Operational Noise Assessment Report

Coal Drops Yard

King's Cross Central General Partner Ltd

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King's Cross

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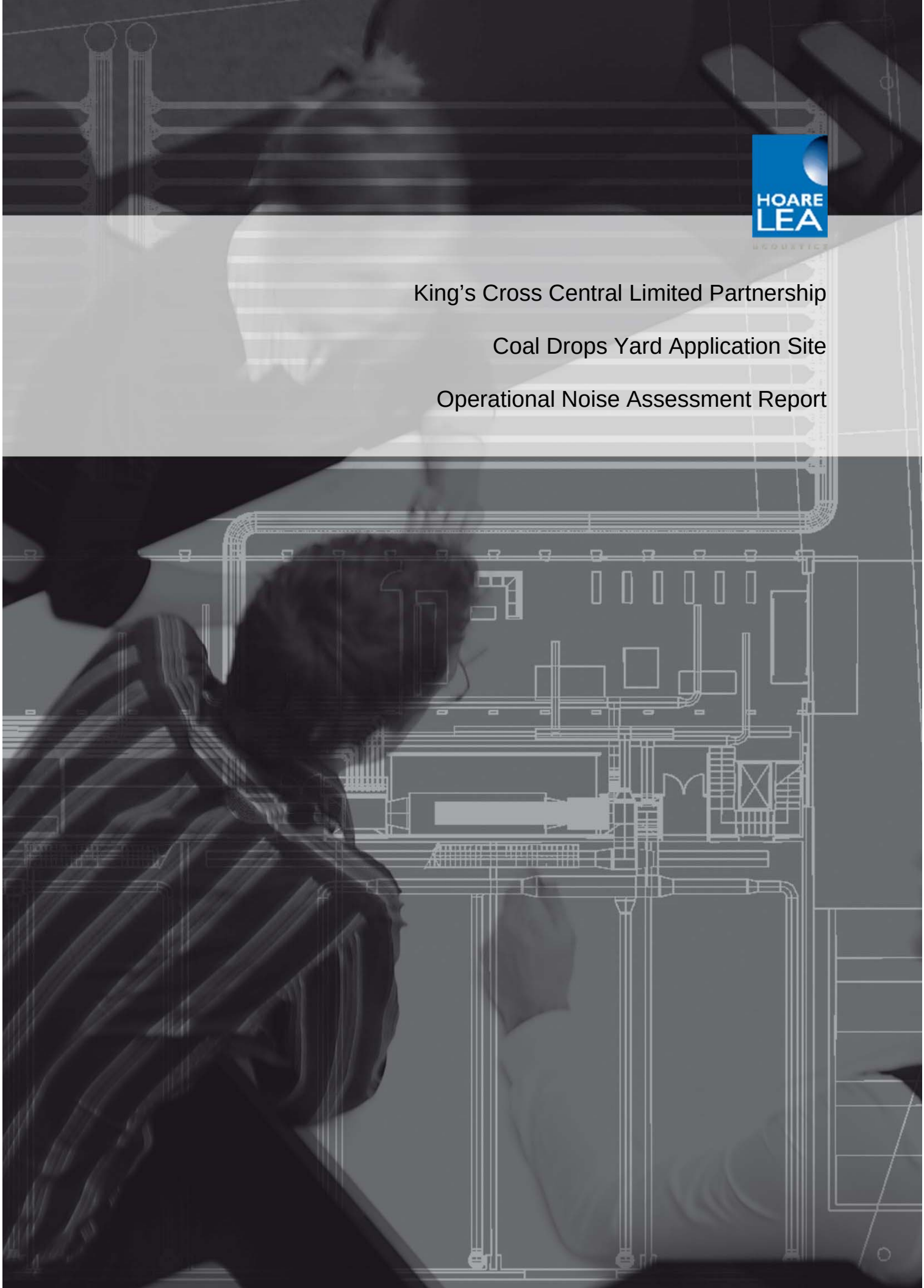

