GridLink Interconnector

Noise Assessment

GridLink Interconnector Ltd

October 2020

Quality information

Prepared by	Checked by	Verified by	Approved by
Matt Light MIOA Acoustics Consultant	Eddie Robinson MIOA Principal Acoustics Consultant	Eddie Robinson MIOA Principal Acoustics Consultant	Yuyou Liu FIOA Regional Director, Acoustics

Revision History

Revision	Revision date	Details	Authorized	Name	Position
0	30/04/2020	First issue (no construction assessment)	YL	Yuyou Liu	Regional Director, Acoustics
1	15/05/2020	Response to client comments (no construction assessment)	YL	Yuyou Liu	Regional Director, Acoustics
2	16/06/2020	Construction assessment included	YL	Yuyou Liu	Regional Director, Acoustics
3	30/06/2020	Response to client comments	YL	Yuyou Liu	Regional Director, Acoustics
4	30/09/2020	Final	YL	Yuyou Liu	Regional Director, Acoustics

Prepared for:

GridLink Interconnector Ltd

Prepared by:
Matt Light MIOA
Acoustics Consultant
E: matt.light@aecom.com

AECOM Environment and Infrastructure Ltd
Sunley House
4 Bedford Park, Surrey
Croydon CRO 2AP
United Kingdom

T: +44 20 8639 3500
aecom.com
+44 (0) 20 8639 3500

Table of Contents

Figures

Tables

1. Introduction

1.1.1 AECOM has been commissioned by GridLink Interconnector Ltd (the Applicant) to undertake a noise assessment to support an outline planning application and environmental report for the construction and operation of a converter station and associated underground electricity cables at Kingsnorth in Kent (hereafter referred to as the 'Proposed Development').

1.1.2 The Proposed Development forms part of the GridLink Interconnector Project (hereafter referred to as 'GridLink'). GridLink is a 1.4 Gigawatt (GW) electricity interconnector between the UK and France. In the UK, GridLink will comprise 108 kilometres (km) of submarine High Voltage Direct Current (HVDC) cable, less than 100 metres (m) of underground HVDC cable, a converter station and 1.5km of underground High Voltage Alternating Current (HVAC) cable from the converter station to the existing National Grid Kingsnorth substation.

1.1.3 The Proposed Development comprises the converter station building(s), outdoor equipment, internal roads, car parking and associated landscaping, and underground HVDC cable from the converter station to Mean High Water Springs (installed by Horizontal Directional Drilling). The submarine HVDC cable below Mean High Water Springs is subject to a Marine Licence granted by the Marine Management Organisation (MMO), therefore it is not included in the Proposed Development. In addition, the underground HVAC cable that will link the converter station to the National Grid Kingsnorth substation is considered to be permitted development and, therefore, it does not form part of the Proposed Development.

1.1.4 The interconnector will enable the UK and France to share electricity, so that any surpluses in power generation can be exported to each other and unexpected interruptions to the national grids can be mitigated to ensure security of supply. This is particularly important as the amount of renewable energy supply to the networks increases, because it is more variable and unpredictable due to weather conditions. To encourage renewable energy, GridLink provides a way to fully utilise high production from renewable sources of electricity and also a means of compensating for periods of low production. The efficient use of renewable energy and security of supply means that both the UK and France will realise environmental and economic benefits from the interconnector.

1.1.5 The European Commission has awarded GridLink the status of Project of Common Interest (PCI). This recognises the project's key contribution to realising Europe-wide goals related to energy policy and climate change. As a PCI, GridLink has been successful in securing a development funding grant of up to €15.2 million from the Connecting Europe Facility, a European funding initiative developed to direct investment into strategic infrastructure projects.

1.1.6 In accordance with Regulation (EU) No 347/2013 of the European Parliament and of the Council as regards the Union list of projects of common interest (known as the 'TEN-E Regulation'), each country connected by GridLink has nominated a National Competent Authority (NCA) responsible for overseeing the implementation of PCIs. The UK NCA for GridLink is delegated by the Department of Business, Energy and Industrial Strategy (BEIS) to the Marine Management Organisation (MMO). The MMO will be responsible for coordinating the procedures for the development consents and permits required to implement GridLink, including the planning application to Medway Council.

1.1.7 The Site is located immediately north of the Medway Estuary in Kent (grid reference TQ 81711 72312), within the former Kingsnorth coal-fired power station site (now demolished). The landscape comprises industrial developments associated with the former power station, such as the National Grid substation, as well as Kingsnorth industrial estate, London Medway Commercial Park and Damhead Creek gas-fired power station. The wider landscape includes arable land, coastal grassland and intertidal mudflats. The Site lies immediately north of the Medway Estuary and Marshes Special Protection Area (SPA), Ramsar and Site of Special Scientific Interest (SSSI), which is designated for its internationally important bird populations.

1.1.8 The Site covers approximately 6.2ha of brownfield land at the former Kingsnorth Power Station site, within which the new converter station (4.95ha) and access road (1.25ha) will be constructed. A temporary construction laydown area (1.6ha) will also be located next to the converter site during the construction phase.

1.1.9 This noise assessment report considers the following:

- The baseline noise environment currently existing within the surrounding area of the Site based upon a noise survey;
- An assessment of the potential impacts of construction noise during the construction of the Proposed Development on identified noise-sensitive receptors;
- An assessment of the potential impacts of road traffic noise during the construction of the Proposed Development; and
- An assessment of the potential impacts of the Proposed Development during operation of the converter station, in terms of the building plant noise, on identified noise-sensitive receptors.

1.1.10 For noise effects on ecological receptors please refer to the Ecology Report Volume 1 – Ecological Impact Assessment.

2. Legislative and planning policy context

2.1 National policy

National Planning Policy Framework (2019)

2.1.1 The National Planning Policy Framework (NPPF) (Ref 1) sets out the Government's planning policies for England and how these are expected to be applied. One of the aims of the NPPF in terms of noise and vibration is that:

2.1.2 *"Planning policies and decisions should contribute to and enhance the natural and local environment by: e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans"* (Paragraph 170).

2.1.3 Section 15 of the NPPF is concerned with conserving and enhancing the natural environment, including the matters that should be considered for planning decisions in relation to ground conditions and pollution. This includes ensuring *"that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*

2.1.4 *Mitigate and reduce to a minimum other adverse impacts resulting from noise from new development and avoid noise giving rise to significant adverse impacts on health and quality of life; and*

2.1.5 *Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason."* (Paragraph 180).

2.1.6 These policies must be applied in the context of Government policy on sustainable development.

Noise Policy Statement for England (2010)

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

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

2.1.9 This long-term vision is supported by three aims:

- *"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 improvements of health and quality of life."*

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

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

2.1.11 With reference to the SOAEL, the NPSE states:

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

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

Planning Practice Guidance (2019)

2.1.13 The Planning Practice Guidance concerned with noise (PPGN) (Ref 3) advises *that "Noise needs to be considered when development may create additional noise, or would be sensitive to the prevailing acoustic environment (including any anticipated changes to that environment from activities that are permitted but not yet commenced)"* and provides guidelines that are designed to assist with the implementation of the NPPF.

2.1.14 The PPGN states that local planning authorities should take account of the acoustic environment and in doing so consider:

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

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

2.1.16 Further details on the hierarchy of noise effects are presented in Table 2.1, which has been reproduced from PPGN.

Table 2.1: Planning Practice Guidance

Response	*Examples of Outcomes*	*Increasing Effect Level*	*Action*

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

2.2 Local planning policy

Medway Local Plan (2003)

2.2.1 The Medway Local Plan sets out the policies and proposals for the control and regulation of development within Medway. In relation to noise due to industrial noise the following is stated:

"Where new noisy industrial or similar development is proposed, it is necessary to ensure that it does not cause an unacceptable degree of disturbance to the amenity of existing uses in the locality. Proposals for such development near existing residential, or other noise sensitive receptors, will need to be assessed in accordance with the advice in PPG24. Where appropriate, however, the technical demonstration of impact will need to be couched in terms set out in British Standard BS4142: 1997."

2.2.2 A Future Medway Local Plan, covering 2019 to 2037 is currently under development, however there are no newer published policies in relation to noise, therefore the noise assessment has been undertaken in-line with the Medway Local Plan (2003).

2.2.3 Medway Local Plan policy states the use of PPG24 (Ref 5) and BS 4142:1997 (Ref 5), which have been withdrawn and superseded by PPGN and BS 4142:2014+A1:2019 (Ref 5) respectively. These more recent documents are considered appropriate to refer to in order to meet the aims of Medway Council.

2.3 Other relevant policies and guidance

2.3.1 The following documents contain guidance and assessment methodologies that have been used within this Noise Assessment. Further details of methodologies applied in this Noise Assessment can be found within these documents.

British Standard 4142:2014+A1:2019

2.3.2 BS 4142 *'Method for Rating Industrial Sound Affecting Mixed Residential and Industrial Areas'* (Ref 7) can be used for assessing the effect of noise of an industrial nature. The method compares the difference between the 'rating level' of the new sound source, with the 'background level' at the receptor position.

British Standard 5228:2009+A1:2014

2.3.3 BS 5228-1 *'Code of practice for noise and vibration control on construction and open sites. Noise'* (Ref 8) provides a 'best practice' guide for noise control and includes a calculation method for noise from construction activities.

Calculation of Road Traffic Noise (1988)

2.3.4 The Department of Transport/Welsh Office Memorandum *'Calculation of Road Traffic Noise'* (CRTN) (Ref 9) describes procedures for traffic noise calculation and is suitable for environmental assessments of schemes where road traffic noise may have an effect.

Design Manual for Roads and Bridges (2019)

2.3.5 The Highways Agency's *'Design Manual for Road and Bridges Sustainability & Environment Appraisal LA 111 Noise and Vibration'* (DMRB) (Ref 10) provides guidance on the appropriate level of assessment to be used when assessing the noise and vibration effects arising from road projects, including construction of new roads, road improvements and maintenance.

3. Assessment methodology

3.1 Baseline noise monitoring methodology

3.1.1 A baseline noise survey was undertaken to establish the existing noise environment around the Site, at locations representative of existing receptors sensitive to noise. Unattended long-term noise measurements were carried out at three locations between the 16th March and 23rd March 2020.

3.1.2 At the time of the noise survey, short term changes in lifestyle in the UK caused by Covid-19 changed the noise climate in the country, particularly in transport noise sources, with a reduction in road traffic, trains and aircraft. It is considered that the monitoring locations were sufficiently removed from transport noise sources and are likely to be unaffected by reduced traffic noise. However, if noise data was affected, then the measured $L_{A90,T}$ background and $L_{Aeq,T}$ ambient noise levels would be lower than typical and assessment criteria based on measured $L_{A90,T}$ background (operational assessment) and $L_{Aeq,T}$ ambient (construction assessment) noise levels would be more onerous. As such, the assessment may be taken to represent a conservative worst-case; therefore, it is considered to be robust.

