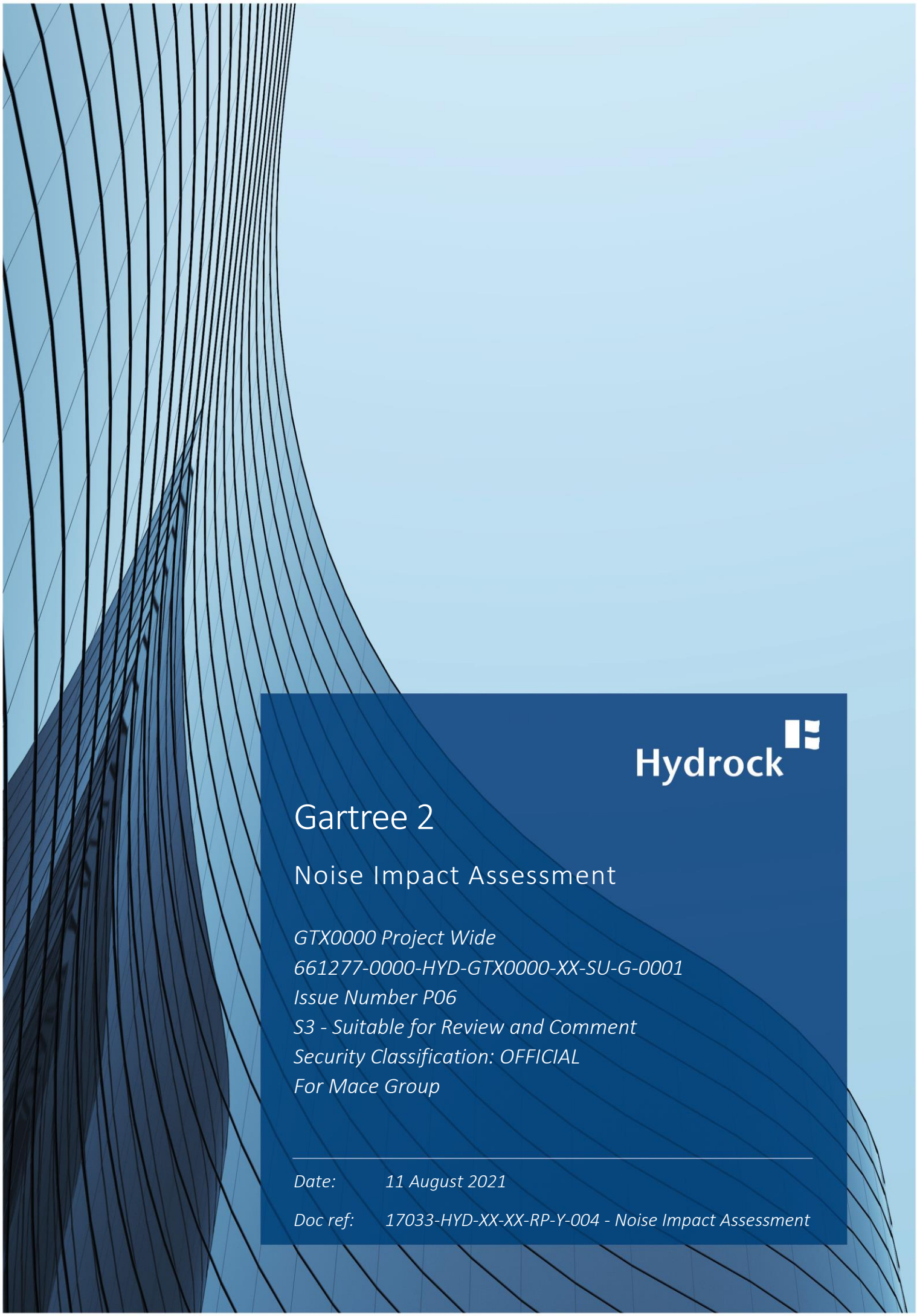


Gartree 2

Noise Impact Assessment

GTX0000 Project Wide
661277-0000-HYD-GTX0000-XX-SU-G-0001
Issue Number P06
S3 - Suitable for Review and Comment
Security Classification: OFFICIAL
For Mace Group

Date: *11 August 2021*

Doc ref: *17033-HYD-XX-XX-RP-Y-004 - Noise Impact Assessment*

EXECUTIVE SUMMARY

Hydrock have been appointed by Mace Group to provide acoustic engineering services to support the outline planning application for a purpose-built prison, on land adjacent to Gartree, Leicestershire. The Proposed Development is hereby referred to as Gartree 2.

The noise assessment has been undertaken to reflect both pre operational and post-construction phase, with consideration given the following potential impacts:

- The impact of noise and vibration on existing sensitive receptors during the construction phase of the development;
- The impact of development generated road traffic at existing sensitive receptors;
- The impact of existing noise sources on the Proposed Development;
- The impact associated with any proposed fixed plant and/or ancillary equipment at existing receptors; and,
- The impact of noise associated with the proposed car park at existing receptors.

A noise survey has been carried out in order to establish the existing noise environment at the proposed development site, during the daytime and night time periods, in accordance with current guidance.

Road traffic noise from the local road network was found to be dominant throughout the daytime and night-time periods across the site.

Appropriate acoustic conditions can be achieved within proposed accommodation blocks and education areas with windows open, therefore no specific mitigation is required.

The development generated traffic at the Site indicates at the worst affected ESR the increase in traffic will have a minor impact in the short term and a negligible impact in the long term, according to DMRB. Therefore, no specific mitigation is required with respect to development generated road traffic.

Atmospheric plant noise emission limits have been established based on the results of the noise survey. These are likely to be achieved with appropriate consideration for selection of low-noise plant and proprietary attenuation measures as appropriate during technical design.

This noise impact assessment presents no reason why all of the BREEAM credits described above would not be available, given due design consideration during technical design.

It is considered that there is no reason for refusal of planning permission, on acoustic grounds.

DOCUMENT CONTROL SHEET

Issued by	Hydrock Consultants Limited Northern Assurance Buildings 9-21 Princess Street Albert Square Manchester M2 4DN United Kingdom	T +44 (0)161 804 5550 E manchestercentral@hydrock.com www.hydrock.com
Client	Mace Group	
Project name	Gartree 2	
Title	Noise Impact Assessment	
Status	S3	
Date	11/08/2021	

Document Production Record		
Issue Number	P06	Name
Prepared by		George Hadjilambri
Approved by		Eddy Goldsmith

Document Revision Record			
Issue Number	Status	Date	Revision Details
P01	S1	12/11/2020	First issue.
P02	S2	17/11/2020	Second issue.
P03	S3	19/07/2021	Updated Layouts.
P04	S3	23/07/2021	Minor Amendments.
P05	S3	09/08/2021	Updated Layouts.
P06	S3	11/08/2021	Minor Amendments

CONTENTS

Tables

Figures

Appendices

1. INTRODUCTION

Hydrock have been appointed by Mace Group to provide acoustic engineering services to support the outline planning application for a purpose-built prison, on land adjacent to Gartree prison, Leicestershire. The Proposed Development is hereby referred to as Gartree 2.

The Proposed Development Site currently comprises open land.

To the north the site is bordered by existing residential properties off Welland Avenue, and the existing Gartree facility. Gallow Field Road is located approximately 400m to the north of the site. To the east and south the site is bordered by open fields. To the west, the site is bordered by Welland Avenue and open land, with Foxton Road approximately 250m beyond.

A review of relevant planning policies and current guidance documents has been undertaken to inform the assessment of potential noise impacts at the Proposed Development. This noise assessment has been prepared in support of an outline planning application.

This assessment has been prepared by George Hadjilambri, Senior Acoustic Engineer at Hydrock, who holds a bachelor's degree in Sound Engineering BSc (Hons) and a Post-graduate Diploma in Acoustics and Noise Control and is a member of the Institute of Acoustics (MIOA).

This report is technical in nature; therefore, a glossary of acoustic terminology is provided in Appendix A to assist in understanding this report.

2. ASSESSMENT METHODOLOGY

2.1 Consultation

The proposed noise survey and assessment methodology was sent to Leicestershire County Council and the following response was received from the Environment Team Leader after the survey completion;

"*The methodology seems fine to me, well thought out and thorough. I think the only comment I would make is in relation to the potential secure monitoring undertaken over 24hours. Obviously for one day it is pretty much a snapshot of the noise environment and will not be as accurate as say a week's worth of data so I would be interested to know if this is likely to be a weekday or at the weekend? I would just expect background noise levels to be noticeably lower at the weekend, especially on a Sunday, unless you can undertake measurements on both a weekday and the weekend to compare?*"

It is appreciated that a 24-hour measurement provides a snapshot of the noise environment, however, considering the nature of the site, a 24-hour measurement period is considered sufficient for the purposes of this assessment exercise as it encompasses the typical weekday ambient and background profile of the area and allows for plant noise criteria to be established.