King's Cross Central Limited Partnership

Coal Drops Yard Application Site

Operational Noise Assessment Report

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Audit Sheet

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0	First Issue	15/07/2015	JB	
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Contents

1.0 Introduction

King's Cross Central Limited Partnership has appointed Hoare Lea Acoustics to prepare an acoustic report in relation to the proposals for Coal Drops Yard (incorporating the Eastern and Western Coal Drops, Western Wharf Road Arches and Lower Stable Street). The proposals are, in summary, to refurbish the existing buildings and bring them back into use, together with additional floor space on a new upper level as a retail destination. Retail uses will primarily be A1, however, with some A3 units including one restaurant in the southern anchor of the Western Coal drops.

As detailed in the accompanying Planning Statement, the suite of applications will comprise a full planning application (Western Coal Drops (WCD), Eastern Coal Drops (ECD) (less the southern anchor), the new upper level and Lower Stable Street), a reserved matters application (Western Wharf Road Arches (WWRA), the southern anchor unit in ECD and the public realm in the Yard) together with a listed building application for works to the Eastern Coal Drops. This report supports the suite of applications and hence considers both the requirements of the Outline Planning Permission (in relation to the reserved matters application) and current development plan policy together with other material considerations.

The report uses National, Regional and Local Planning Policy and recognised standards to assess potential noise emissions associated with the Application Site. The following operational noise emissions have been considered:

- Plant noise emissions
- Operational noise activity arising from within A3 and A1 uses at night
- Operational noise activity arising from the whole Application site during the day
- Noise associated with servicing the Application Site.

Typical operational noise levels have been used to calculate resultant noise effects at the closest noise sensitive receptor locations and assess the noise.

2.0 Site Description and Closest Noise Sensitive Receptors

The Application Site is located adjacent to and to the west of the Granary Building, with the Gasholder Triplets (a residential development) immediately to the west of the Western Coal Drops. Other less noise sensitive uses are offices on Stable Street that overlook the Eastern Coal Drops and Lower Stable Street. There are also restaurant units on Stable Street and in Granary Square.

The Application Site is bounded by the Regent's Canal to the south west with Camley Street Natural Park on the opposite bank. To the north lies the recently completed Lewis Cubitt Square. Immediately to the west lies the site for the proposed residential Gasholder Triplets development and Gasholder Park beyond. Local roads include Goods Way to the south of the Canal, Camley Street to the west with railway lines beyond serving St Pancras Station, and Stable Street to the east.