3.1.3 Additional details on the noise monitoring methodology are presented in Appendix B.

3.2 Methodology for Determining Sensitive Receptors

3.2.1 The impacts of noise generated by the Proposed Development during construction and operation are considered at the nearest sensitive receptors (i.e. buildings whose occupants may be disturbed by adverse noise levels). The sensitive receptors considered in this report are the nearest receptors to the site i.e. the receptors that are likely to experience the highest levels of noise.

3.2.2 Receptor locations have been subjectively selected at which noise impacts have been assessed and are deemed to be representative of the nearest noise sensitive receptors to the Proposed Development. It is considered that, if noise levels are suitably controlled at the key receptors identified, then noise levels will correspondingly be suitably controlled at all sensitive receptors within the surrounding area.

Sensitive receptors

3.2.3 Sensitive receptors that have been considered in the assessment are presented in Figure 3-1 and described in Table 3.3.

Table 3.1: Sensitive receptors

Receptor	*Receptor Address*	*Receptor Type*	*Approximate distance to Receptor*
R1	Burnt House Farm Kennels	Residential	1,300 m west
R2	Eschol Road/Jacobs Lane	Residential	1,550 m northwest
R3	Beluncle Villas	Residential	1,800 m northwest
R4	Tunbridge Hill	Residential	1,650 m north
R5	Polly Adams Cottage	Residential	1,550 m north

3.2.4 The nearest residential area is Hoo St Werbergh, situated approximately 3 km west from the Proposed Development.

Noise monitoring locations

3.2.5 The noise monitoring locations are shown in Figure 3-1 and described in Table 3.2. LT1 was chosen to represent noise environment at nearest residential receptor. Two additional noise monitoring locations, LT2 and LT3, were chosen in order to inform ecology assessments.

Table 3.2: Noise Monitoring Locations

Location	*Coordinates*	*Details*
LT1	51°25'17.1"N 0°35'31.4"E	Burnt House Farm Kennels
LT2	51°25'04.0"N 0°36'39.0"E	Site Boundary along River Medway
LT3	51°25'20.1"N 0°36'41.1"E	Site Boundary along Damhead Creek

3.2.6 Noise measurements were undertaken using 01dB DUO Type 1 sound level meters. Calibration of the meters was carried out using a Rion NC-74 Type 1 field calibrator. The calibration levels were checked before and after measurements. The sound level meters log environmental noise measurement parameters including average ambient ($L_{Aeq,T}$), maximum (L_{Amax}) and background ($L_{A90,T}$) noise levels.

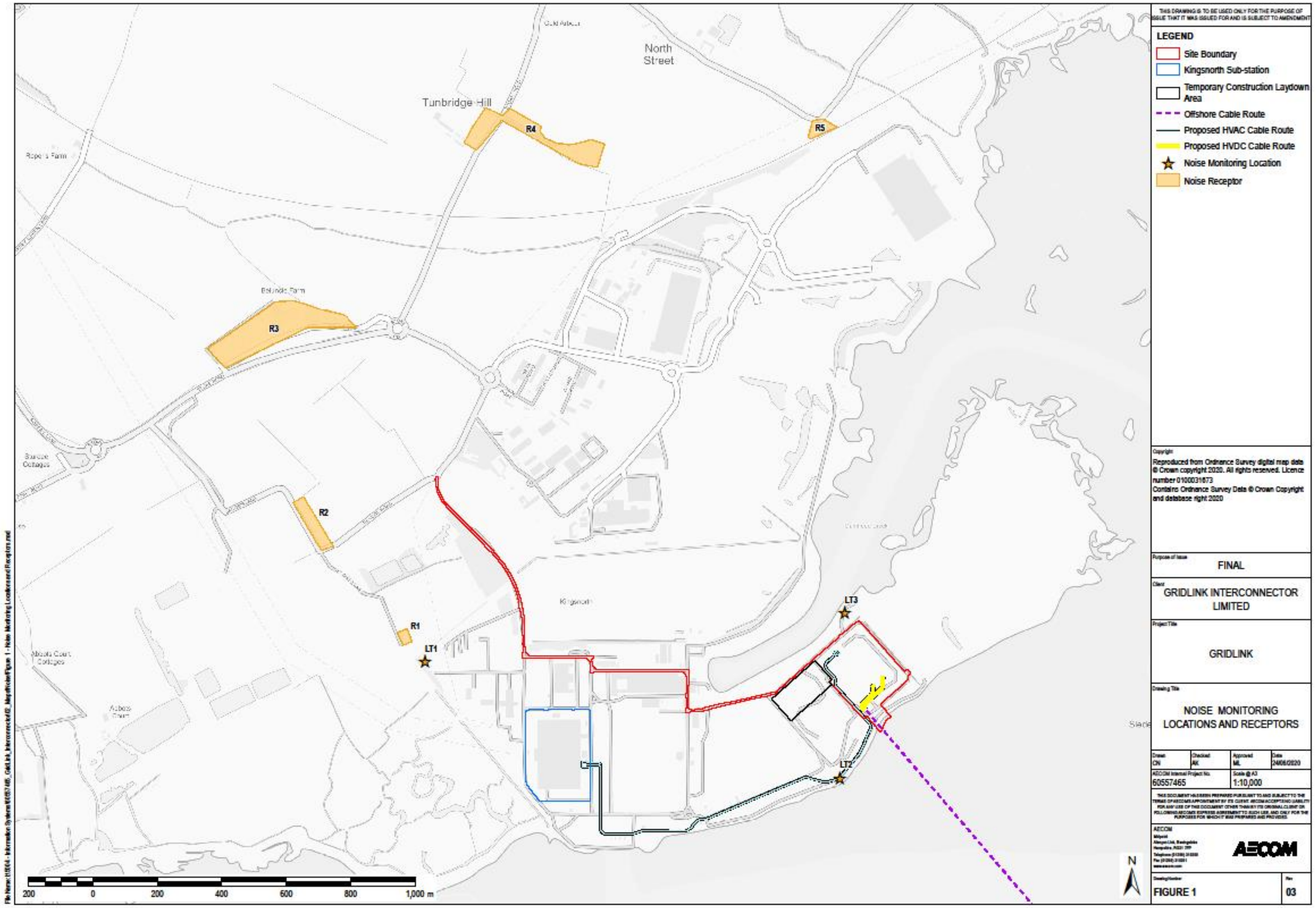


Figure 3-1: Noise Monitoring and Sensitive Receptor Locations

3.3 Construction noise assessment

Construction noise

3.3.1 Noise predictions of construction activities related to the Proposed Development have been undertaken using computer noise modelling software CadnaA® (v2019). CadnaA applies methodologies within BS 5228-1 to predict construction noise. The calculation method provided in BS 5228-1 is based on the number and type of equipment operating, their associated Sound Power Level (Lw), and the distance to sensitive receptors. Details of the noise modelling methodology and assumptions have been presented in Appendix C.

3.3.2 To assess potential noise impacts that may occur due to activities during the construction programme (scheduled from 2022 to 2025), the assessment has considered scenarios of typical high intensity construction activity that is considered representative of worst-case noise emissions. The assessment considers potential noise effects from the construction of the following phases of the Proposed Development:

- Phase A: Site remediation;
- Phase B: Site preparation;
- Phase C: Civil works and foundations;
- Phase D: Structural and steel erection works; and
- Phase E: Mechanical and electrical installation.

3.3.3 The construction noise assessment makes reference to absolute noise levels in terms of LOAEL and SOAEL. Annex E of BS 5228-1 (Ref 8) provides example criteria for the assessment of construction noise impacts which have been used to derive the assessment criteria presented in Table 3.3. For the purposes of this assessment the NOAEL at each receptor is considered to be equal to the measured baseline ambient noise level.

Table 3.3: Thresholds for potential effect of construction noise at residential buildings

Time Period	*Threshold Value ($L_{Aeq,T}$ dB)*	
	LOAEL	*SOAEL*
Weekday 07:00 – 19:00 Saturday 07:00 – 13:00	65	75
Weekday 19:00 – 23:00 Saturday 13:00 – 23:00 Sunday 07:00 – 23:00	55	65
Night 23:00 – 07:00	45	55

Construction road traffic noise

3.3.4 Construction road traffic noise levels have been calculated with reference to methodology within the CRTN. The Basic Noise Level (BNL) at 10 m from the road edge has been calculated for each road in terms of the 18-hour AAWT (Average Annual Weekday Traffic) flow from 06:00 to 24:00. This BNL value is used to indicate the magnitude of the road traffic noise level at receptors and to assess the change in noise from changes in traffic flow due to construction road traffic due to the Proposed Development.

3.3.5 The magnitude of a noise impact due to changes in road traffic noise levels has been assessed with reference to criteria outlined in DMRB for the following scenarios:

- Scenario 1: Future 2023 baseline without development; and
- Scenario 2: Future 2023 baseline + Proposed Development construction traffic.

3.3.6 The Proposed Development construction traffic data has been selected from January 2023, which is the month anticipated to have the highest volume of construction traffic. The change between Scenario 1 and Scenario 2 provides the worst-case change in road traffic noise due to the Proposed Development construction traffic.

3.3.7 The criteria used for the assessment of changes in road traffic noise levels have been taken from Table 3.17 of DMRB LA 111 Noise and Vibration (Ref 10) and are provided in Table 3.4.

Table 3.4: DMRB Construction Road Traffic Assessment Criteria

Magnitude of change	*Increase in BNL of closest public road used for construction traffic (dB $L_{A10,18h}$)*
Major	Greater than or equal to 5.0
Moderate	Greater than or equal to 3.0 and less than 5.0
Minor	Greater than or equal to 1.0 and less than 3.0
Negligible	Less than 1.0

3.3.8 DMRB LA 111 also states that the following in terms of assessing significance of the magnitude of change for construction road traffic noise:

"Construction traffic noise shall constitute a significant effect where it is determined that a major magnitude of impact will occur for duration exceeding:

1) 10 or more days or nights in any 15 consecutive days or nights;

2) A total number of days exceeding 40 in any 6 consecutive months."

3.4 Operational noise assessment

3.4.1 The operational noise from the Proposed Development has been assessed following BS 4142:2014+A1:2019 (Ref 7) 'Methods for rating and assessing industrial and commercial sound' methods, whereby the rating level of noise emissions from activities are compared against the background sound level of the pre-development noise climate.