The assessment considers the following pre operational and post-construction potential impacts:

- The effect of noise and vibration during earthworks and construction at existing receptors;
- The effect of existing road traffic noise, together with any existing commercial noise sources at proposed sensitive receptors;
- The effect of development generated road traffic noise at existing receptors;
- The effect of any proposed ancillary equipment at existing sensitive receptors;
- The effect of noise associated with the proposed car park at existing receptors; and,

2.2 Policy and Guidance

The assessment methodology is based on the following current policy and guidance documents:

- National Planning Policy Framework, 2021 (NPPF);
- Noise Policy Statement for England, 2010 (NPSE);
- Planning Practice Guidance – Noise, 2014 (PPG);
- World Health Organisation (WHO) 1999: Guidelines for Community Noise;
- BS 8233:2014 - Guidance on sound insulation and noise reduction for buildings (BS8233);
- BS 4142:2014 + A1 2019 - Methods for rating and assessing commercial and industrial sound (BS4142);
- BREEAM UK New Construction, 2018 (BREEAM);
- Building Bulletin: Acoustic Design of Schools: Performance Standards, 2015 (BB93)
- Department of Transport Technical Memorandum: Calculation of Road Traffic Noise, 1975 (CRTN)
- Design Manual for Roads and Bridges, Volume 11, Section 3, Part 7, 2011 (DMRB);
- Sport England: Artificial Grass Pitch Acoustics – Planning Implications, 2015;
- Bavarian State Office for the Environment: Parking Area Noise – 6. Revised Edition, 2007; and,

A review of the relevant planning policies and acoustics guidance is found in Appendix B.

3. NOISE SURVEY

3.1 Survey Overview

Noise Monitoring was undertaken at the site, between the 22nd and 23rd October 2020.

Noise measurements were made using Class 1, integrating sound level meters. Microphones were positioned vertically on a tripod at least 1.2m above the ground and at least 3.5m from any other reflecting surfaces. The sound level meter was calibrated to a reference level of 94 dB at 1kHz both prior to, and on completion of, the noise survey. No significant drift in calibration was noted during the survey (≤ 0.5 dB).

Monitoring was carried out by George Hadjilambri, Senior Acoustic Engineer at Hydrock, who holds a bachelor's degree in Sound Engineering BSc (Hons) and a Post-graduate Diploma in Acoustics and Noise Control and is a member of the Institute of Acoustics (MIOA). All measurement equipment has been laboratory calibrated within the appropriate calibration interval.

All noise monitoring took place during conducive conditions, with wind speeds less than $5ms^{-1}$ and no significant precipitation.

3.2 Survey Procedure

For the purposes of this assessment, in accordance with current guidance, daytime hours are taken to be 0700 to 2300 hours and night-time hours to be 2300 to 0700 hours

Noise monitoring was undertaken at 4 Monitoring Locations (MLs) considered to be representative of proposed and Existing Sensitive Receptors (ESRs). Noise monitoring locations are shown on **Figure 1**, and summarised as follows:

- ML1: Unattended noise monitoring to the west of the site at 5m from Foxton Road. This location was selected to obtain road traffic noise levels associated with Foxton Road. This location is also considered representative of the noise climate in the vicinity of ESRs close to Foxton Road;
- ML2: Attended noise monitoring to the north of the site at 3m from Gallow Field Road. This location was selected to obtain road traffic noise levels associated with Gallow Field Road.This location is also considered to be representative of the noise climate in the vicinity of ESRs to the north of the site, close to Gallow Field Road;
- ML3: Unattended 5hr noise monitoring in the vicinity of the residential properties off Welland Avenue, positioned approximately 5m from the carriageway (Private Road with 15mph speed limit). This location was selected to obtain road traffic noise lavels from the aforementioned road. This location is considered representative of ESRs closest to the proposed site and most likely to be affected by both future transport operations as well as during the construction phase of the development;
- ML4: Unattended noise monitoring in the north eastern part of the site, closest to existing facilities. This location was to obtain representative ambient noise level in the north eastern part of the site, and capture any noise associated with activities at Gartree.

Observations and subjective evaluation of noise sources was carried out and noted during initial site walkover and attended monitoring. Measurements were also supplemented with audio recordings to allow retrospective subjective analysis of the acoustic environment.

Unattended noise monitoring was undertaken at ML1 and ML4 for approximately 24 hours, between 12:30pm on 22nd and 23rd October 2020. This monitoring period allows for peak daytime transportation periods (0700 to 1000, and 1600 to 1900) to ensure a typical daytime and night time noise levels are captured.

Attended noise monitoring was undertaken at ML2 between 13:30pm and 16:30pm on the 22nd October 2020 as per the CRTN shortened measurement procedure.

Unattended noise monitoring was undertaken at ML3 during what is considered to be the quiet daytime period, for approximately 5 hours between 11:10am and 16:10 on the 22nd and 23rd October 2020. Although this monitoring location was targeted for 24hrs, a 5hr monitoring data has been obtained instead due to survey interruption. The data collected on site at ML3 along with the surrounding monitoring locations (ML1, ML2, ML4) are considered sufficient to accurately calibrate the noise model for the purposes of this assessment.

Observation while on site identified that noise associated with the existing pumping station is considered negligible.

3.3 Summary of Existing Noise Environment

Observations made during the survey and a review of audio recordings made during unattended measurements, identified the following significant noise sources contributing to the noise climate at the site:

Road Traffic: Road Traffic noise from Foxton Road and Gallow Field Road was dominant across the site throughout the daytime and night time period. Road traffic was also the dominant source at ML3, however, as Welland Avenue is a private road, the number of vehicle movements and associated noise level was significantly lower than Foxton Road and Gallow Field Road.

Other Sources: Bird song and distant aircraft movements where occasionally audible across the site but mostly at ML4.

3.4 Summary of Existing Noise Levels

Measured noise levels at each ML have been separated in to daytime (0700 to 2300 hours) and night-time (2300 to 0700 hours) categories, where appropriate.

Measured levels at ML1 and ML4 captured a total 16 hours during the daytime period and a full 8 hour night time period. This is considered to provide a representation of typical weekday levels, as the measurement period includes peak transportation times.

Measured levels at ML2 were undertaken for 3 consecutive hours as per the shortened CRTN methodology.

Measured levels at ML3 captured a total of 5 hours during the quiet period of daytime, including 3 consecutive hours as per the shortened CRTN methodology. Daytime and night time levels derived from the 3-hour CRTN calculation procedures, and comparison with ML1 and ML4 measurements, indicate that noise levels are provide a reliable representation typical road traffic noise levels, for the purposes of this assessment.

Existing average noise levels are summarised in Table 1.