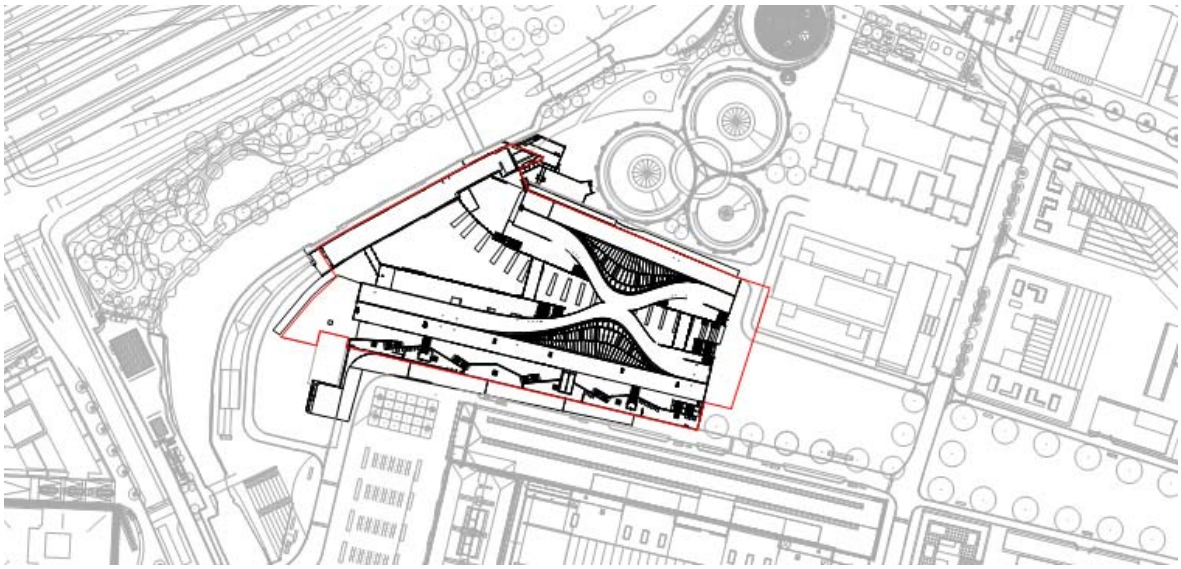

Figure 1: Application Site Location

3.0 Basis of Assessment

3.1 National Planning Policy Framework (NPPF)

The National Planning Policy Framework sets out the Government's current planning policies for England and how these are expected to be applied.

With regards to local noise planning policies, Section 11 paragraph 123 of the NPPF states:

'Planning policies and decisions should aim to:

- Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
- Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;
- Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put upon them because of changes in nearby land uses since they were established;
- Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.'

The NPPF makes reference to the DEFRA Noise Policy Statement for England 2010 (NPSfE). This latter document is intended to apply to all forms of noise other than that which occurs in the workplace and includes environmental noise and neighbourhood noise in all forms and is discussed in more detail in section 3.2.

3.2 Noise Policy Statement for England 2010 (NPSfE)

Noise Policy Statement for England (NPfSE) advises that the impact of noise should be assessed on the basis of adverse and significant effect but does not provide any specific guidance on assessment methods or limit sound levels. Moreover, the document advises that it is not possible to have 'a single objective noise-based measure…that is applicable to all sources of noise in all situations'. It further advises that the sound level at which an adverse effect occurs is 'likely to be different for different noise sources, for different receptors and at different times'.

In the absence of specific guidance for assessment of environmental noise within the NPPF and the NPSfE, it is considered appropriate to base assessment on current British Standards, national and local guidance. These are considered to be Local Authority guidance, BS 4142, BS 8233 and the World Health Organisations (WHO) guidelines.

NPSfE introduces the following concepts of noise effects which it states have been applied by the World Health Organisation:

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

LOAEL – Lowest Observed Adverse Effect Level
This is the level above which adverse effects on health and quality of life can be detected.
Extending these concepts for the purpose of this NPfSE introduces to the concept of a significant observed adverse effect level.

SOAEL – Significant Observed Adverse Effect Level
This is the level above which significant adverse effects on health and quality of life occur.

No guidance is defined in relation to these effects in terms of limiting values of noise within the NPSfE. The World Health Organisation guidelines (WHO Night Noise Guidelines 2009) adopt these definitions but NPSfE does not apply the noise values contained in the guidelines.

The document advises that it is not possible to have 'a single objective noise based measure…. that is applicable to all sources of noise in all situations' (paragraph 2.15). It further advises that the sound level at which an adverse effect occurs is likely to be different for different noise sources, for different receptors at different times (paragraph 2.22).

3.3 Planning Practice Guidance 2013 (PPG)

On-line guidance has been published to provide greater details in relation to the relevance of noise to planning following the introduction of the NPPF and NPSfE.

It states under the heading *'How to Determine the Noise Impact'* that the following should be considered by local authorities:

- 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.

The overall effect of both construction and when a development is complete should be considered. In line with NPSfE this includes identifying where noise exposure is above or below the significant observed adverse effect level and the lowest observed adverse effect level for a given situation.

The observed effects are defined in the table given in Appendix A attached which is detailed in the section headed *'How to Recognise when Noise could be a concern?'*

It is important to note that no specific noise parameters are defined in the text or target noise levels provided.