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

- Background sound level – $L_{A90,T}$ – defined in the Standard as the 'A' weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels;
- Specific sound level – $L_{Aeq,Tr}$ – the equivalent continuous 'A' weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, Tr; and
- Rating level – $L_{Ar,Tr}$ – the specific sound level plus any adjustment made for the characteristic features of the noise.

3.4.3 BS 4142 recommends that the specified interval over which the specific sound level is determined as 1-hour during the day from 07:00 to 23:00 hours and a shorter period of 15-minutes at night from 23:00 to 07:00 hours.

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

- Tonality – a penalty of 2 dB is applied for a tone which is just perceptible at the receptor, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible;

- Impulsivity – a penalty of 3 dB is applied for impulsivity which is just perceptible at the receptor, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible. An impulse is defined as the sudden onset of a sound;
- Intermittency – a penalty of 3 dB can be applied if the intermittency of the specific sound is readily identifiable against the residual acoustic environment at the receptor i.e. it has identifiable on/off conditions;

3.4.5 Other sound characteristics – a penalty of 3 dB can be applied where the specific sound features characteristics that are neither tonal nor impulsive but are readily distinctive against the residual acoustic environment.

3.4.6 Once any adjustments have been made, the background sound level and the rating levels are compared. The standard states that:

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

3.4.7 The criteria for determining the significance of changes in noise levels from building services plant, based on guidance within BS 4142, and the potential impact on noise sensitive receptors are presented in Table 3.5.

Table 3.5: BS4142 Noise Rating

Rating Level Minus Background Level (dB)	*NPSE/PPG Effect Level*
-10 approximately	NOAEL
+0 approximately	LOAEL
+10 approximately	SOAEL

3.4.8 For the purposes of predicting the rating level due to the operational converter station at sensitive receptors, noise predictions have been undertaken using the computer modelling software CadnaA® (v2019). This has been carried out using plant noise source data provided by GridLink. Details of the noise modelling methodology and assumptions have been presented in Appendix C.

4. Baseline conditions

4.1 Noise survey results

4.1.1 A summary of the baseline noise measurements obtained at LT1 is presented in Table 4.1. The results of noise measurements are presented in more detail in Appendix B. This data is considered representative of baseline noise conditions at the time of preparing this assessment.

Table 4.1: Noise Monitoring Results

Location			*$L_{Aeq,T}$ (dB)*	*$L_{A90,T}$ (dB)*
LT1	Weekday	Daytime (07:00 – 19:00)	47	42
		Evening (19:00 – 23:00)	44	35
		Night-time (23:00 – 07:00)	48	39
	Weekend	Daytime (07:00 – 19:00)	56	48
		Evening (19:00 – 23:00)	54	45
		Night-time (23:00 – 07:00)	46	41

4.1.2 The noise environment at unattended monitoring location LT1 was dominated by birds. Other noise sources included distant operational plant noise and dogs barking.

5. Construction noise assessment

5.1 Construction noise

5.1.1 The construction noise assessment follows the BS 5228-1 methodology. The results from the noise model are presented in Appendix C and contour plots are provided in Appendix D.

5.1.2 Working hours will be 07:00-19:00 Monday to Friday and 07:00-13:00 Saturdays, with night-working occurring for specialist activities only (including delivery of special loads and horizontal directions drilling cable pull-ins), therefore with reference to Table 3.3, the assessment has considered 'Weekday 07:00 – 19:00' and 'Saturday 07:00 – 13:00' only.

5.1.3 The construction prediction results are presented in Table 5.1.

Table 5.1: Predicted $L_{Aeq,T}$ dB noise levels due to construction activities

Receptor	*Phase A: Site remediation and enabling works*	*Phase B: Site preparation*	*Phase C: Civil works and foundations*	*Phase D: Structural and steel erection works*	*Phase E: Mechanical and electrical installation*
R1	32	32	40	36	39
R2	30	30	37	34	37
R3	29	29	36	33	36
R4	30	30	37	34	37
R5	30	30	38	35	37

5.1.4 A contour plot of predicted construction noise levels for the construction phase with the greatest potential impacts (civil works and foundations with hammer impact piling) is provided in Figure 5-1.

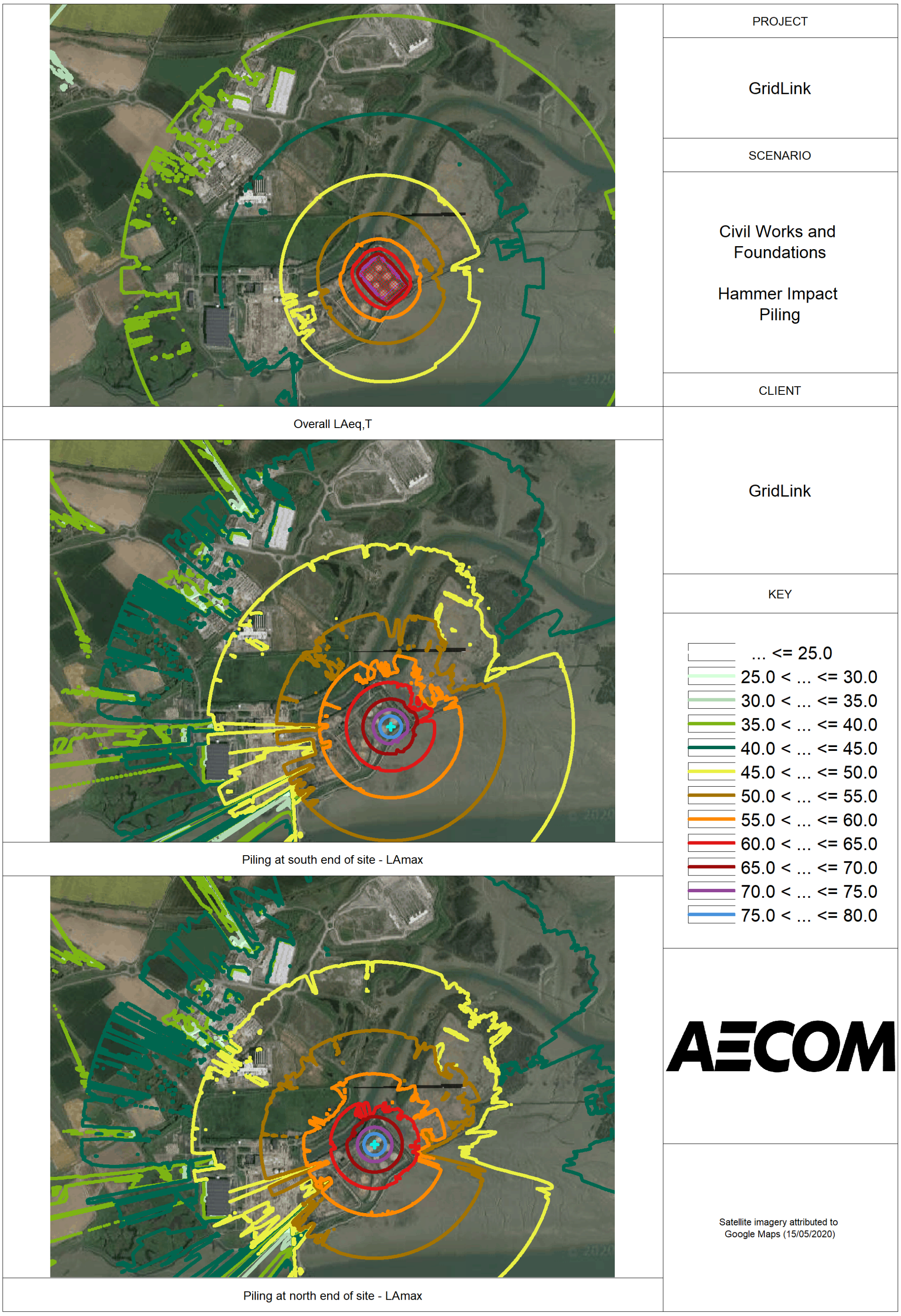


Figure 5-1. Contour plot of worst case predicted construction noise levels (civil works and foundations, with hammer impact piling)

5.1.5 For the purposes of this assessment, ambient noise levels measured at LT1 have been considered representative of all residential receptors R1-R5.

5.1.6 The construction noise, during all phases, is predicted to be below the measured ambient weekday daytime noise level at LT1 (47 dB $L_{Aeq,12h}$) and therefore construction noise is likely to be below NOAEL at the nearest residential receptors R1-R5.

5.1.7 Construction noise is unlikely to be perceptible at receptors within the nearest residential area of Hoo St Werbergh, approximately 3 km away, so it is considered there will be below the NOAEL at these receptors.

5.2 Construction road traffic noise

5.2.1 Comparison of calculated future 2023 baseline BNLs (Scenario 1) with the future construction BNLs (Scenario 2) calculated from road traffic flows are presented in Table 5.2. It should be noted that speeds weren't available for A228 roads and therefore the speed limit (70 mph) has been used for the calculation of the BNL for these roads.

5.2.2 The change in road traffic noise due to the Proposed Development construction traffic is predicted to be at most 0.4 dB above baseline noise levels, which is a negligible change in noise and not significant.

Table 5.2: Construction Road Traffic Assessment

Road	*2023 future baseline BNL (dB $L_{A10,18h}$ 06:00 – 24:00)*	*2023 + construction traffic BNL (dB $L_{A10,18h}$ 06:00 – 24:00)*	*Difference (dB)*	*Magnitude of Change*
Stoke Road	65.8	66.2	+0.4	Negligible
A228 Peninsular Way east of Bells Lane	73.5*	73.6*	+0.1	Negligible
A228 Peninsular Way west of Bells Lane	74.5*	74.6*	+0.1	Negligible

**worst-case assumption of 70mph*

6. Operational noise assessment

6.1.1 The operational noise assessment follows the BS 4142 methodology using indicative noise source data provided by GridLink. The results from the noise model are presented in Appendix C and contour plots are provided in Appendix E.

6.1.2 For the purposes of the assessment, background noise levels measured at LT1 have been considered representative of all residential receptors R1- R5.

6.1.3 A contour plot of predicted operational noise levels is provided in Figure 6-1.

6.1.4 Table 6.1 summarises the BS 4142 assessment at the nearest noise sensitive receptors R1 – R5. The noise emissions from the converter station have been assumed to be operating at the same noise level throughout a 24-hour period. Therefore, a BS 4142 assessment has been presented for the weekday evening (19:00 – 23:00) as the measured background noise levels during the weekday evening are lower than during the daytime, night-time periods and weekend periods. This provides the worst-case assessment.