Table 1: Average Measured Daytime and Night-time Noise Levels

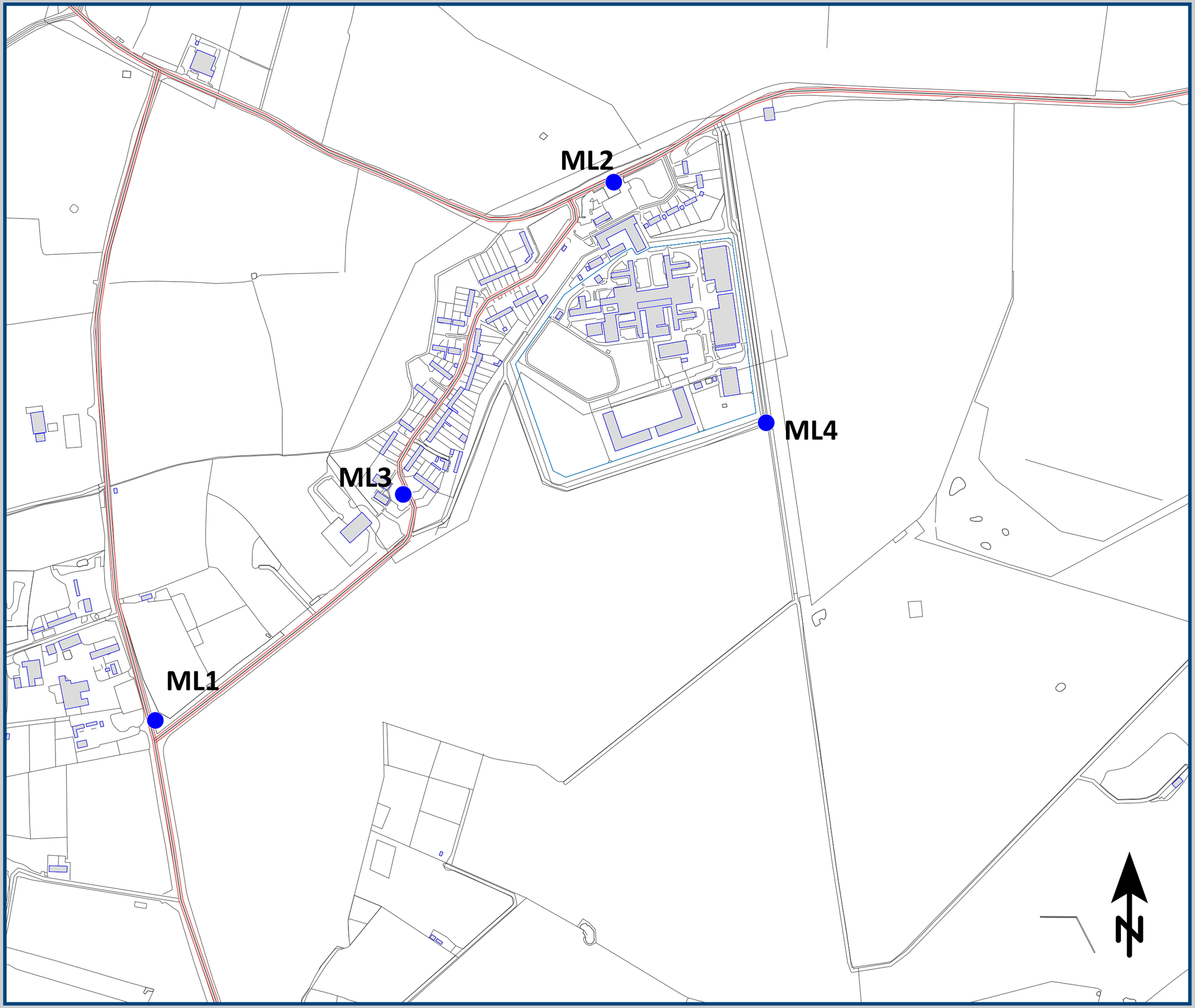
Monitoring Location	Time Period	Measured Noise Level, $L_{Aeq,T}$ dB
ML1	0700 - 2300 2300 - 0700	64 53
ML2	0700 - 2300 2300 - 0700	66* 57*
ML3	0700 - 2300 2300 - 0700	52* 45*
ML4	0700 - 2300 2300 - 0700	45 38

* *Daytime and Night-time levels derived from shortened measurement procedure described within CRTN and TRL.*

The typical measured night-time L_{AFmax} noise levels at ML1 and ML4 are summarised in Table 2. For ML2-ML3, the L_{AFmax}, measured during the daytime period has been adopted to reflect a night-time worst-case scenario. Measured maxima which are not considered representative of the typical noise environment have been eliminated from this assessment.

Table 2: Summary of Typical Maximum Night-time Noise Levels

Monitoring Location	Typical Night-time L_{AFmax} dB
ML1	80
ML2	84
ML3	70
ML4	53



Hydrock

Legend

- Existing Buildings
- Noise Monitoring Locations
- Roads
- Approx. Development Area

PROJECT:
Gartree 2

DRAWING TITLE:
Noise Monitoring Locations

DRG No.	SCALE
Figure 1	1:5000

DATE:	PREPARED	APPROVED
04/08/2021	GH	ED

CLIENT:
Mace Group

mace

4. NOISE ASSESSMENT

4.1 Construction Phase Assessment

4.1.1 Noise from Earthworks and Construction Activities

During the construction phase, any works carried out at the Proposed Development has the potential to generate noise that may propagate beyond the Site boundary.

At this stage, detailed information pertaining to site specific earthworks and construction activities are not known. Activities at the Site, which could give rise to potential noise impacts typically include (but are not limited to):

- Site preparation i.e. ground excavation, levelling of ground, trenching, trench filling, unloading, levelling of hardcore and compact filling; and,
- Construction of the Proposed Development including piling, construction of access roads, fabrication processes e.g. planning, sanding, routing, cutting, drilling and laying foundations.

The contractor undertaking the enabling and construction works has not yet been appointed. However, it is considered that the enabling and construction works are likely to be restricted to standard daytime working hours, i.e. between 0800 and 1700 Monday to Friday, 0900 to 1200 on a Saturday, with no work on Sundays or Bank Holidays. The appropriate noise impact threshold category has been determined for each nearby sensitive receptor, based on measured daytime ambient noise levels, in accordance with 'The ABC Method' provided in BS5228-1 as detailed in **Table 3** below.

Table 3 Thresholds of Significant Impacts at Residential Receptors in Accordance with the 'ABC' Method of BS5228-1

Assessment Category Threshold Value	Threshold Value, dB		
	Category A *1	Category B *2	Category C *3
Weekday Daytime (07:00 to 19:00) and Saturdays (07:00 to 10:00)	65	70	75
*1 Category A: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than this value. *2 Category B: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values. *3 Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are more than this value.			

Table 4 below identifies the appropriate category value in order to determine whether a significant noise impact has occurred, at ESRs, during earthworks and construction.

Table 4 Appropriate Category Value for Existing Sensitive Receptors

Description of Receptor	Representative Monitoring Location	Average Measured Daytime Level, dB $L_{Aeq,T}$	Rounded Daytime Level to the Nearest 5 dB(A)	Appropriate Category Value, according to BS5228-1	Significant Noise Impact Threshold, dB $L_{Aeq,T}$
Residential dwellings to the west of the proposed development overlooking Foxton Road	ML1	64	65	A	65
Residential Dwellings to the north of the proposed development overlooking Welland Avenue	ML3	52	50	A	65

The earthworks and construction phase activities have the potential to generate short-term increases in noise levels. The levels of noise received at the receptors closest to the Proposed Development would depend on the sound power levels of equipment used, the distance to the properties, the presence of screening or reflective surfaces and the ability of the intervening ground to absorb propagating noise.

Furthermore, the nearest noise sensitive receptors to the earthworks and construction activity will vary over the course of the construction period, depending on where earthworks or construction activities are taking place within the Site. Given the distances between activities and existing residential dwellings, noise levels at the receptors may occur above those detail in **Table 4.** Therefore, it is recommended that mitigation measures be put in to place in order to avoid and/or reduce potential impacts where possible. Further, detail is provided in the Mitigation Section of this report.

4.1.2 Vibration from Earthworks and Construction Activities

Damage to buildings associated with groundborne vibration is uncommon, and although vibration may be noticeable, there is little evidence to suggest that cosmetic damage can occur, such as a crack in plaster, unless the magnitude of the vibration is extremely high. The most likely impact, where elevated levels of vibration do occur, during the earthworks and construction phases of development, is associated with perceptibility i.e. potential annoyance.

Where groundborne vibration is of a relatively continuous nature, there is a greater likelihood of structural damage occurring, compared to transient vibration; for example, that caused by transiting vehicles or piling. The only current national guidance document which provides a methodology for predicting levels of vibration from construction activities is BS5228- 2. The prediction method provided relates specifically to percussive, or vibratory, rolling and piling only.

Therefore, it is not possible to accurately predict levels of vibration during the Site preparation and the construction phase of Development. However, vibration impacts during Site activities other than piling

are uncommon. As such, to control the impact of vibration during Site preparation and construction of a Development, limits relating to the perceptibility of vibration are typically set.

As stated in BS5228-2 and as generally accepted, the threshold of vibration perception for humans is typically in the Peak Particle Velocity (PPV) range of 0.14 mms^{-1} to 0.3mms^{-1}, which forms the basis of the recommend maximum permitted vibration levels of 1 mms^{-1} PPV within occupied residential dwellings.

BS5228-2 also sets out the distances (based on historical field measurements) at which certain activities could give rise to a just perceptible level of vibration. These distances are presented in Table 5 below.

Table 5 Distance at which Vibration may be Just Perceptible

Construction Activity	Distance from Activity at which Vibration may be Just Perceptible, metres
Excavation	10 – 15
Heavy Vehicles (e.g. Dump Trucks)	5 – 10
Hydraulic Breaker	15 – 20
Rotary Piling	20 – 30

The nearest ESRs to the proposed construction works, would vary depending upon the part of the Proposed Development under construction. As a worst-case scenario, earthworks and construction works may potentially take place at a distance of 70m from the nearest residential properties to the south Welland Avenue.