Under the heading '*What factors influence whether noise could be a Concern?'* the subjective nature of noise is discussed. It is stated that there is no simple relationship between noise levels and the impact on those affected. This depends on how various factors combine in particular situations, these include:

- *The source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day – this is because people tend to be more sensitive to noise at night as they are trying to sleep. The adverse effect can also be greater simply because there is less background noise at night;*

- *For non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise;*

- *The spectral content of the noise (i.e. whether or not the noise contained particular high or low frequency content) and the general character of the noise (i.e. whether or not the noise contains particular tonal characteristics or other particular features). The local topology and topography should also be taken into account along with the existing and, where appropriate, the planned character of the area.*

- *Consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases a suitable alternative means of ventilation can be found in the Building Regulations.*

- *In cases where existing noise sensitive locations already experience high noise levels, a development that is expected to cause even a small increase in noise may result in a significant adverse effect occurring even though little to no change in behaviour would be likely to occur.*

- *If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.*

- *Some commercial developments including fast food restaurants, night clubs and public houses can have particular impacts, not least because activities are often at their peak in the evening and late at night. Local planning authorities will wish to bear in mind not only the noise that is generated within the premises but also the noise that may be made by customers in the vicinity.*

3.4 Regional Planning Policy

3.4.1 The London Plan

The *London Plan: The Spatial Development Strategy for London Consolidated with alterations since 2011, March 2015* sets out planning policies on a range of issues including the effect of noise.

Policy 7.15 is specifically concerned with noise pollution and is to be implemented in order to reduce noise and support the objectives of the Mayor's Ambient Noise Strategy. It states that development proposals should seek to manage noise by:

- Avoiding significant negative noise impacts on health and quality of life as a result of new development
- Mitigating and minimising the existing and potential negative impacts of noise on, from, within as a result of, or in the vicinity of new development without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens on existing businesses
- Improving and enhancing the acoustic environment and promoting appropriate soundscapes (including quiet areas and spaces of relative tranquillity)
- Separating new noise sensitive development from major noise sources (such as road, rail, air transport and some types of industrial development) through the use of distance, screening or internal layout – in preference to sole reliance on sound insulation
- Where it is not possible to achieve separation of noise sensitive development and noise sources without undue impact on other sustainable development objectives, then any potential [negative] effects should be controlled and mitigated through the application of good acoustic design principles
- Having particular regard to the impact of aviation noise on noise sensitive development
- Promoting new technologies and improved practices to reduce noise at source, and on the transmission path from source to receiver

Policy 7.5 'Public Realm' notes that the effects of traffic can have a significant impact on the quality of the public realm in terms of noise and amenity of a space. It states:

- The negative effects of traffic should be minimised to ensure people's enjoyment of public realm is maximised
- Places should provide opportunity for quiet enjoyment

3.5 Local Planning Policy

3.5.1 Camden Development Policy: Local Development Framework, 2010-2015

"Camden Development Policies forms part of the Council's Local Development Framework (LDF), the group of documents setting out planning strategy and policies. The lead Local Development Framework document is the Core Strategy, which sets out the key elements of the Council's planning vision and strategy for the borough and contains strategic policies. The Core Strategy contributes to achieving the vision and objectives of Camden's Community Strategy and helps the Council's partners and other organisations deliver relevant parts of their programmes. All of our other planning documents must be consistent with the Core Strategy."

"Noise and vibration can have a major effect on amenity and health and therefore quality of life. Camden's high density and mixed-use nature means that disturbance from noise and vibration is a particularly important issue in the borough. Camden's Core Strategy recognises the importance of this issue for Camden's residents and policy DP28 contributes to implementing a number of Core Strategy policies, including CS5 – *Managing the impact of growth and development*, CS9 – *Achieving a successful Central London*, CS11 – *Promoting sustainable and efficient travel* and CS16 – *Improving Camden's health and well-being*."