Figure 6-1. Contour plot of predicted operational noise levels

Table 6.1: BS 4142 assessment of the Proposed Development

Results		*Commentary*
Background sound level (night-time)	35 dB $L_{A90,1hour}$	Based on the mode of $L_{A90,1hour}$ values during weekday evening (19:00 – 23:00) measured at LT1 during the baseline noise survey between the 16th March and 23rd March 2020.
Reference time interval	1 hour	Assessment made during weekday evening (19:00 – 23:00), so the reference time period is 1 hour
Specific sound level	26 – 30 dB $L_{Aeq,1hour}$	Predicted indicative sound level at receptors R1-R5 due to the Proposed Development. Assumption made that plant will be operating 100% for 24 hours, all days of the week.
Acoustic feature correction	+4 dB (tonality)	A conservative feature correction has been added for tonality being “clearly perceptible” at receptors to account for any potential tonal sound in relation to transformer units. Tonality may not be observable in close proximity to the site, however low frequencies are perceptible over long distances and tonality may be observable at receptors.
Rating Level (dB L_{Ar})	30 – 34 dB $L_{Ar,1hour}$	Specific sound level + acoustic feature correction
Excess of rating over background sound	-5 to -1 dB	Rating level – background sound level

6.1.5 The assessment indicates that operational noise of the Proposed Development will be below the LOAEL at the nearest noise sensitive receptors, R1 – R5, and therefore it is unlikely to cause a significant adverse impact on nearby sensitive receptors. Noise is unlikely to be perceptible at receptors within the nearest residential area of Hoo St Werbergh, approximately 3 km away, so it is considered there will be below the NOAEL at these receptors.

6.1.6 Based on the assumptions, the noise level is predicted to be highest at the north boundary, at 68 dB $L_{Aeq,1hour}$. It is likely that a site boundary noise level of 68 dB $L_{Aeq,1hour}$ or below will lead to noise levels being below the LOAEL at all sensitive receptors.

6.1.7 To apply the principle of reducing noise to as low as reasonably practicable, if possible the converter station will be designed so that noise levels at receptors are below the NOAEL. In order for noise levels to be at or below the NOAEL at sensitive receptors, the design target for the converter station will be that noise emissions do not exceed approximately 58 dB $L_{Aeq,1hour}$ at the site boundary.

7. Mitigation measures

7.1 Construction noise mitigation

7.1.1 Noise levels at residential receptors due to construction noise are predicted to be below the NOAEL and, therefore, no specific additional mitigation measures are required.

7.1.2 However, the increase in noise levels experienced by birds (see Ecology Report Volume 1 – Ecological Impact Assessment) using the inter-tidal mudflats of the Medway Estuary and Marshes SSSI/SPA/Ramsar site to the south of the Site needs to be minimised to avoid unnecessary disturbance. Therefore, the mitigation measures given below will be implemented:

- Construction vehicles and other mechanical equipment shall be designed to minimise noise emissions, including selection of 'sound reduced' or inherently low noise models and the fitting of exhaust silencers, air intake silencers and mufflers;
- Construction vehicles and equipment shall be maintained in good working condition to minimise extraneous noise from mechanical vibration, braking, gear changes, hydraulic lifting, engine, exhaust system and/or other sources;
- High noise-generating plant and equipment, including generators, shall be positioned as far as practicable away from the site boundaries near to the Medway Estuary and Marshes SSSI, SPA and Ramsar site;
- Construction vehicles and machinery shall be switched off when not in use; engine idling shall not be permitted;
- Temporary sound absorbing barriers, covers and acoustic enclosures around static or stationary construction equipment shall be used, where appropriate;
- Acoustic boarding shall be positioned between the main locations of civil works (including piling operations) and the closest boundaries of Medway Estuary and Marshes SSSI, SPA and Ramsar site;
- Noise compliance monitoring of construction works shall be carried out; a portable noise meter shall be available at worksites to monitor noise whenever required.

7.1.3 Piling for foundations is the most likely source of noise disturbance. Therefore, the piling methodology and equipment will be selected to minimise noise generation, including consideration of low noise techniques, e.g. vibro-piling instead of percussive piling, number of piling rigs in operation and timing and duration of piling operations, where technically feasible.

7.1.4 These mitigation measures will also provide further assurance that the construction noise levels at residential receptors are below the NOAEL.

7.2 Operational noise mitigation

7.2.1 Operational noise at nearby sensitive receptors due to the Proposed Development has been predicted to be below the LOAEL.

7.2.2 However, the detailed design of the Proposed Development will seek to achieve noise levels below the NOAEL if reasonably practicable through selection and layout of equipment, acoustic enclosures and building materials. In particular, the interface transformers, which represent the equipment with the highest noise levels, will be designed to minimise noise levels as low as reasonably practicable.

7.2.3 All mitigation measures will take into account noise emissions at low frequencies and tonal characteristics.

8. Conclusions

8.1.1 The nearest sensitive receptor is an individual residential property with farm/kennels business at 1.3 km west of the Proposed Development. Four further nearby residential receptors have been identified to the northwest and north, between 1.5 and 1.8 km away from the Proposed Development, with the nearest residential area of Hoo St Werbergh at approximately 3 km west.

8.1.2 Based on assessment, construction noise has been predicted to be below the NOAEL, therefore not significant, at the nearest sensitive receptors.

8.1.3 Changes in road traffic flows due to the construction traffic generated by the Proposed Development have been predicted to lead to negligible, therefore not significant, changes in noise emissions from traffic (up to +0.4 dB on Stoke Road).

8.1.4 Operational plant noise has been predicted to be below the LOAEL, therefore not significant, at the nearest sensitive receptors. The Proposed Development will further seek to reduce noise levels to below the NOAEL during detailed design through the selection and layout of equipment, acoustic enclosures and building materials, if practicable. .

8.1.5 The information provided in this assessment indicates that the operation of the Proposed Development complies with the noise requirements set out in Medway Council's policy and will not generate any significant noise impacts at nearby sensitive receptors.

9. References

Ref 1. Ministry of Housing, Communities and Local Government (MCHLG) (2019) National Planning Policy Framework (NPPF). Conserving and enhancing the historic environment. Ministry of Housing, Communities & Local Government. Available online at: www.gov.uk/government/publications/national-planning-policy-framework--2

Ref 2. Department for Environmental Food and Rural Affairs (2010); Noise Policy Statement for England.

Ref 3. Ministry of Housing, Communities & Local Government, (last updated July 2019) Planning Practice Guidance Noise.

Ref 4. Medway Council (2003); Medway Local Plan

Ref 5. Department of the Environment/Welsh Office, (1994); Planning Policy Guidance 24 – Planning and Noise, The Stationary Office, London.

Ref 6. British Standards Institute (1991); BS 4142:1997 – Method for rating industrial noise affecting mixed residential and industrial areas, BSi, London

Ref 7. British Standards Institute (2014); BS 4142:2014+A1-2019 – Methods for rating and assessing industrial and commercial sound, BSi, London

Ref 8. British Standards Institute (2014); BS5228-1:2009+A1:2014 – Code of practice for noise and vibration control on construction and open sites. Part 1: Noise, BSi, London

Ref 9. Department of Transport/Welsh Office (1988); Calculation of Road Traffic Noise

Ref 10. Highways Agency (2019); Design Manual for Road and Bridges Sustainability & Environmental Appraisal LA 111 Noise and Vibration

Appendix A Acoustic Terminology

Term	Definition
Noise	Unwanted sound.
Decibel/Sound Pressure Level (dB)	The range of audible sound pressures is approximately 2 x 10^{-5} Pa to 200 Pa. Using decibel notation presents this range in a more manageable form, 0dB to 140dB. Mathematically, sound pressure level = 20 log {p(t)/p_0} Where P_0 = 2 x 10^{-5} Pa.
"A" Weighting (dB(A))	The human ear does not respond uniformly to different frequencies. "A" weighting is commonly used to simulate the frequency response of the ear.
Equivalent Continuous A-weighted Sound Pressure Level $L_{Aeq,T}$	Value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, T = $t_2 - t_1$, has the same mean-squared sound pressure as a sound that varies with time, and is given by the following equation: $$LAeq,T = 10 \times log\left\{\left(\frac{1}{T}\right)\left(\frac{P_A^2}{P_o^2}\right)dt\right\}$$ Where p_0 is the reference sound pressure (20µPA); and P_A(t) is the instantaneous A-weighted sound pressure level at time t
Ambient Sound	Totally encompassing sound in a given situation at a given time usually composed of sound from many sources near and far.
Ambient Sound Level $L_a = L_{Aeq,T}$	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.
Background Sound Level $L_{A90,T}$	A-weighted sound pressure level that is exceeded by the residual sound for 90% of a given time interval, T.
Maximum Noise Level, $L_{Amax, F}$	The A-weighted, fast-response, maximum, sound level

Appendix B Baseline noise monitoring

Noise monitoring was carried out to establish baseline noise levels in the vicinity of the Site. Baseline noise levels were required in order to inform the noise and ecology assessments.

Measurement Equipment

Details of the measurement equipment are given in Table B.1. The measurement microphones were installed on a tripod or pole and positioned sufficiently far from vertical surfaces to be representative of free-field conditions. Each long-term noise monitoring instrument was housed in a weatherproof box. The calibration level of the sound level meters was checked before and after each measurement.

Table B.1: Equipment Details

Measurement Location	*Description*	*Manufacturer*	*Type*	*Serial Number*
LT1	Sound Level Meter	01dB	DUO	12076
	Calibrator	Rion	NC-74	50541127
LT2	Sound Level Meter	01dB	DUO	12081
	Calibrator	Rion	NC-74	50541127
LT3	Sound Level Meter	01dB	DUO	12029
	Calibrator	Rion	NC-74	50541127

Meteorological Conditions

Due to high wind speeds during the measurement period, measurements obtained during wind speeds of greater than 5m/s have been omitted from the report. A summary of the meteorological conditions during the measurement period can be found in Table B.2. The weather data used is publicly available weather data from a weather station near Kingsnorth Power Station.

Table B.2: Meteorological Conditions

Date	*Temperature [°C]*	*Wind Speed [mph]*	*Precipitation [mm]*
Mon 16/03/2020	7.3	1.4	0.0
Tue 17/03/2020	9.1	5	0.0
Wed 18/03/2020	11.1	4.3	0.0
Thu 19/03/2020	7.3	3.3	1.3
Fri 20/03/2020	7.0	5.5	0.0
Sat 21/03/2020	6.9	4.4	0.0
Sun 22/03/2020	6.3	3.5	0.0
Mon 23/03/2020	6.3	3.0	0.0

Noise Monitoring Results

Higher wind speeds may have resulted in higher noise levels on 17th, 18th 20th and 21st March, therefore summary noise levels been derived from 16th, 19th, 22nd, 23rd and 24th March.