At 20m, it is considered possible that vibration due to the operation of construction machinery may be perceptible, for example if piling is used, but unlikely during the majority of the earthworks and construction period. If any perceptible vibration occurs at ESRs, this would likely be transient in nature and only and for a very limited period(s), and is unlikely to exceed the maximum permitted vibration level of 1mms^{-1} PPV within occupied dwellings, as recommended by BS5228-2.

No specific vibration mitigation measures are considered to be required, unless high risk construction techniques are employed, such as percussive piling. Notwithstanding, methods of best practice should be implemented with regards to minimising potential vibration levels generated during the earthworks and construction period.

4.2 Operational Phase Assessment

4.2.1 Development Generated Road Traffic

Potential noise impacts associated with road traffic generated by the Proposed Development when operational have been assessed via comparison ‘without development’ and ‘with development’ scenarios for the opening year 2025, in accordance with DMRB. The assessment has been carried out at ESRs in the vicinity of the adjacent transport network and considered most likely to be affected by any increase in traffic, as a result of the Proposed Development.

Road traffic noise predictions for each scenario have been carried out using SoundPLAN 3D noise modelling software, in accordance with current guidance.

Nearby roads have been calibrated within the model based on the measured baseline noise levels at the site to ensure a reliable representation of the existing environment and road traffic noise propagation

across the site is replicated. CRTN predictions have been carried out to assess any potential changes in road traffic noise at existing receptor locations due to Development generated road traffic.

The 'without development' and 'with development' scenarios incorporate predicted development generated traffic flows provided by Atkins, the appointed transport consultants for this scheme. Traffic data was provided in 18hour Annual Average Weekday Traffic format, and the associated HGVs percentages.

Traffic data used for this assessment, as provided by the transport consultants are included in Appendix D.

A summary of noise modelling assumptions, used to predict road traffic noise levels during each assessment scenario, are provided in Appendix E.

The assessment of development generated road traffic noise impact has been carried out at 5 ESRs, which are shown on Figure 2. Impacts are summarised in Table 6 below.

Table 6 Predicted Change in Road Traffic Noise Levels

Existing Sensitive Receptors	Predicted Road Traffic Noise Level at ESRs, $L_{10\ 18hour}$ dB(A)		Change in Noise Level associated with the Proposed Development
	Without Development	With Development	
ESR1 – Overlooking Foxton Road	55.1	56.4	1.3 dB
ESR2 – Overlooking Welland Avenue	53	53.1	0.1 dB
ESR3 – To the North and South of Gallow Field Road Overlooking Welland Avenue	56.1	56.7	0.6 dB
ESR4 - To the North and South of Gallow Field Road overlooking Stuart Cres	64	64.8	0.8 dB
ESR5 - Foxton Primary School	62.8	63.7	0.9 dB

Table 6 indicates that the greatest increase in road traffic noise would be +1.3dB at ESR1 overlooking Foxton Road. This equates to a minor impact in the short term and negligible impact in the long term, according to DMRB.

Road traffic noise is predicted to increase by less than +1dB at all other ESRs, this equates to a negligible impact both in the short term and long term, in accordance with DMRB.

Therefore, no specific mitigation is required with respect to development generated traffic.

4.2.2 Daytime Noise Levels in Outdoor Living Areas

Figure 3 shows the predicted average daytime noise levels $L_{Aeq,\ 16hour}$, across the majority of the site and are way below the upper guideline value of 55dB $L_{Aeq,\ T}$ recommended by BS8233. Therefore, no specific mitigation is required for external living areas.

4.2.3 Daytime Noise Levels in Habitable Rooms and Education Areas

Figure 3 shows the predicted daytime average $L_{Aeq, 16hour}$ across the Proposed Development Site. The minimum composite sound reduction required of facades, in order to achieve appropriate internal daytime noise levels, in accordance with BS8233 and BB93, is summarised in Table 7 below.

Table 7: Daytime Façade Noise Levels at the Proposed Development and Required Attenuation

Proposed Receptors	Daytime Façade Level, $L_{Aeq,T}$ dB	Minimum Composite Sound Reduction of Façade, D_w, dB
Proposed accommodation blocks in the central part of the site.	47	12

Noise from the surrounding roads will be screened at the proposed habitable rooms facing in to the Site, due to the future buildings themselves, therefore façade levels are likely to be less than indicated in Table 7.

Measurements undertaken at ML4 indicate noise associated with wildlife, wind in trees and aircraft movements contribute to the ambient noise environment in the eastern part of the site as shown in Table 1. This indicates that the above daytime façade noise level is representative of proposed habitable rooms across the proposed development site.

The noise levels in Table 7 indicate that appropriate conditions can be achieved with open windows. Therefore, no specific mitigation is required.

4.2.4 Night-time Noise Levels in Habitable Rooms

Figure 4 and Figure 5 show the predicted night time average $L_{Aeq, 8hour}$ and L_{AFmax} noise levels, across the Proposed Development Site.

The level of façade noise attenuation required to achieve appropriate internal night-time noise levels, in accordance with BS8233, is summarised in Table 8.

Table 8: Night-time Façade Noise Levels at the Proposed Development and Required Attenuation

Proposed Receptors	Night-time Façade Level, $L_{Aeq,T}$ dB	Maximum Night-time Façade Noise Level, $L_{AFmax\,T}$ dB	Required Composite Sound Reduction of Façades, D_w, dB
Proposed accommodation blocks to the central part of the site	39	57	12

Measurements undertaken at ML4 indicate noise associated with wildlife, wind in trees and aircraft movements contribute to the ambient and maximum noise environment in the eastern part of the site as shown in Table 1 and Table 2. This indicates that the above night-time and maximum façade noise level is representative of proposed habitable rooms across the proposed development site.

4.2.5 Industrial Type Noise from Proposed Ancillary Equipment

At this stage, detailed information relating to any proposed fixed plant and/or building services is unavailable. However, the annotations to the Illustrative Masterplan are presented in Appendix F, highlighting likely sources of industrial type noise.

Guideline noise limits have been formulated based on the existing noise environment, in accordance with current guidance. With reference to BS4142, the atmospheric noise rating level limits, L_{Ar} dB, have been determined for any proposed ancillary equipment (with the exception of emergency plant i.e. back-up generators).

Noise associated with the development shall be controlled to the guideline levels outlined in **Table 9,** where possible, when assessed in accordance with BS4142, at the nearest sensitive receptor. The limits during daytime correspond to the average background noise levels measured at ML3. In the absence of night-time noise levels at ML3, representative background noise levels measured ML4 have been adopted as limits, reflecting a worst-case scenario.

Table 9: Guideline Atmospheric Plant Noise Emission Limits

Period	Atmospheric Plant Noise Emission Limit
Daytime (07:00 to 23:00 hrs)	$L_{Ar,1hr}$ 45 dB
Night-time (23:00 to 07:00 hrs)	$L_{Ar,15min}$ 25 dB

The magnitude of impact depends upon the context and not only upon the comparison of rating and background noise levels, therefore these levels are intended to provide a guideline. Proposals should be reviewed by Hydrock during technical design.

As detailed information relating to fixed plant is unknown, Hydrock highlight that provisions for the selection of low noise equipment, silencers, enclosures, screens and other acoustic attenuation measures should be made where necessary.

4.2.6 Noise from the Proposed Car Park

The Illustrative Masterplan, shown in **Appendix F**, indicates the Proposed Development includes a Car Park in the western part of the Site, approximately 90m from the nearest existing residential dwellings, off Welland Avenue. Therefore, the potential noise impact associated with the car park has been assessed with respect to these dwellings.

The most comprehensive and widely accepted methodology guidance document for the prediction of car parking noise is the Parking Area Noise document published by the Bavarian State Office for the Environment in 2007. The methodology allows the prediction of average noise levels from a car park based on the number of spaces and number of parking events per hour, per space.

The car parking noise level has been predicted based on the shift pattern information provided by Atkins, included in **Appendix D**. Parking events per hour, per space has been derived from the shift change information and the total number of predicted vehicle trips at the site. This has been used for the basis of noise level predictions in accordance with the Parking Area Noise guidance, using SoundPLAN acoustic modelling software.

Predicted average noise levels associated with carparking noise levels have been assessed by comparison with health based WHO and BS8233 guideline noise levels at the nearest ESRs. **Table 9** presents the predicted average daytime noise levels associated with the car park, within external gardens at the nearest ESR.