3.5.2 Policy DP28 – Noise and Vibration

Policy DP28. Noise and Vibration states that the Council will not grant planning permission for:

- *development likely to generate noise pollution; or*
- *development sensitive to noise in locations with noise pollution, unless appropriate attenuation measures are provided; and*
- *development that exceeds Camden's Noise and Vibration Thresholds will not be permitted.*

Tables D and E of DP28 are relevant to the proposed Application Site and the tables are reproduced on the following pages. As can be seen from Table D, noise from entertainment venues cannot increase the existing ambient noise by more than 5 dB during the daytime (0700-2300hrs) and more than 3 dB at night (2300-0700hrs). This equates to the limits discussed in section 5. Table E sets out limits for plant noise emissions affecting residential properties.

Table D: Noise levels from places of entertainment on adjoining residential sites at which planning permission will not be granted

Noise description and measurement location	Period	Time	Sites adjoining places of entertainment
Noise at 1 metre external to a sensitive façade	Day and evening	0700-2300	L_{Aeq}, 5m shall not increase by more than 5dB*
Noise at 1 metre external to a sensitive façade	Night	2300-0700	L_{Aeq}, 5m shall not increase by more than 3dB*
Noise inside any living room of any noise sensitive premises, with the windows open or closed	Night	2300-0700	L_{Aeq}, 5m (in the 63Hz Octave band measured using the 'fast' time constant) should show no increase in dB*

* As compared to the same measure, from the same position, and over a comparable period, with no entertainment taking place

Table 1: Table D of Camden Development Policy 28 (DP28)

Table E: Noise levels from plant and machinery at which planning permission will not be granted

Noise description and location of measurement	Period	Time	Noise level
Noise at 1 metre external to a sensitive façade	Day, evening and night	0000-2400	5dB(A) <LA90
Noise that has a distinguishable discrete continuous note (whine, hiss, screech, hum) at 1 metre external to a sensitive façade.	Day, evening and night	0000-2400	10dB(A) <LA90
Noise that has distinct impulses (bangs, clicks, clatters, thumps) at 1 metre external to a sensitive façade.	Day, evening and night	0000-2400	10dB(A) <LA90
Noise at 1 metre external to sensitive façade where LA90>60dB	Day, evening and night	0000-2400	55dBL_{Aeq},

Table 2: Table E of the Camden Development Policy 28 (DP28)

3.5.3 Camden Emerging Policy

Camden's LDF is currently at the early stages of review. A draft Local Plan has been published for consultation. The initial period of consultation has ended. It will go through a further period of review prior to consideration by a planning Inspector at Public Inquiry. It is noted that the proposed draft criteria in respect of noise are more onerous than the current policy and the Outline Planning Permission requirements, however, the draft plan proposes to remove Table D (noise levels from places of entertainment).There are no criteria for servicing.

3.6 Outline Planning Permission (OPP)

The following Condition was applied to the overall scheme in relation to plant noise emissions:

Condition 60 (Amenity – Plant Noise)

"Applications for approval of Reserved Matters shall include full particulars of the noise impact of any plant or equipment included in that application which shall meet the following standard unless otherwise agreed in writing by the local planning authority:

(a) Noise levels at a point 1 metre external to sensitive facades to be at least 5dB(A) less than the existing background measurement (L_{A90}) expressed in dB(A) when all plant/equipment are in operation;

(b) Where it is anticipated that any plant/equipment will have a noise that has a distinguishable, discrete continuous note (whine, hiss, screech, hum) and/or if there are distinct impulses (bangs, clicks, clatters, thumps) special attention to be given to reducing the noise levels from the piece of plant / equipment at any sensitive façade to at least 10dB(A) below the (L_{A90}) expressed in dB(A).

Reason: To ensure a sustainable development and to safeguard the amenities of the development and adjoining premises and the area generally and to ensure that the development is carried out in accordance with the Environmental Impact Assessment, in accordance with SD1, SD6, SD7 and KC8 of the London Borough of Camden Replacement Unitary Development Plan 2006"

This is consistent with the Local Authority planning policy shown in the previous section.