The noise environment at unattended monitoring location LT1 was dominated by birds. Other noise sources included distant operational plant noise and dogs barking. Tables B.3 to B.5 present the results of the unattended noise monitoring at LT1.

Table B.3: LT1 Daytime (07:00 – 19:00) Monitoring Results

Date	$L_{Aeq,12h}$ dB	$L_{A90,1h}$ dB
Mon 16/03/2020	47	37
Tue 17/03/2020	48	43
Wed 18/03/2020	49	44
Thu 19/03/2020	48	44
Fri 20/03/2020	57	48
Sat 21/03/2020	58	48
Sun 22/03/2020	54	48
Mon 23/03/2020	46	41
Tue 24/03/2020	43	36
Summary Weekday	**47**	**42**
Summary Weekend	**54**	**48**

Table B.4: LT1 Evening (19:00 – 23:00) Monitoring Results

Date	$L_{Aeq,4h}$ dB	$L_{A90,1h}$ dB
Mon 16/03/2020	38	35
Tue 17/03/2020	39	46
Wed 18/03/2020	42	35
Thu 19/03/2020	49	44
Fri 20/03/2020	56	48
Sat 21/03/2020	54	47
Sun 22/03/2020	47	42
Mon 23/03/2020	41	37
Summary Weekday	**44**	**35**
Summary Weekend	**47**	**42**

Table B.5: LT1 Night-time (23:00 – 07:00) Monitoring Results

Date	$L_{Aeq,8h}$ dB	$L_{A90,15min}$ dB
Mon 16/03/2020	49	33
Tue 17/03/2020	45	44
Wed 18/03/2020	47	46
Thu 19/03/2020	49	39
Fri 20/03/2020	55	47
Sat 21/03/2020	48	42
Sun 22/03/2020	44	39
Mon 23/03/2020	42	35
Summary Weekday	**48**	**39**
Summary Weekend	**46**	**41**

Measurements at LT2 were only obtained for 2 days due to a battery connection failure. However, enough data was obtained to provide representative values for the L_{Aeq}, L_{A90} and L_{Amax}.

The noise environment at unattended monitoring location LT2 was dominated by birds. Other noise sources included air traffic and industrial site noise. Table B.6 to Table B.8 present the results of the unattended noise monitoring at LT2.

Table B.6: LT2 Daytime (07:00 – 19:00) Monitoring Results

Date	$L_{Aeq,12h}$ dB	$L_{A90,1h}$ dB	$L_{Amax,1h}$ dB
Mon 16/03/2020	44	39	64
Tue 17/03/2020	49	44	71
Summary	**44**	**39**	**64**

Table B.7: LT2 Evening (19:00 – 23:00) Monitoring Results

Date	$L_{Aeq,4h}$ dB	$L_{A90,1h}$ dB	$L_{Amax,1h}$ dB
Mon 16/03/2020	41	39	56
Tue 17/03/2020	39	45	58
Summary	**41**	**39**	**56**

Table B.8: LT2 Night-time (23:00 – 07:00) Monitoring Results

Date	$L_{Aeq,8h}$ dB	$L_{A90,15min}$ dB	$L_{Amax,15min}$ dB
Mon 16/03/2020	42	37	64
Tue 17/03/2020	43	45	62
Summary	**42**	**37**	**64**

The noise environment at unattended monitoring location LT3 was dominated by bird noise. Other noise sources included air traffic due to light aircraft, noise from the power station and noise from other nearby industrial sites. Table B.9 to Table B.11 present the results of the unattended noise monitoring at LT3.

Table B.9: LT3 Daytime (07:00 – 19:00) Monitoring Results

Date	$L_{Aeq,12h}$ dB	$L_{A90,1h}$ dB	$L_{Amax,15min}$ dB
Mon 16/03/2020	42	39	65
Tue 17/03/2020	63	56	77
Wed 18/03/2020	65	57	81
Thu 19/03/2020	56	43	72
Fri 20/03/2020	64	53	79
Sat 21/03/2020	70	55	84
Sun 22/03/2020	66	55	80
Mon 23/03/2020	59	47	74
Tue 24/03/2020	53	44	68
Summary	**55**	**47**	**73**

Table B.10: LT3 Evening (19:00 – 23:00) Monitoring Results

Date	$L_{Aeq,4h}$ dB	$L_{A90,1h}$ dB	$L_{Amax,1h}$ dB
Mon 16/03/2020	43	40	59
Tue 17/03/2020	51	55	71
Wed 18/03/2020	53	43	68
Thu 19/03/2020	57	44	73
Fri 20/03/2020	66	54	82
Sat 21/03/2020	67	54	81
Sun 22/03/2020	57	43	73
Mon 23/03/2020	38	35	58
Summary	**48**	**41**	**64**

Table B.11: LT3 Night-time (23:00 – 07:00) Monitoring Results

Date	$L_{Aeq,8h}$ dB	$L_{A90,15min}$ dB	$L_{Amax,15min}$ dB
Mon 16/03/2020	49	43	66
Tue 17/03/2020	57	56	76
Wed 18/03/2020	48	35	67
Thu 19/03/2020	58	46	73
Fri 20/03/2020	67	52	82
Sat 21/03/2020	61	47	77
Sun 22/03/2020	50	35	71
Mon 23/03/2020	49	37	64
Summary	**51**	**40**	**68**

Figure B.1, Figure B.2 and Figure B.3 show the change in L_{Aeq}. L_{90}, and L_{Amax} over the monitoring period.

Figure B.1: LT1 Monitoring Results

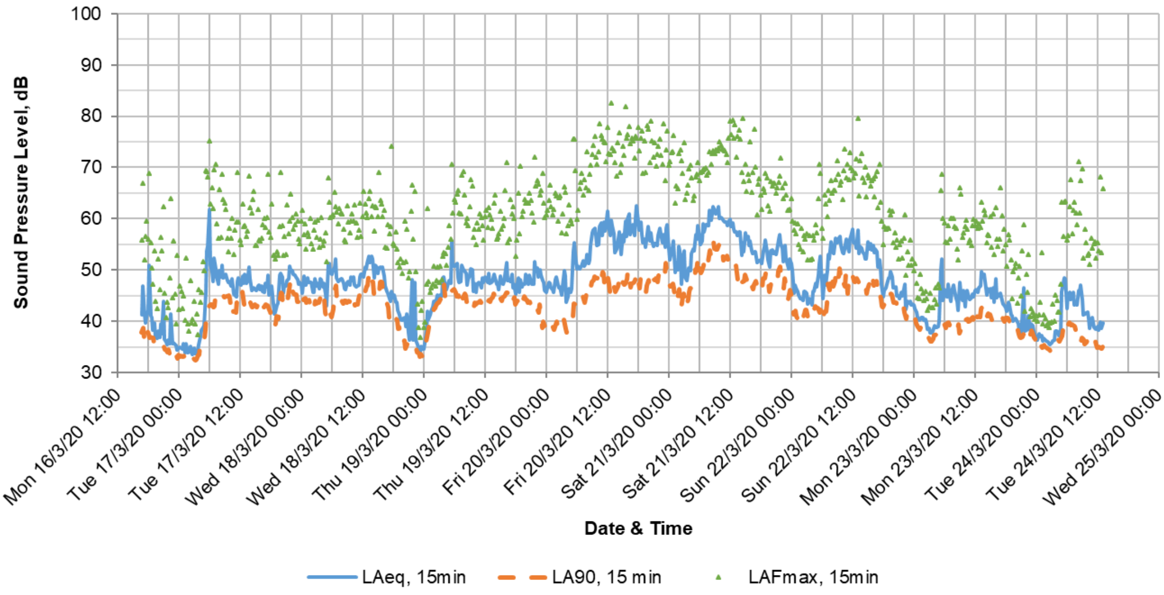


Figure B.2: LT2 Monitoring Results

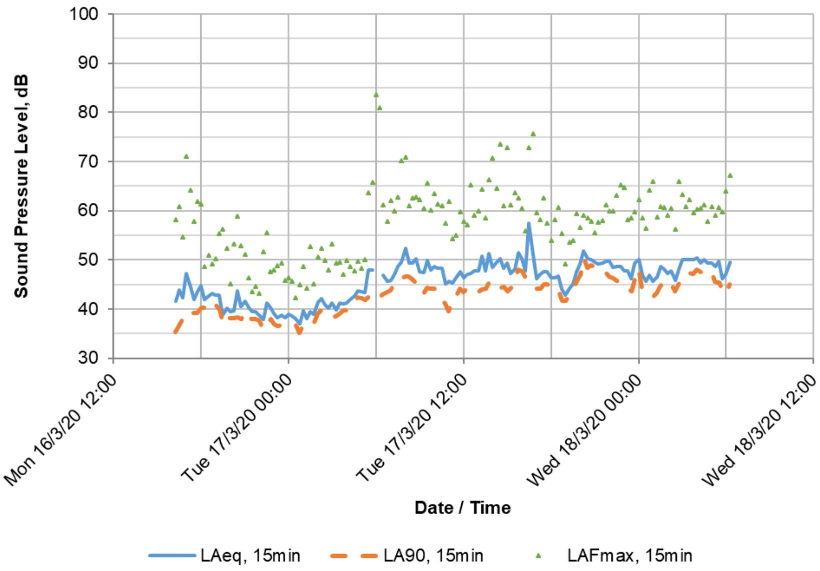
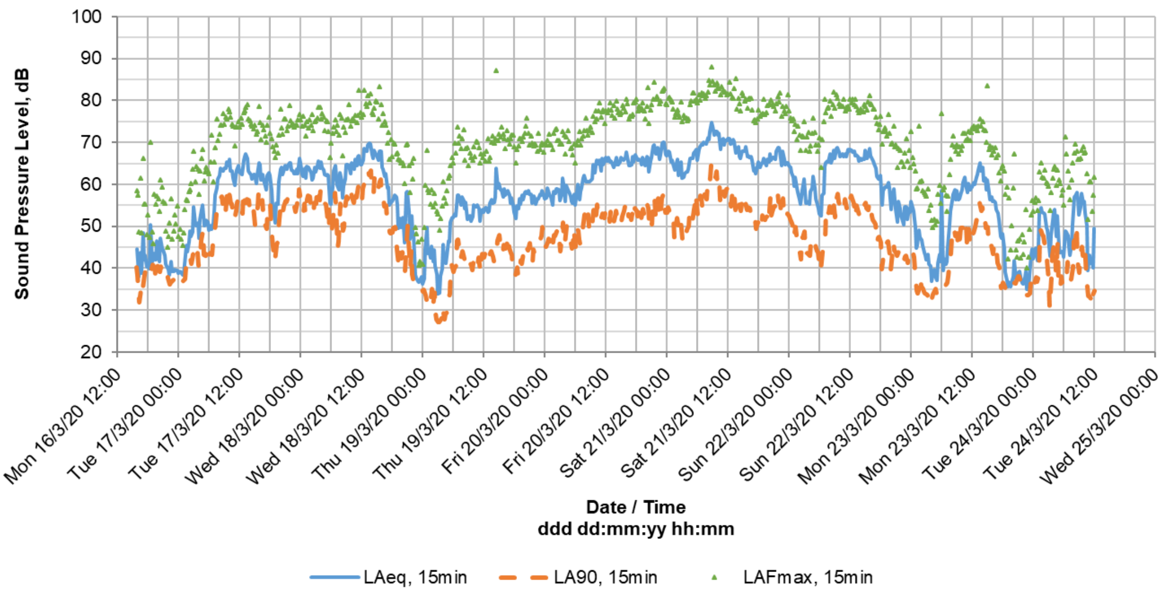