Table 10: Predicted Noise Levels from Car Park

Receptor	Predicted External Noise Level, dB $L_{Aeq, 16\ hours}$	Approximate Distance from Car Park, m
Gardens of Nearest Residential Properties North of the proposed development site overlooking Welland Avenue	38	90

Table 9 indicates that average daytime noise levels associated with the proposed car park are 38 dB $L_{Aeq, 16hour}$ at the nearest outdoor living areas of existing residential properties at Welland Avenue. This is below the guideline level of 50 dB $L_{Aeq, 16hoour}$ recommended as a desirable, but not mandatory level be BS8233. Therefore, no specific mitigation is required for car parking activity noise during the daytime.

While the shift pattern information indicates that all shift changes would occur during the daytime periods (0700 to 2300), to render this assessment exercise more robust, the potential impact of individual car parking events has been considered during the night time period.

Measured noise data, taken from the Hydrock data archive, indicates that the typical free field maximum level associated with car engines starting and car doors slamming is 65 dB L_{AFmax}, measured at 10m. Maximum noise levels associated with individual parking events have been predicted based on this measured data using SoundPLAN acoustic modelling software.

Table 10 presents the predicted night time maximum noise levels associated with the car park, at the nearest ESR façade, taking in to account attenuation of 15dB through an open window.

Table 11: Predicted Noise Levels from Car Park

Receptor	Maximum Façade Noise Level, dB L_{AFmax}	Maximum Internal Noise Level, dB L_{AFmax}	Approximate Distance from Car Park, m
Gardens of Nearest Residential Properties North of the proposed development site overlooking Welland Avenue	48	33	90

Table 10 indicates that maximum noise levels associated with the proposed car park are 33 dB L_{AFmax} internally, assuming windows are open, at the nearest facade of existing residential at Welland Avenue. This is below the guideline level of 45 dB L_{AFmax} as recommended by BS8233. Therefore, no specific mitigation is required for car parking activity noise during the night-time.

Hydrock

Legend

- Existing Buildings
- Roads
- Approx. Development Area
- ESRs

Noise Level $L_{A10, 18hour}$ dB(A)

	<=	0.0
0.0 <	<=	1.0
1.0 <	<=	2.0
2.0 <	<=	3.0
3.0 <	<=	4.0
4.0 <	<=	5.0
5.0 <	<=	6.0
6.0 <	<=	7.0
7.0 <	<=	8.0
8.0 <		

PROJECT:
Gartree 2

DRAWING TITLE:
Increase in Road Traffic Noise Levels Associated with the Proposed Development

DRG No.	SCALE
Figure 2	1:5000

DATE:	PREPARED	APPROVED
04/08/2021	GH	EG

CLIENT:
Mace Group

mace

Hydrock

Legend

- Existing Buildings
- Roads
- Approx. Development Area
- 55 dB(A) Limit line
- Car Park

Noise Level $L_{Aeq, 16hour}$ dB(A)

	<=	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 <		

PROJECT:
Gartree 2

DRAWING TITLE:
Daytime Noise Levels
- With Development

DRG No.	SCALE
Figure 3	1:5000

DATE:	PREPARED	APPROVED
04/08/2021	GH	EG

CLIENT:
Mace Group

mace

Hydrock

Legend

- Existing Buildings
- Roads
- Approx. Development Area
- Car Park

Noise Level $L_{Aeq, 8hour}$ dB(A)

	<=	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 <		

PROJECT:
Gartree 2

DRAWING TITLE:
Night-time Noise Levels
- With Development

DRG No.	SCALE
Figure 4	1:5000

DATE:	PREPARED	APPROVED
04/08/2021	GH	EG

CLIENT:
Mace Group

mace

Hydrock

Legend

- Existing Buildings
- Roads
- Approx. Development Area
- Car Park

Noise Level L_{AFmax} dB(A)

	<= 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 <	

PROJECT:
Gartree 2

DRAWING TITLE:
Night time Maximum Noise Levels - With Development

DRG No.	SCALE
Figure 5	1:5000

DATE:	PREPARED	APPROVED
04/08/2021	GH	EG

CLIENT:
Mace Group

mace

5. NOISE MITIGATION MEASURES

5.1.1 Construction Phase

Noise from Earthworks and Construction

In order to reduce the potential impact of noise generated by the construction phase of the proposed development, at existing receptor locations in the immediate vicinity of the Site, mitigation measures would be required. Best working practice would be implemented during each phase of the earthworks and construction works at the Site. The construction works would follow the guidelines in BS5228-1 and the guidance in BRE Controlling particles, vapour and noise pollution from construction sites, Parts 1 to 5, 2003. The following measures would be put in place to minimise noise emissions and implemented via a Construction Environmental Management Plan (CEMP):

- When works are taking place within close proximity to the sensitive receptors identified, the screening of noise sources via the erection of temporary screens would be employed;
- All machinery would be regularly maintained to control noise emissions, with particular emphasis on lubrication of bearings and the integrity of silencers;
- Site staff would be made aware that they are working adjacent to a sensitive area and avoid all unnecessary noise due to misuse of tools and equipment, unnecessary shouting and radios;
- As far as possible, the avoidance of two noisy operations occurring simultaneously in close proximity to the same sensitive receptor;
- Adherence to any time limits imposed on noisy works by the local authority;
- Implement set working hours during the week and at weekends;
- Ensure engines are turned off when possible; and
- Should earthworks and construction activities need to be carried out during night-time hours, the local authority may include a planning condition that requests advance notice and details of any night working to provided.

Vibration from Earthworks and Construction

BS5228-2 indicates that mitigation might include the use of alternative methods, removal of obstructions, provision of cut-off trenches, reduction of energy input per blow, reduction of resistance to penetration.

As the construction programme and methodologies become more defined, earthworks and construction vibration would be reviewed and a detailed strategy for control would be devised and implemented via the CEMP, where appropriate.

5.1.2 Operational Phase

Proposed Outdoor Living Areas

Proposed outdoor living areas at the Site require no specific acoustic mitigation.

Proposed Habitable Rooms

Good acoustic conditions can be secured within habitable rooms across the site with open windows, therefore, there are no specific acoustic glazing and ventilation requirements for habitable rooms.

BREEAM UK New Construction

4 total credits are available under the BREEAM scheme. It is anticipated that up to three credits will be available under Hea 05 covering sound insulation between rooms and other occupied areas, internal ambient noise levels and room acoustics. A further credit is available under Pol 05 relating to the reduction of noise pollution from industrial type sources.

This noise impact assessment presents no reason why all of the BREEAM credits described above would not be available, given due design consideration during technical design. Acoustic commissioning would be required upon practical completion, in order to obtain these credits.

Development Generated Road Traffic

No specific mitigation is required with respect to development generated traffic.

Proposed Car Park

No specific mitigation is required with respect to the proposed car park.

6. CONCLUSIONS & SUMMARY

Hydrock have been appointed to provide acoustic engineering services to support to support the planning application for a purpose-built prison, hereby referred to as Gartree 2.

The noise assessment has been undertaken to reflect both pre operational and post-construction phase, with consideration given to the following potential impacts:

- The impact of noise and vibration on existing sensitive receptors during the construction phase of the development;
- The impact of development generated road traffic at existing sensitive receptors;
- The impact of existing noise sources on the Proposed Development;
- The impact associated with any proposed fixed plant and/or ancillary equipment at existing receptors; and,
- The impact of noise associated with the proposed car park at existing receptors.

A noise survey has been carried out in order to establish the existing noise environment at the proposed development site, during the daytime and night time periods, in accordance with current guidance.

Road traffic noise from the local road network was found to be dominant throughout the daytime and night-time periods across the site.

The existing daytime noise levels across the site are below the guideline limit of 55dB $L_{Aeq, T}$ as recommended by BS8233. Therefore, no specific mitigation is required for outdoor living areas.

Calculations indicate that open windows would be sufficient to control existing noise sources, during the daytime and night-time periods, to ensure that guideline internal noise levels are achieved within habitable rooms and education spaces, in accordance with BS8233 and BB93, respectively. Therefore, there are no specific acoustic glazing and ventilation requirements for habitable rooms.

The development generated traffic at the Site indicates at the worst affected ESR the increase in traffic will have a minor impact in the short term and a negligible impact in the long term, according to DMRB. Therefore, no specific mitigation is required with respect to development generated road traffic.

Atmospheric plant noise emission limits have been established based on the results of the noise survey. These are likely to be achieved with appropriate consideration for selection of low-noise plant and proprietary attenuation measures as appropriate during technical design.