3.7 British Standards and other guidance

3.7.1 BS 4142

British Standard 4142: 2014 Method for rating and assessing industrial and commercial sound (BS 4142:2014) [(1)] provides an objective method for rating the significance of impact from industrial and commercial operations. It describes a means of determining noise levels from fixed plant installations and determining the background noise levels that prevail on a site. It is also applicable to sound from loading and unloading of goods and materials at commercial premises.

The assessment of the impacts is based on the subtraction of the measured background noise level ($L_{A90,T}$) from the rating level ($L_{Ar,Tr}$). The rating level is the specific source noise level in question (either measured or predicted) with graduated corrections (from +0 dB to +9 dB) for tonality, impulsivity, intermittency and other sound characteristics which may be determined either subjectively or objectively, if necessary. Under section 9 *rating level* in the British Standard *other sound characteristics* are discussed, this states that where specific sound feature characteristics that are neither tonal nor impulsive but may otherwise be readily recognisable against the residual acoustic environment a penalty of 3 dB can be applied. The difference is then compared to the following criteria to evaluate the likelihood of complaint.

- a difference of around +10 dB is likely to be an indication of a significant adverse impact, depending on context;
- a difference of around +5 dB is likely to be an indication of an adverse impact, depending on context; and

- a difference of +0 dB or less is an indication of the specific sound source having a low impact, depending on the context.

3.7.2 BS 8233: Sound Insulation and Noise Reduction for Buildings

BS 8233: 2014 provides guidance for control of noise in and around buildings, and suggests appropriate criteria and limits for different situations. The criteria and limits are primarily intended to guide the design of new or refurbished buildings undergoing a change of use.

Table 4 within BS 8233 provides desirable internal ambient noise levels for spaces in residential dwellings when they are unoccupied (when there are no other noise sources than extraneous external noise).

Activity	**Location**	**Daytime** (0700 to 2300)	**Night-Time** (2300 to 0700)
Resting	Living Room	35 dB $L_{Aeq,16hr}$	-
Dining	Dining Room / Area	40 dB $L_{Aeq,16hr}$	-
Sleeping (Daytime Resting)	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$

Table 3: Indoor Ambient Noise Levels in Spaces for Dwellings (Table 4 BS 8233:2014)

Supplementary Note 2 and 4 to Table 4 within BS 8233 are copied below for reference:

"NOTE 2 – The levels shown in Table 4 are based on the existing guidelines issued by the WHO…"

"NOTE 4 – Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$ depending on the character and number of events per night."

In addition, Table 6 within BS 8233 provides indoor ambient noise levels in non-domestic buildings when they are unoccupied.

Activity	**Location**	**Design Range** $L_{Aeq,T}$ dB
Speech or Telephone Communications	Department Store	50 – 55
Study and Work requiring Concentration	Staff / Meeting Room, Training Room	35 – 45
	Executive Office	35 – 40

Table 4: Typical Noise Levels in Non-Domestic Buildings (Table 6 BS 8233:2014)

3.7.3 World Health Organisation Guidelines for Community Noise 1999

The Guidelines were published in 1999 and provide guideline values in section 4.1. It is made clear that the guideline values are for onset effects, no matter how small the effects may be and they should not necessarily be used for the setting of practical noise immission standards as the following text states:

> *'These are essentially values for the onset of health effects from noise exposure. It would have been preferred to establish guidelines for exposure-response relationships. Such relationships would indicate the effects to be expected if standards were set above the WHO guideline values and would facilitate the setting of standards for sound pressure levels (noise immission standards)'.*

In relation to noise effects on sleep in paragraph 4.2.3 of the WHO Guidelines it is stated that measurable effects on sleep start at background noise levels of about 30 dB L_{Aeq}. If noise is not continuous then L_{Amax} can be used. Effects have been observed at individual L_{Amax} exposures of 45 dB or less. It is important to limit the number of noise events with an $L_{Amax(Fast)}$ exceeding 45 dB.