Figure B.3: LT3 Monitoring Results



Appendix C Noise modelling

Modelling methodology and assumptions

Noise predictions of the operational Scheme have been undertaken using the computer modelling software CadnaA® (v2019), which implements the calculation procedures of ISO 9613 ‘Acoustics – Attenuation of Sound During Propagation Outdoors’, to predict the propagation of noise away from the site in all directions and to quantify resultant noise levels at the identified noise sensitive receptor locations.

A series of assumptions were made for the generation of the noise models:

- Assumes all plant during operational phase is on 24-hours per day;
- The ground absorption, has been set to 0.5 to reflect grassed areas/soft ground, i.e. acoustically absorptive;
- Buildings have been modelled as acoustically reflective, with a reflection loss of 1 dB;
- The maximum order of reflections has been set at 2;
- Topographical data was taken from OS Open Data;
- Noise contours generated from the model are at a height of 4 m above ground;
- No boundary fences or walls have been included in the noise model;
- All noise sources have been modelled as a single band source, centred at 500 Hz.

Table C.1 presents sound sources at the site which has been included in the noise modelling for the construction noise assessment. Area source noise levels were derived for each area and phase of works and modelled at 1 m height. The modelling scenarios were split into the following 5 phases with area sources derived for works in different areas of the site. The following scenarios were modelled:

- Phase A – Remediation and site enabling works:
  - Remediation and site enabling works within the red line boundary (haul road excluded).
- Phase B – Site works:
  - Site works within the red line boundary (haul road excluded).
- Phase C – Civil works and foundations, including:
  - Civil works and foundations in converter station area;
  - Converter station laydown area; and
- Phase D – Erection of converter station buildings and structures, including:
  - Erection of converter station buildings and structures in converter station area;
  - Converter station laydown area;
- Phase E – Mechanical and electrical equipment installation (outdoor), including:
  - Mechanical and electrical equipment installation (outdoor) in converter station area;
  - Converter station laydown area;
  - DC cable construction works; and
  - AC cable construction works.

For the civil and foundations scenario, two alternative piling techniques were considered – percussive (impact) piling and vibratory piling.

Table C.1: Construction Noise Sources

Plant	*Sound Pressure Level @ 10 m dB(A)*	*Sound power level L_w, dB(A)*	*Percentage on time*	*Remediation works*	*Site works*	*Civil works and foundations (hammer impact piling)*	*Civil works and foundations (vibratory piling)*	*Erection of converter station buildings and structures*	*Mechanical and electrical equipment installation*	*AC Cable construction works*	*DC cable construction works*	*Converter station laydown area*
Tracked excavator	75	103	75%	2	2	2	2	-	-	1	-	-
Tracked dozer	80	108	75%	2	2	-	-	-	-	-	-	1
Wheeled back-hoe / grader	75	103	50%		-	-	-	-	-	-	-	2
Wheeled front end loader	75	103	75%	1	1	2	2	-	-	1	1	1
Dump truck	75	103	50%	1	1	2	2	3	1	1	1	1
Hydraulic hammer piling rig	90	118	75%	-	-	1	-	-	-	-	-	-
Vibro piling rig	80	108	75%	-	-	-	1	-	-	-	-	-
Mobile crane (wheeled)	70	98	50%	-	-	2	2	3	1	1	1	1
Concrete mixer + pump	75	103	25%	-	-	-	-	-	-	-	-	-
Diesel generator / compressor	85	113	50%	-	-	2	2	3	3	1	2	-
Telescopic man-lift	60	88	25%	-	-	-	-	2	2	-	-	-
Horizontal Directional Drill	75	103	75%	-	-	-	-	-	-	-	1	-
Area source sound power level L_w dB(A):				**112**	**112**	**119**	**115**	**115**	**115**	**112**	**114**	**110**

Table C.2 presents the piling noise sources used to generate models of single L_{Amax} piling events. No data was available for the L_{Amax} of a vibratory piling rig, therefore the difference between the overall and L_{Amax} event found in the hydraulic hammer piling rig has been used as a worst-case assumption.

Table C.2: Construction Noise Sources – L_{Amax} scenarios

Plant	*Overall Sound power level L_w, dB(A)*	*L_{Amax} event Sound power level L_w, dB(A)*
Hydraulic hammer piling rig	118	126[1]
Vibro piling rig	108[2]	116

Table C.3 presents sound sources at the site which has been included in the noise modelling for the operational noise assessment.

Table C.3: Operational Noise Sources

Plant	*Number of items*	*Sound power level L_w, dB(A)*	*Height (m)*	*Type of source*
Reactor hall	-	86	-	Roof and walls area sources
Valve Hall	-	81	-	Roof and walls area sources
DC Hall	3	75	-	Roof and walls area sources
HVACs	4	72	2	point source
Interface Transformer	3	106	5	point source
Transformer Cooler	3 banks	90 per bank	4	point source
AC Filter Reactors	3	75	15	point source
AC Filter Capacitors	3	86	15	point source
Cooling Fans	12	86 per bank, 75 per source	3	12 No. point sources
Building Fans	4	72	1 (above roof top)	point source
Service Building	-	55	-	Roof and walls area sources
Spares Building	-	55	-	Roof and walls area sources

[1] https://wtikemsley.co.uk/site/assets/files/1376/appendix_12_1.pdf
[2] BS5228-1 Table C.3 Item 27

Modelling results

Table C.3 presents the predicted construction noise level at sensitive receptors, noise monitoring locations and at approximately 50m from the Site boundary to the south, west, north and east.

Table C.3: Construction noise modelling results – $L_{Aeq,T}$

	$L_{Aeq,T}$ (dB)						
Name	*Phase A*	*Phase B*	*Phase C (hammer impact piling)*	*Phase C (vibro piling)*	*Phase D*	*Phase E*	*Height (m)*
R1	32	32	40	36	36	39	1.5
R2	30	30	37	34	34	37	1.5
R3	29	29	36	33	33	36	1.5
R4	30	30	37	34	34	37	1.5
R5	30	30	38	35	35	37	1.5
LT1	33	33	40	37	37	40	1.5
LT2	49	49	55	52	52	57	1.5
LT3	53	53	61	58	58	59	1.5
50 m South	57	57	63	61	61	66	1.5
50 m West	60	60	63	60	60	68	1.5
50 m North	58	58	66	62	62	64	1.5
50 m East	57	57	65	62	62	63	1.5

Table C.4 presents the predicted construction noise level from piling L_{Amax} events at sensitive receptors, noise monitoring locations and at approximately 50m from the Site boundary to the south, west, north and east.

Table C.4: Construction noise modelling results – Piling L_{Amax}

	L_{Amax} (dB)				
Name	*Hammer Impact Piling (North end of site)*	*Hammer Impact Piling (South end of site)*	*Vibro piling (North end of site)*	*Vibro piling (South end of site)*	*Height (m)*
R1	45	46	37	37	1.5
R2	44	32	35	33	1.5
R3	42	42	34	33	1.5
R4	44	43	35	34	1.5
R5	45	45	36	35	1.5
LT1	48	47	38	37	1.5
LT2	61	61	52	54	1.5
LT3	66	62	58	54	1.5
50 m South	61	71	56	63	1.5
50 m West	72	69	60	59	1.5
50 m North	74	66	65	56	1.5
50 m East	71	70	60	60	1.5

Table C.5 presents the predicted rating level at sensitive receptors, noise monitoring locations and at approximately 50m from the Site boundary to the south, west, north and east.

Table C.5: Operational noise modelling results

Name	*Level LAr (dB)*	*Height (m)*
R1	30	1.5
R2	28	1.5
R3	26	1.5
R4	27	1.5
R5	28	1.5
LT1	30	1.5
LT2	29	1.5
LT3	50	1.5
50 m South	32	1.5
50 m West	54	1.5
50 m North	59	1.5
50 m East	43	1.5

Appendix D Construction noise contour plots

Figure D.1: Construction noise contour plot – Site remediation and enabling works

Figure D.2: Construction noise contour plot – Site preparation

PROJECT
GridLink
SCENARIO
Site Preparation Predicted LAeq,T
CLIENT
GridLink
KEY
... <= 25.0 25.0 < ... <= 30.0 30.0 < ... <= 35.0 35.0 < ... <= 40.0 40.0 < ... <= 45.0 45.0 < ... <= 50.0 50.0 < ... <= 55.0 55.0 < ... <= 60.0 60.0 < ... <= 65.0 65.0 < ... <= 70.0 70.0 < ... <= 75.0 75.0 < ... <= 80.0
AECOM
Satellite imagery attributed to Google Maps (15/05/2020)

Figure D.3: Construction noise contour plot – Civil works and foundations (hammer impact piling)

Figure D.4: Construction noise contour plot – Civil works and foundations (vibro piling)

Figure D.5: Construction noise contour plot – Structural and steel erection works