This noise impact assessment presents no reason why all of the BREEAM credits described above would not be available, given due design consideration during technical design.

It is considered that there is no reason for refusal of planning permission, on acoustic grounds.

Appendix A Glossary of technical terms

Term	Description
dB (decibel)	The scale on which sound pressure level is expressed. Sound pressure level 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.
$L_{Aeq,T}$	L_{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period.
L_{Amax}	L_{Amax} is the maximum A - weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L_{10} and 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 L_n 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 the L_{90} is the level exceeded for 90% of the time.
R_w	R_w is the single-number quantity which characterizes the sound insulating properties of a given material over a range of frequencies. This is typically measured in a laboratory in accordance with BS EN ISO 717-1.
$D_{n,e,w}$	$D_{n,e,w}$ is the single number quantity which characterizes the airborne sound insulation performance across a given 'element' and is typically used to describe the acoustic performance of trickle ventilators etc.
C_{tr}	C_{tr} is a correction term applied to single-number sound insulation values (R_w, $D_{n,e,w}$ etc.) to afford additional weighting against low frequency performance.
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally as measured outside and at least 3m from buildings.

Appendix B Policy and Guidance

National Planning Policy Framework (NPPF)

Published in July 2021, this document sets out the Government's planning policies for England and supersedes the previous version of the NPPF published in 2019. It makes the following reference to noise in the section entitled Conserving and enhancing the natural environment:

> *"174. 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."*

It also makes the following references to noise in the Section entitled Ground conditions and pollution:

> *"185. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*
>
> *a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life60;*
>
> *b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.*
>
> *60 See Explanatory Note to the Noise Policy Statement for England (Department for Environment, Food & Rural Affairs, 2010)."*

And

> *"187. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."*

Noise Policy Statement for England (NPSE)

Published in March 2010, the Noise Policy Statement for England (NPSE) sets out the long-term vision of Government noise policy as follows:

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

The NPSE identifies three observed effect levels, names "No Observed Effect Level" (NOEL), "Lowest Observed Adverse Effect Level" (LOAEL) and "Significant Observed Adverse Effect Level" (SOAEL).

The NPSE contains little detail on assessment methodologies and specific parameters at which the varying observed effect levels would occur in the context of a residential development.

BS 8233:2014 - Guidance on sound insulation and noise reduction for buildings

As discussed above, there is no specific guidance contained within the Planning Condition and the NPSE. In lieu of this, the approach that is generally adopted when assessing environmental noise sources on residential developments is to undertake an assessment in accordance with BS 8233: 2014.

BS 8233 provides guidance for the control of noise in and around buildings. The guidance provided within the document is applicable to the design of new buildings, or refurbished buildings undergoing a change of use, but does not provide guidance on assessing the effects of changes in the external noise levels to occupants of an existing building. The guidance provided includes appropriate internal and external noise level criteria which are applicable to dwellings for steady external noise sources. It is stated that it is desirable that the internal ambient noise level does not exceed the following criteria set out in the table below:

Activity	Location	Period	
		Daytime (07:00 to 23:00 hrs)	Night-time (23:00 to 07:00 hrs)
Resting	Living room	$L_{Aeq,16hrs}$ 35 dB	-
Dining	Dining room/area	$L_{Aeq,16hrs}$ 40 dB	-
Sleeping (daytime resting)	Bedroom	$L_{Aeq,16hrs}$ 35 dB	$L_{Aeq,8hrs}$ 30 dB

Whilst BS 8233:2014 recognises that a guideline value may be set in terms of SEL or L_{AFmax} for the assessment of regular individual noise events that can cause sleep disturbance during the night-time, a specific criterion is not stipulated. Accordingly, reference has been made in this assessment to the World Health Organisation (WHO) 1999: Guidelines for Community Noise below.

With respect to external amenity space such as gardens and patios it is stated that it is desirable that the 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. It is then confirmed that higher external noise criteria may be appropriate under certain circumstances such as within city centres urban areas, and locations adjoining the strategic transportation network, where it may be necessary to compromise between elevated noise levels and other factors such as convenience of living, and efficient use of land resource.

World Health Organisation (WHO) 1999: Guidelines for Community Noise

As with the 'good' and 'reasonable' criteria in BS 8233, the LAFmax criterion in BS8233 is largely concordant with the World Health Organisation (WHO) guidance 1999: Guidelines for community noise. This document draws upon guidance from Vallet and Vernay, which states:

> *"For good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB LAFmax more than 10-15 times per night"*

BS 4142:2014 - Methods for rating and assessing commercial and industrial sound

BS 4142 describes methods for rating and assessing sound from industrial and manufacturing processes, fixed installations which comprise mechanical and electrical plant and equipment, the loading and unloading of goods and materials at industrial and/or commercial premises and mobile plant and vehicles that are an intrinsic part of the overall sound emanating from premises or processes.

The methods use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

If appropriate, the specific sound level of the source ($L_{Aeq,T}$) is corrected, by the application of one or more corrections for acoustic features to give a 'rating' level ($L_{Ar,Tr}$). The Standard effectively compares and rates the difference between the rating level of the sound and the prevailing background sound level ($L_{A90,T}$). Comparing the rating level with the background sound level, BS 4142 states:

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

Building Bulletin: Acoustic Design of Schools: Performance Standards, 2015 (BB93)

The acoustic conditions of schools are controlled by Building Regulations 2010 (as amended by Statutory Instrument, SI 2002/2871) states:

> *"Each room or other space in a school building shall be designed and constructed in such a way that it has the acoustic conditions and insulation against disturbance by noise appropriate to its intended use".*

The Regulatory Requirement E4 of the Building Regulations, the School Premises Regulations and the Independent School Standards, are generally achieved via the implementation of appropriate guideline criteria outlined in Section 1 of BB93.

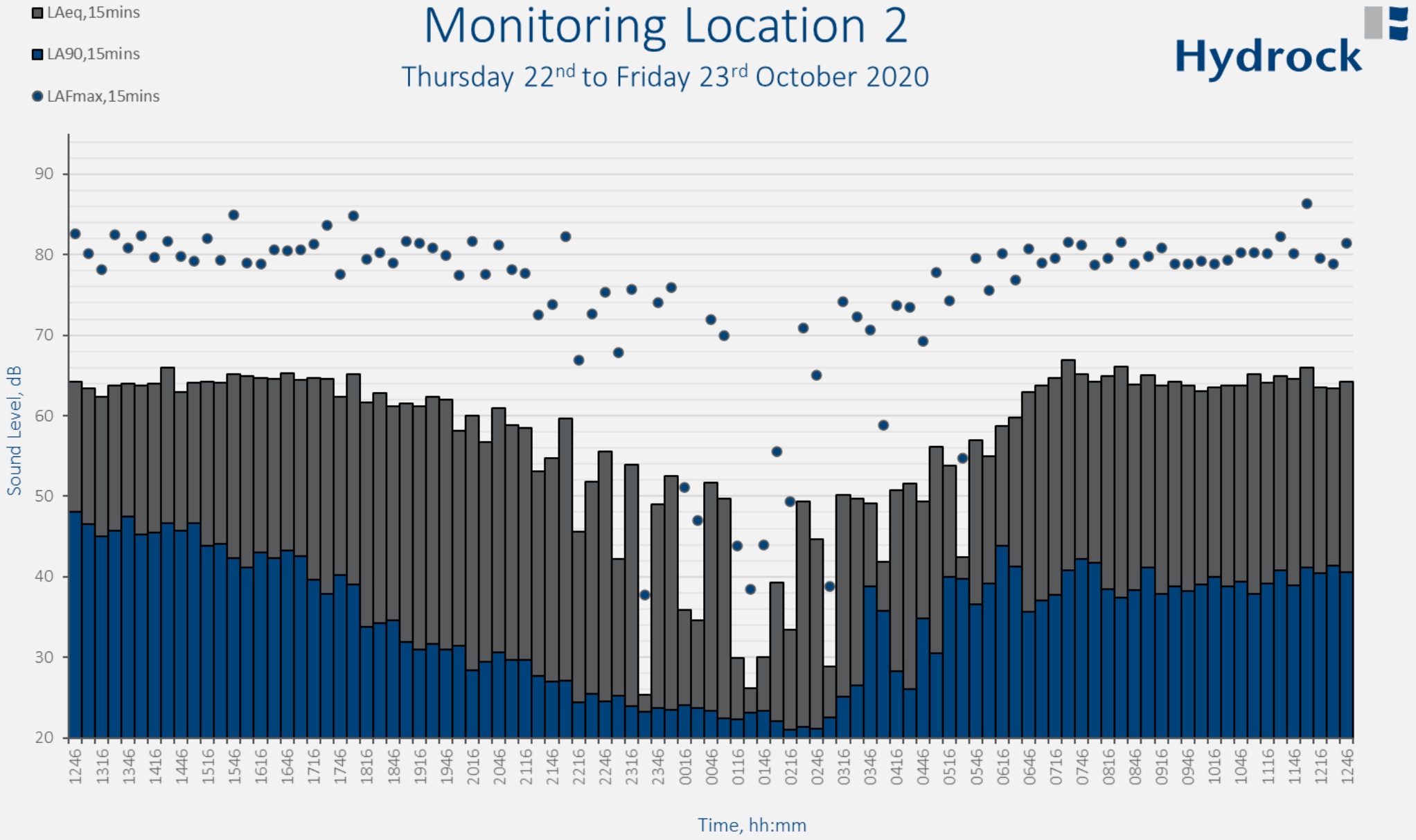
BB93 seeks to:

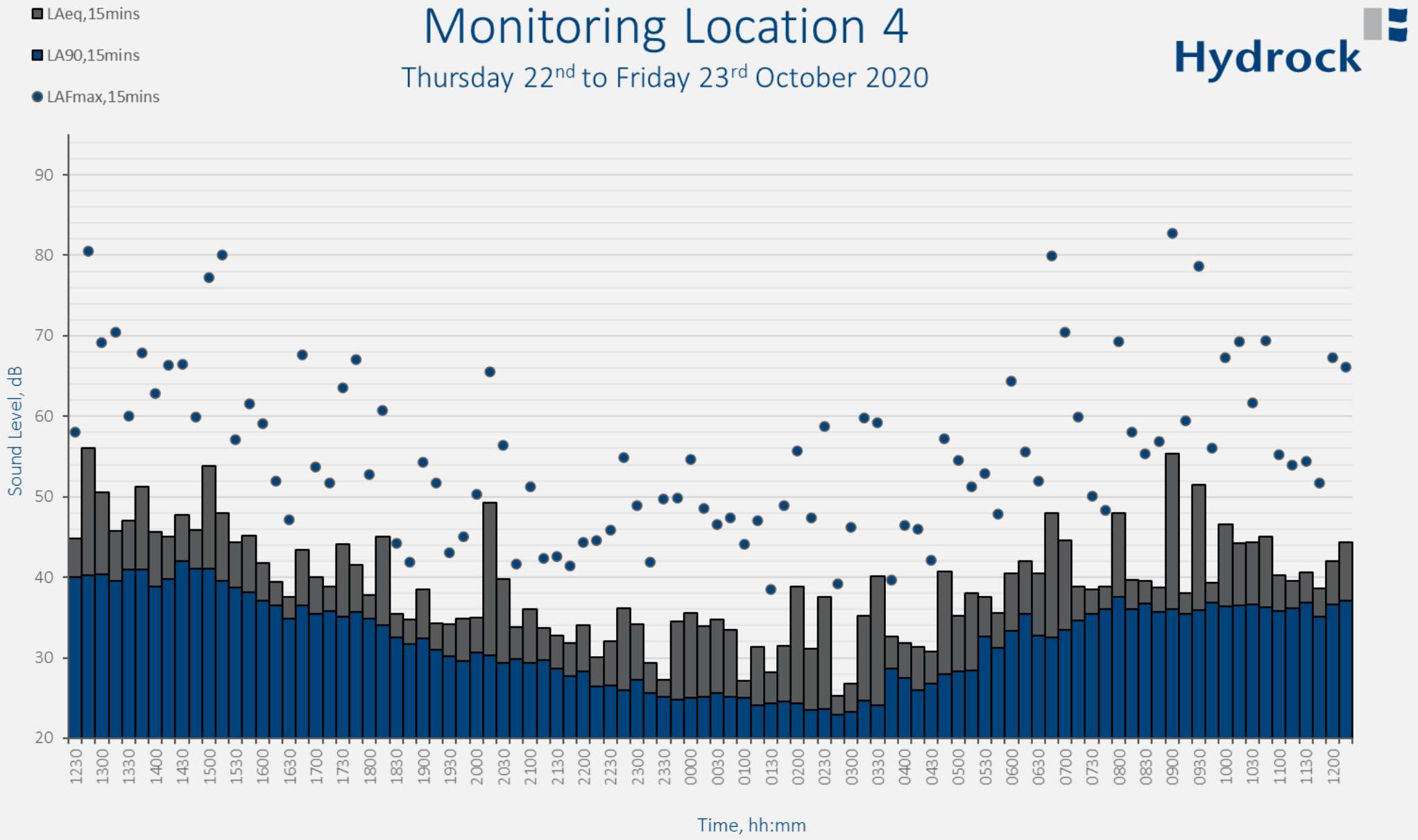
- Facilitate clear communication of speech between teacher and student, and between students; and,
- Ensure activities associated with study are not inhibited.

BB93 provided comprehensive guidance on appropriate acoustic conditions, for various categories of educational spaces, to be achieved internally and externally. Together with guidance on appropriate airborne and impact sound insulation criteria for internal partitions, and recommended reverberation values for each space.

Table 1.1 of BB93 provides upper guideline limits for internal ambient noise levels L_{Aeq}, 30min for a range of educational rooms, where classrooms require an internal ambient level of 35dB(A).