The guidance is summarised in table 4.1 extracts of the WHO Guidelines which are shown below applicable to internal noise levels within dwellings.

Specific Environment	Critical Health Effect(s)	L_{Aeq} [dB]	Time Base [hours]	$L_{Amax(Fast)}$ [dB]
Outdoor living area	Serious annoyance, daytime and evening	55	16	-
	Moderate annoyance, daytime and evening	50	16	-
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	
Inside Bedrooms	Sleep disturbance, night-time	30	8	45

Table 5: Table 4.1 of WHO Guidelines

3.8 Summary of assessment criteria

The application for full planning permission is required to be assessed against the provisions of the development plan (The London Plan, and Camden's LDF) and where relevant, any other material considerations. The application for reserved matters approval is required to be consistent with the provisions of Condition 60 of the OPP.
The most relevant guidance available to the operations of the Application Site are therefore the Local Authority guidelines for noise from plant and entertainment. In terms of plant noise the DP28 Policy is consistent with the Outline Planning Permission Condition 60. The Local Authority guidance is considered most relevant as it is directly applicable to the activity being assessed, the other guidance discussed in section 3 has been taken into consideration.

For noise generated during servicing of the Application Site comparison is made with the existing noise climate and WHO Guidelines for internal noise. In addition an assessment of noise created by the movement of goods at the Site has been made using the principles of BS 4142. It should be noted that this is not considered a particularly suitable means of assessment as the range of variability in activity cannot be defined absolutely. In addition the site is not developed so data from other sources / developments has been used which may vary in practice.

The Application Site will be assessed in the following sections against these parameters.

4.0 Existing Noise Climate

Acoustic surveys were undertaken as part of the Outline Planning Permission submission for the King's Cross Central Application Site. This noise monitoring was conducted at various locations around the whole Application Site and the two most appropriate locations relative to the Application Site are as shown in Figure 2 at Fish & Coal and Granary West.

Figure 2: Baseline Noise Monitoring Locations (site outlined in red)

The typical weekday ambient and background noise levels are as below:

Site	Ambient $L_{Aeq,T}$			Background (lowest) L_{A90}		
	Day12hr	Evening 4hr	Night 8hr	Day12hr	Evening 4hr	Night 8hr
Fish & Coal	66.1 dB	63.1 dB	60.2 dB	56.5 dB	53.4 dB	45.6 dB
Granary West	56.9 dB	55.6 dB	52.7 dB	49.6 dB	49.2 dB	43.8 dB

Table 6: Baseline Noise Levels

For reference the ambient noise level is the average of surrounding environmental noise, the background noise level is the taken to be the quietest 10% of the time.

The results are similar for background noise but ambient noise at Fish & Coal is higher, this is due to the proximity to the main noise sources which are the adjacent railway and local roads. For the purposes of this report the Granary West noise levels are seen as more appropriate as the location is closer to the affected receptors.

5.0 Operational Noise Assessment

This section of the report provides an assessment of predicted noise emissions from the Application Site when operational. The three aspects considered are as below:

- Plant Noise Emissions
- Day and Night operational noise emissions
- Retail servicing noise

The noise sensitive receptor location has been taken to be the Gasholder Triplets. The Camley Street Natural Park and Regent's Canal are considered less sensitive to noise emissions from the Application Site as they are largely screened by the Wharf Road Arches and are subject to higher noise levels due to the proximity to existing noise sources such as adjacent road and rail traffic.

5.1 Plant Noise Emissions

The final plant noise emissions for the Application Site cannot be accurately determined at this stage. This is due to much of the plant being provided by tenants as part of their fit out works. However, robust noise limits can be set for each tenancy to ensure that the cumulative noise levels would meet the following values at the closest noise receptor location, namely, the Gasholder Triplets as this is residential use.