PROJECT

GridLink

SCENARIO

Structural and Steel Erection Works

Predicted LAeq,T

CLIENT

GridLink

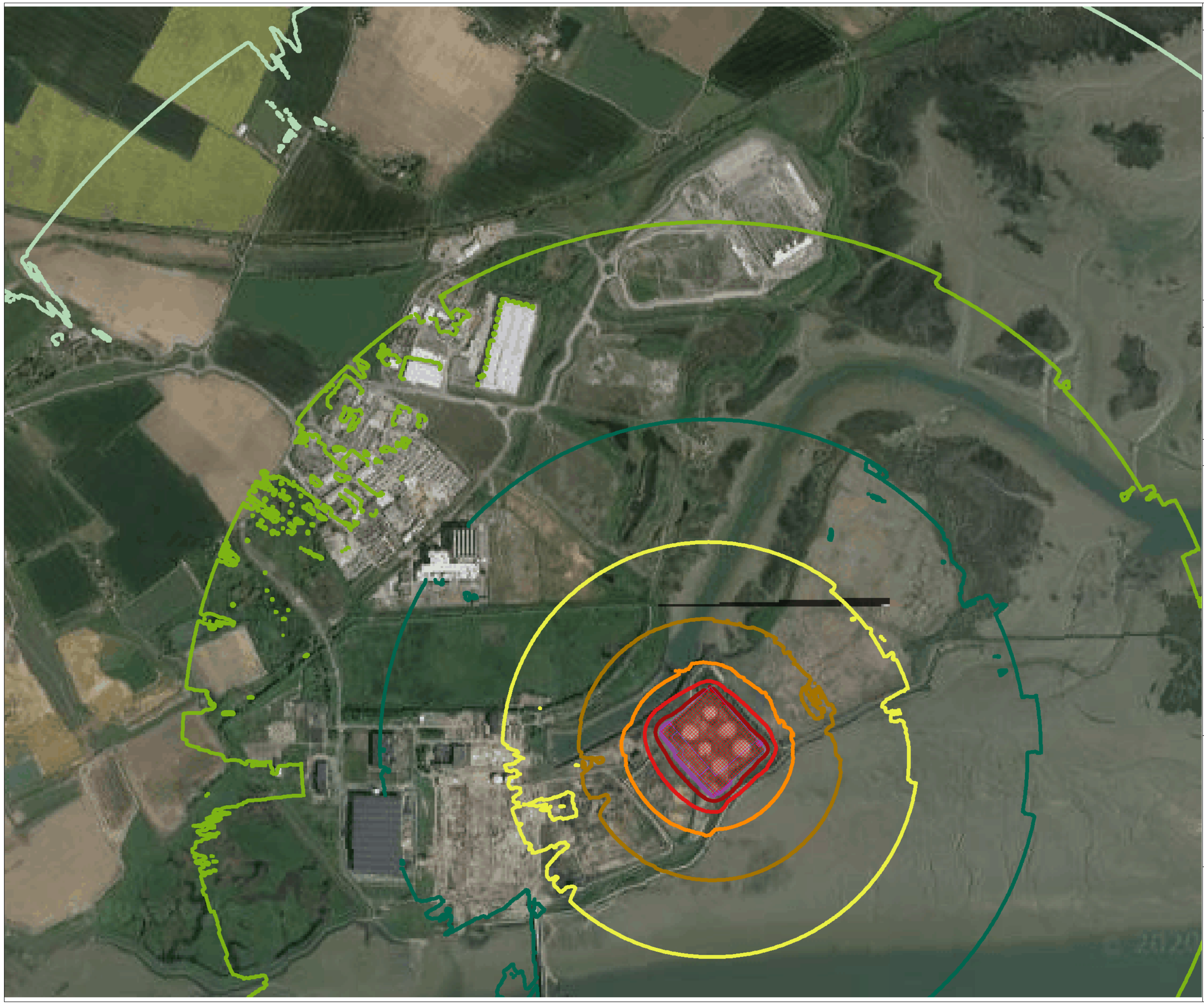
KEY

... <= 25.0
25.0 < ... <= 30.0
30.0 < ... <= 35.0
35.0 < ... <= 40.0
40.0 < ... <= 45.0
45.0 < ... <= 50.0
50.0 < ... <= 55.0
55.0 < ... <= 60.0
60.0 < ... <= 65.0
65.0 < ... <= 70.0
70.0 < ... <= 75.0
75.0 < ... <= 80.0

AECOM

Satellite imagery attributed to Google Maps (15/05/2020)

Figure D.6: Construction noise contour plot – Mechanical and Electrical Equipment and Installation



PROJECT

GridLink

SCENARIO

Mechanical and Electrical Equipment Installation

Predicted LAeq,T

CLIENT

GridLink

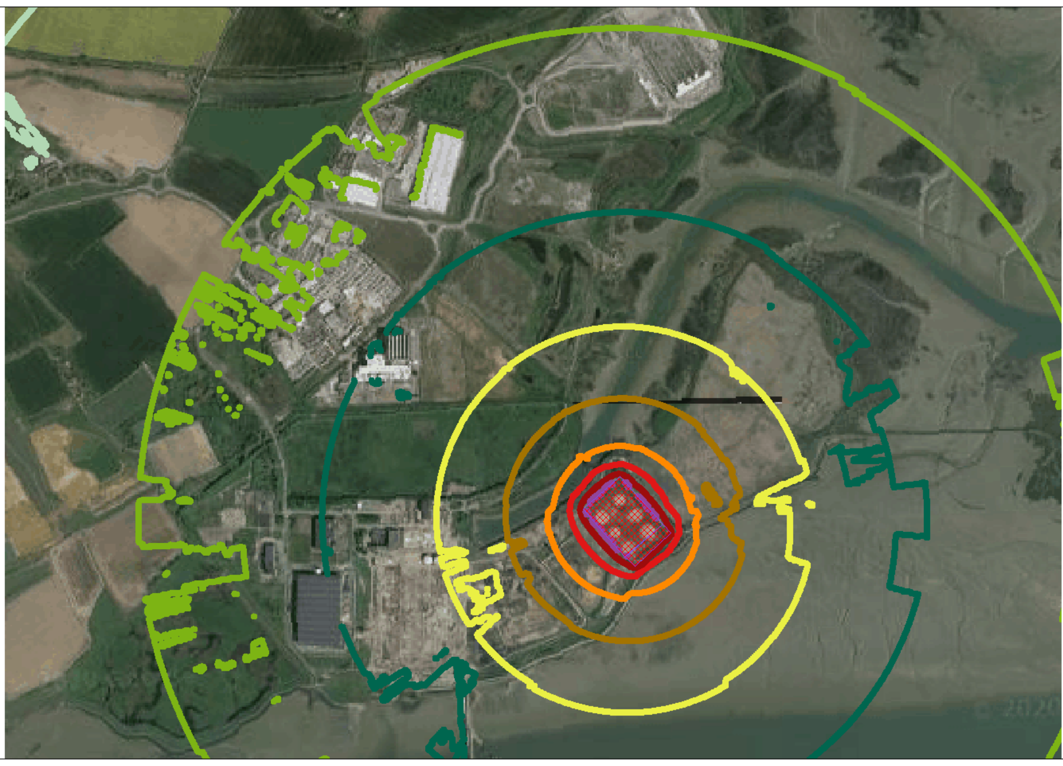
KEY

... <= 25.0
25.0 < ... <= 30.0
30.0 < ... <= 35.0
35.0 < ... <= 40.0
40.0 < ... <= 45.0
45.0 < ... <= 50.0
50.0 < ... <= 55.0
55.0 < ... <= 60.0
60.0 < ... <= 65.0
65.0 < ... <= 70.0
70.0 < ... <= 75.0
75.0 < ... <= 80.0

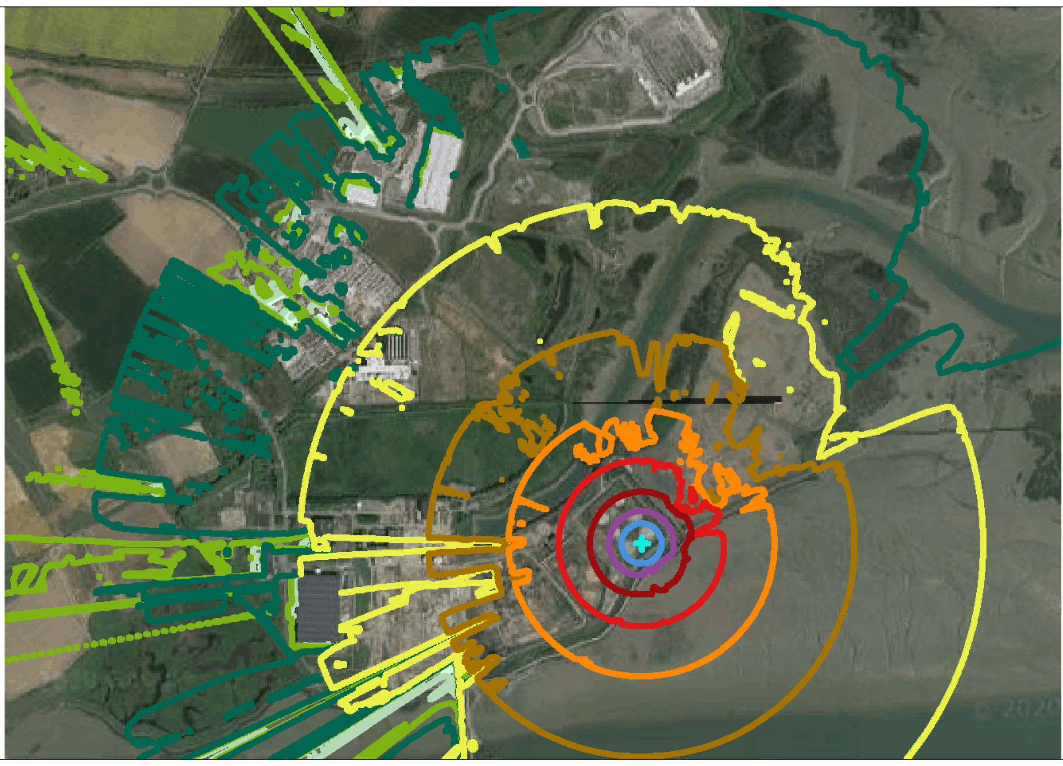
AECOM

Satellite imagery attributed to Google Maps (15/05/2020)