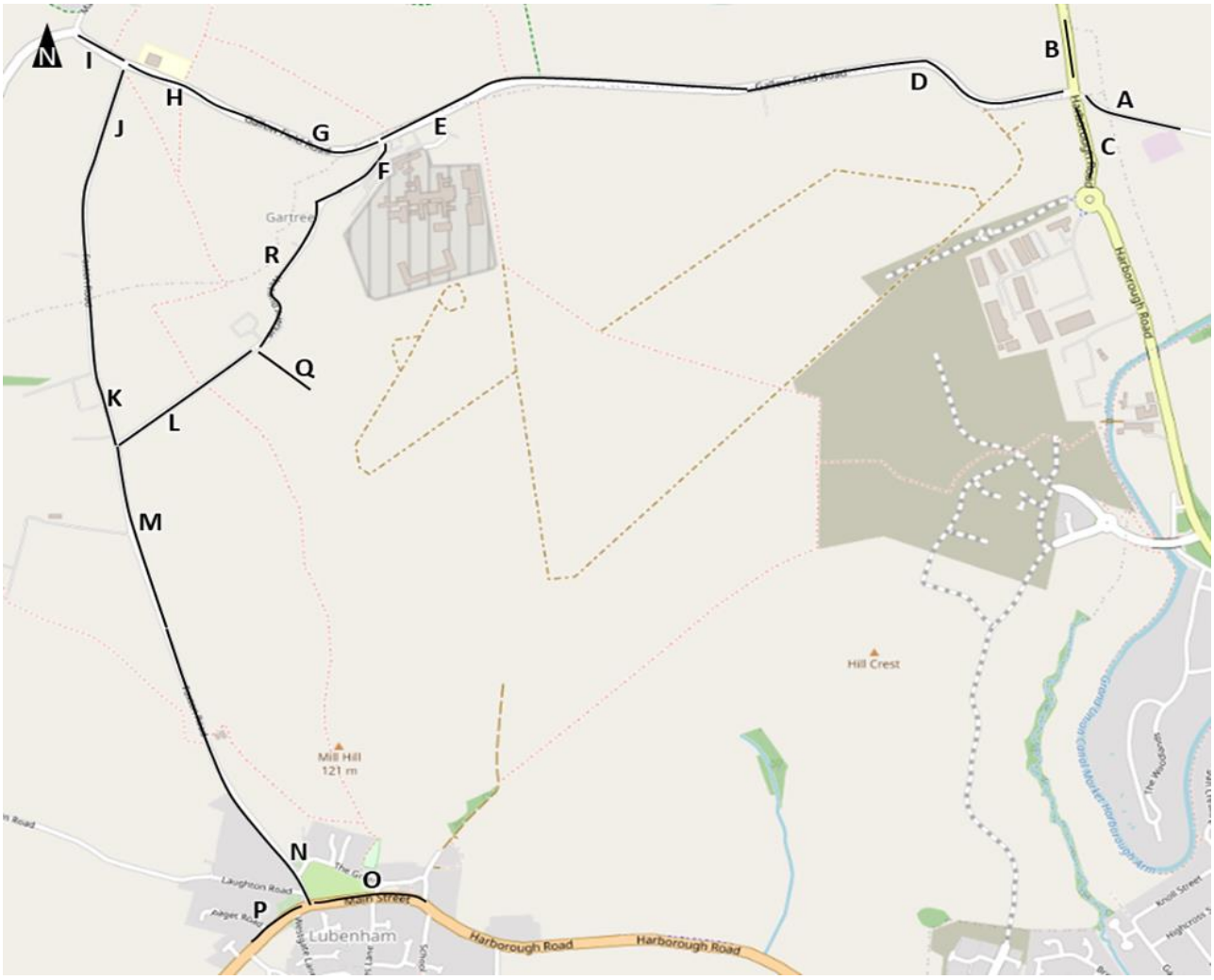
Appendix C Noise Survey Results


LAeq,15mins
LA90,15mins
LAFmax,15mins
Monitoring Location 2
Thursday 22nd to Friday 23rd October 2020
Hydrock
Sound Level, dB
90
80
70
60
50
40
30
20
1246
1316
1346
1416
1446
1516
1546
1616
1646
1716
1746
1816
1846
1916
1946
2016
2046
2116
2146
2216
2246
2316
2346
0016
0046
0116
0146
0216
0246
0316
0346
0416
0446
0516
0546
0616
0646
0716
0746
0816
0846
0916
0946
1016
1046
1116
1146
1216
1246
Time, hh:mm


LAeq,15mins
LA90,15mins
LAFmax,15mins
Monitoring Location 4
Thursday 22nd to Friday 23rd October 2020
Hydrock
Sound Level, dB
90
80
70
60
50
40
30
20
1230
1300
1330
1400
1430
1500
1530
1600
1630
1700
1730
1800
1830
1900
1930
2000
2030
2100
2130
2200
2230
2300
2330
0000
0030
0100
0130
0200
0230
0300
0330
0400
0430
0500
0530
0600
0630
0700
0730
0800
0830
0900
0930
1000
1030
1100
1130
1200
Time, hh:mm

Appendix D Traffic Information

ID	Location	Baseline 2021 Link Flows 18hr AAWT Veh	Baseline 2021 Link Flows 18hr AAWT %HGVs	Opening Year (2025) Without Development Traffic Link Flows 18hr AAWT Veh	Opening Year (2025) Without Development Traffic Link Flows 18hr AAWT %HGVs	Opening Year (2025) With Development Traffic Link Flows 18hr AAWT Veh	Opening Year (2025) With Development Traffic Link Flows 18hr AAWT %HGVs	**Speed** Posted speed limit shown unless value is denoted with an * in which case this is the average 2-way Mean Speed observed during the Automatic Traffic Count survey period
A	Leicester Lane, east of Harborough Road / Leicester Lane / Gallow Field Road Junction	1655	1%	1780	1%	1780	1%	60
B	Harborough Road, north of Harborough Road / Leicester Lane / Gallow Field Road Junction	13755	5%	14794	5%	15361	5%	50
C	Harborough Road, south of Harborough Road / Leicester Lane / Gallow Field Road Junction	12462	5%	13403	5%	13660	5%	50
D	Gallow Field Road, west of Harborough Road / Leicester Lane / Gallow Field Road Junction	3448	4%	3708	4%	4533	4%	48.5 *
E	Gallow Field Road, east of Gallow Field Road / Welland Avenue Junction	3454	5%	3715	5%	4539	5%	60
F	Welland Avenue, south of Gallow Field Road / Welland Avenue Junction	994	1%	1069	1%	1200	2%	15.3 *
G	Gallow Field Road, west of Gallow Field Road / Welland Avenue Junction	2992	5%	3218	5%	4027	5%	60
H	Gallow Field Road, east of Gallow Field Road / Foxton Road Junction	2981	5%	3206	5%	4015	5%	60
I	Gallow Field Road, west of Gallow Field Road / Foxton Road Junction	2349	4%	2526	4%	2526	4%	60
J	Foxton Road, south of Gallow Field Road / Foxton Road Junction	2684	5%	2887	5%	3696	5%	60
K	Foxton Road, north of Foxton Road / Welland Avenue Junction	2675	5%	2877	5%	3686	5%	60
L	Welland Avenue, east of Foxton Road / Welland Avenue Junction	258	3%	277	3%	1622	5%	34.3 *
M	Foxton Road, south of Foxton Road / Welland Avenue Junction	2817	5%	3030	5%	3681	5%	50.2 *
N	Foxton Road, north of A4304 Main Street / Foxton Road Junction	4027	3%	4331	3%	4982	3%	30
O	A4304 Main Street, east of A4304 Main Street / Foxton Road Junction	8417	5%	9053	5%	9417	5%	30
P	A4304 Main Street, west of A4304 Main Street / Foxton Road Junction	8120	6%	8733	6%	9020	6%	30
Q	Proposed Site Access	0	0%	0	0%	1345	5%	New Access
R	Welland Avenue between Welland Avenue / Proposed Site Access Junction and Welland Avenue / HMP Gartree Junction	337	14%	362	14%	362	14%	15



Appendix E Noise Modelling Assumptions

The following prediction methodologies and assumptions were adopted and implemented in to the acoustic model:

- The base map of the acoustic model is based on scale mapping of the site, provided by Mace, together with Ordinance Survey vector mapping of the surrounding areas;
- A Digital Terrain Model (DTM) has been created within the acoustic model based on OS Terrain 5m resolution topographical data of the Site and surrounding area;
- Existing buildings, that will not be demolished as part of the proposed development, are incorporated within the acoustic model, to allow prediction of screening effects across the Site. Buildings are assumed to have fully reflective facades;
- No specific mitigation has been included within the acoustic model;
- Noise propagation is predicted in accordance with ISO 9613-2:1996 *'Acoustics – Attenuation of sound during propagation outdoors – Part 2: General Method of calculation'* (ISO9613);
- To reflect the local ground cover, ground absorption was set to G = 0.8 for majority soft ground (80% acoustically absorptive ground);
- Road traffic is assumed to travel at the known speed limits on each road and as per the provided information by the transport consultant;
- Between 3-10% HGVs assumed for the roads incorporated within the model; and,
- 1st order reflections included in predictions.

Appendix F Potential Industrial Noise Sources

1 / 9002 Plan-Site-Block-Proposed - Planning

1 : 2000

0m 40m 80m 120m 160m 200m

VISUAL SCALE 1:2000 @ A1

- Building Footprint
- Exercise Area
- All Weather Surface Area
- Clearance Zone
- Community Area
- Existing Vegetation Retained
- Proposed Vegetation (refer to landscape plan for details)
- Horticultural Area
- Proposed Woodland Screening
- Proposed Ponds
- Existing Ponds
- Application Red Line Boundary
- MOJ Ownership Boundary
- Existing Gas Main
- Security Fence Zonal Fencing 5.2m
- Zonal Low Level Timber Fence
- Security Fence - Internal Fence 5.2m
- Security Fence - Outer Fence 5.2m
- Badger Set and Exclusion Zone

Rev	Date	Description
P06	03.08.21	Existing gas main line type on legend revised to show dash-dot.
P05	30.07.21	New ponds west of site indicated, with footpath route. New footpaths along Welland Avenue added. Existing Gas Main to south shown.
P04	26.07.21	Proposed bus stop note removed.
P03	13.07.21	Updated ownership and site line boundaries
P02	14.06.21	Updated to Mace TA Comments
P01	30.04.21	First Issue

This document references the following linked files

File Reference	Status	Revision
661277-0000-PEV-GTX0000-XX-M3-A-0001-D0200	S1	P 00
661277-0000-CEN-GTX0000-XX-SU-G-0001-A0700	S2	P03

Project Status
RIBA Stage 2

Client
Ministry of Justice

Project
New Prisons Programme

Ministry of Justice, 102 Petty France, London, SW1H 9AJ

Project Description / Site
New Prisons Programme
Gartree 2

Project Address
Site Adjacent to HMP Gartree

Building Type
SITE INFRASTRUCTURE

Drawing Title
Site-Block Plan-Proposed-Planning

Originator Logo
PICK EVERARD

Drawn By	HKM	Date	08-04-2021	
Checked By	CGI	Date	08-04-2021	
Approved By	CGI	Date	08-04-2021	

Drawing Number: 661277-0000-PEV-GTX0011-ZZ-DR-A-9002
Delref: B0700

Sheet No.: 1 of 1
Scale: As indicated
Orig. Sheet Size: @ A1
Rev.: P06

Data Security Classification: OFFICIAL
Suitability: S3

Status Rev: P01