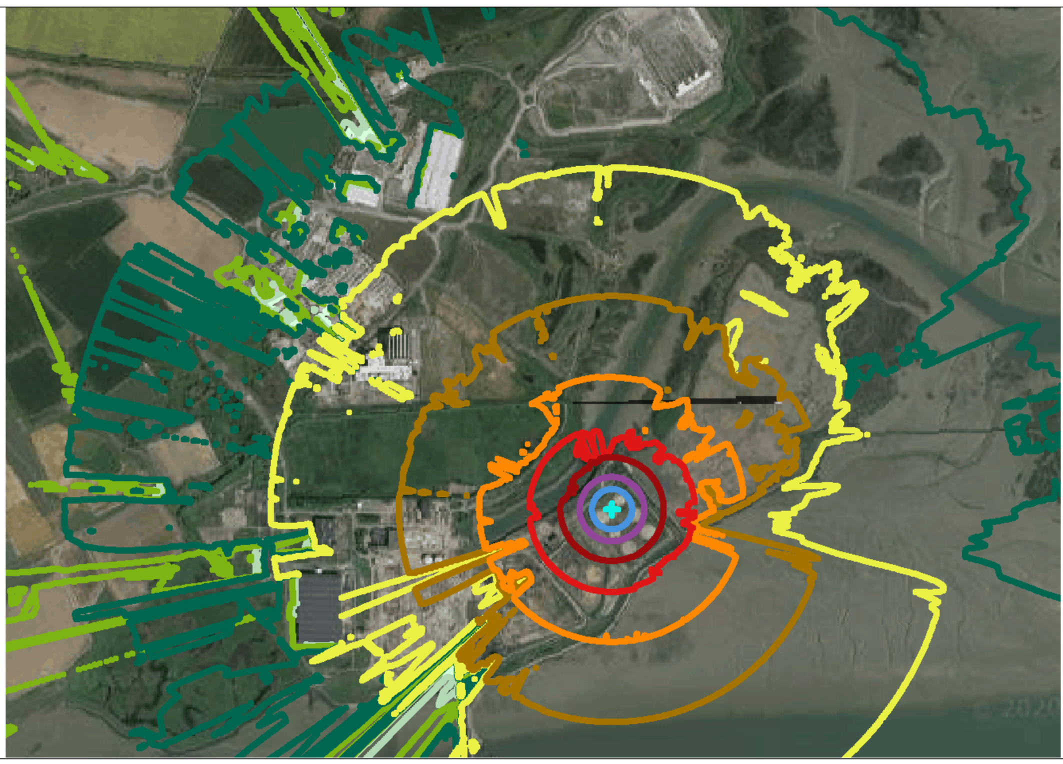
Figure D.7: Construction noise contour plot – civil works and foundations + hammer impact piling L_{Amax} plots



Overall LAeq,T



Piling at south end of site - LAmax



Piling at north end of site - LAmax

PROJECT

GridLink

SCENARIO

Civil Works and Foundations

Hammer Impact Piling

CLIENT

GridLink

KEY

... <= 25.0
25.0 < ... <= 30.0
30.0 < ... <= 35.0
35.0 < ... <= 40.0
40.0 < ... <= 45.0
45.0 < ... <= 50.0
50.0 < ... <= 55.0
55.0 < ... <= 60.0
60.0 < ... <= 65.0
65.0 < ... <= 70.0
70.0 < ... <= 75.0
75.0 < ... <= 80.0

Satellite imagery attributed to Google Maps (15/05/2020)

Figure D.8: Construction noise contour plot – civil works and foundations + vibro piling L_{Amax} plots

Overall LAeq,T

Piling at south end of site - LAmax

Piling at north end of site - LAmax

PROJECT

GridLink

SCENARIO

Civil Works and Foundations

Vibro Piling

CLIENT

GridLink

KEY

... <= 25.0
25.0 < ... <= 30.0
30.0 < ... <= 35.0
35.0 < ... <= 40.0
40.0 < ... <= 45.0
45.0 < ... <= 50.0
50.0 < ... <= 55.0
55.0 < ... <= 60.0
60.0 < ... <= 65.0
65.0 < ... <= 70.0
70.0 < ... <= 75.0
75.0 < ... <= 80.0

AECOM

Satellite imagery attributed to Google Maps (15/05/2020)

Appendix E Operational noise contour plots

Figure D.1: Operational converter station noise contour plot

PROJECT
GridLink
SCENARIO
Converter Station Predicted LAeq,T
CLIENT
GridLink
KEY
... <= 25.0 25.0 < ... <= 30.0 30.0 < ... <= 35.0 35.0 < ... <= 40.0 40.0 < ... <= 45.0 45.0 < ... <= 50.0 50.0 < ... <= 55.0 55.0 < ... <= 60.0 60.0 < ... <= 65.0 65.0 < ... <= 70.0 70.0 < ... <= 75.0 75.0 < ... <= 80.0
AECOM
Satellite imagery attributed to Google Maps (15/05/2020)

Figure D.2: Noise Sources Location (purple area – roof area source, Blue area – wall area source, light blue dot – point sources)

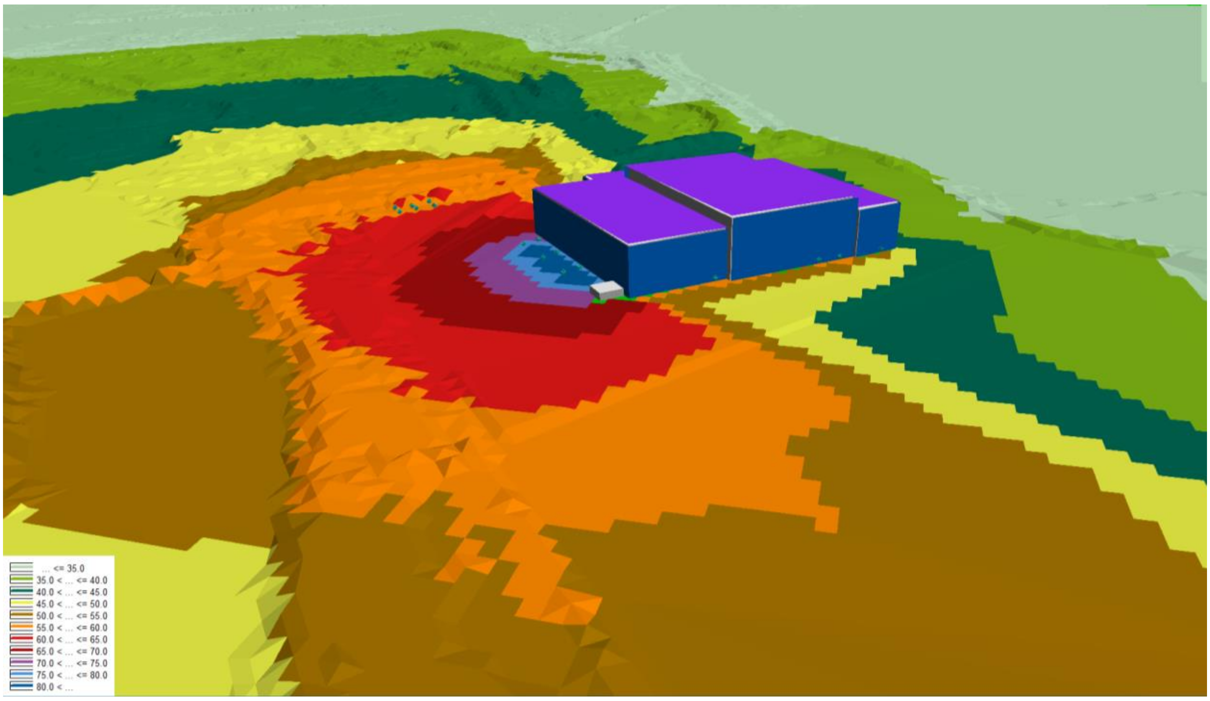
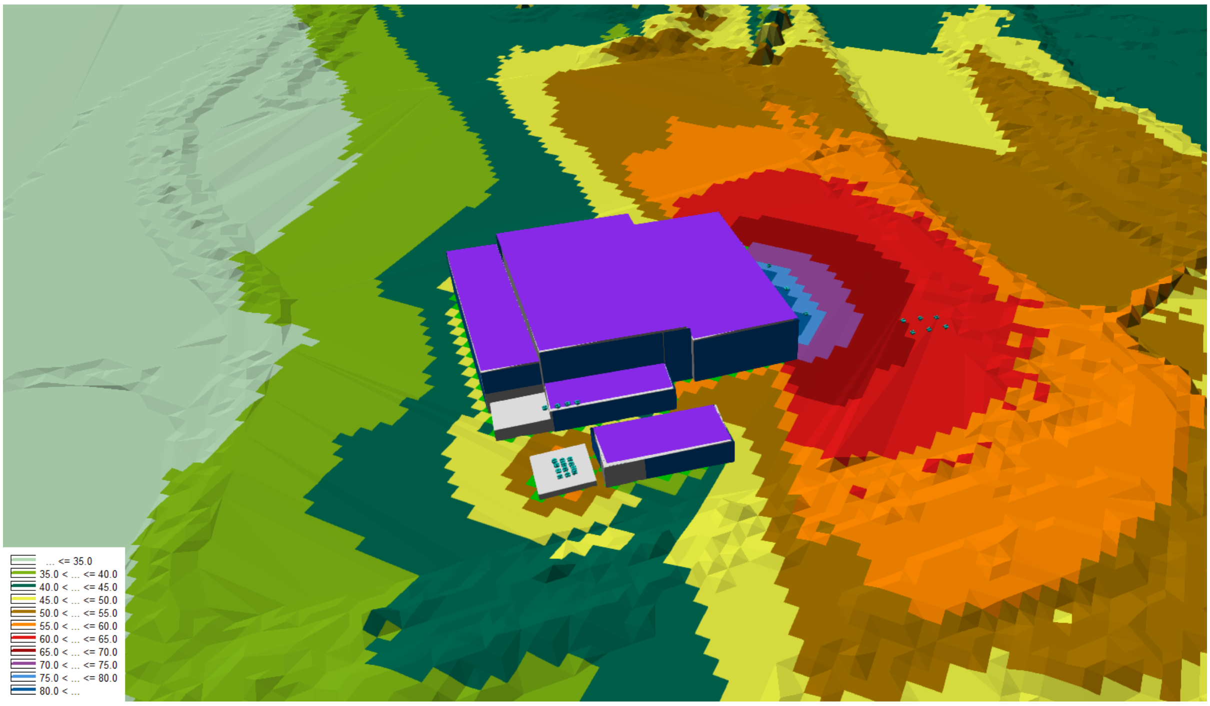


Figure D.3: Noise Sources Location (purple area – roof area source, Blue area – wall area source, light blue dot – point sources)



Appendix F Road Traffic Data

Table F.1: Road traffic data – 2023 Future baseline

Road	Total AAWT	HGV%	Speed (mph)
Stoke Road	4018	15	42.5
A228 Peninsular Way east of Bells Lane	14324	16	70
A228 Peninsular Way west of Bells Lane	20590	13	70

Table F.1: Road traffic data – 2023 Future baseline + Construction traffic

Location	AAWT	HGV%	Speed (mph)
Stoke Road	4272	15	42.5
A228 Peninsular Way east of Bells Lane	14557	17	70
A228 Peninsular Way west of Bells Lane	20823	13	70