Period	Rating Level $L_{Ar,Tr}$
Daytime	44 dB
Night	39 dB

Table 7: Rating Noise Limits

These limits are based on a rating level of 5 dB below background consistent with the Outline Planning Permission Consent Condition 60 applicable to King's Cross Central Development Site and are in alignment with recognised guidance.

The likely plant installation is taken to be as below in table 8:

Location	
Western Coal Drops	6 kitchen extract flues (chimney)
Eastern Coal Drops	1 kitchen extract flue (chimney)
Lower Stable Street	Miscellaneous small scale cooling
Yard Level Western Coal Drops	Small scale cooling

Table 8: Potential Plant Installations

Extract flues are proposed to give some flexibility to the uses within the Western and Eastern Coal Drops to allow for A3 uses in certain units, however, it is not proposed that all will be in operation at one time as the majority of units are anticipated to be in A1 use.

The Landlords' systems provide district heating and cooling to the scheme, reducing the requirement for local plant at the Application Site.

The known and potential plant as shown in Table 8 has been included within a noise model created using CADNA which is based on ISO 9613-2 Acoustics – Attenuation of Sound during propagation outdoors. Figure 3 indicates with red crosses, the proposed plant positions, and shows the resulting noise levels at the upper floors of Gasholder Triplets at a height of 20 metres consistent with the upper storeys.

The noise model is based on the following emissions:

Kitchen Extract Flue	58 dB $L_{Ar,Tr}$ at one metre
Miscellaneous small existing plant	61 dB $L_{Ar,Tr}$ at one metre
Louvre to Yard Level	64 dB $L_{Ar,Tr}$ at one metre

These noise levels are consistent with carefully selected plant with attenuation to the kitchen extract systems.

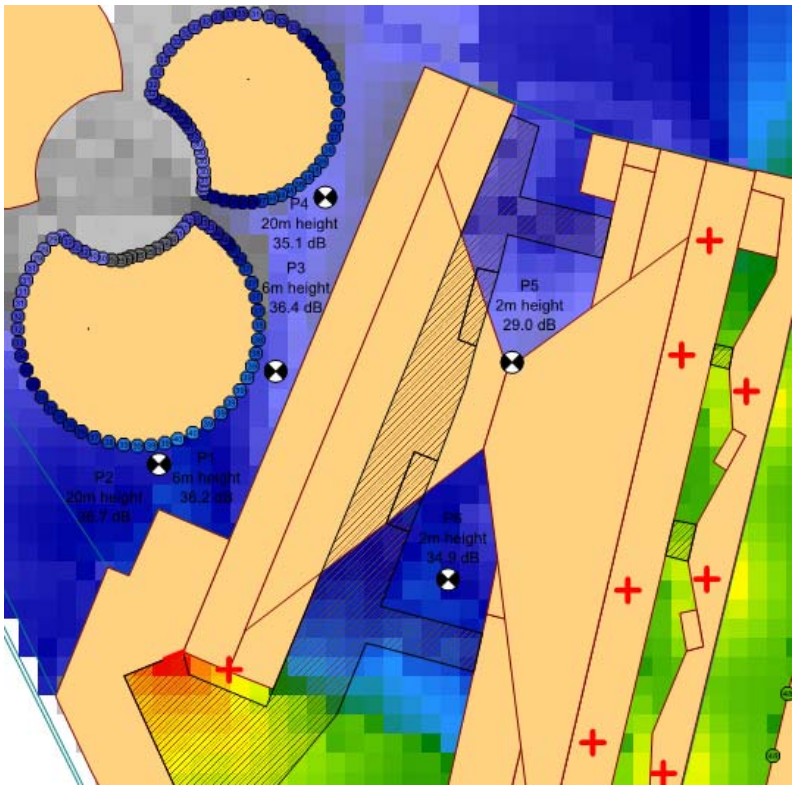

Figure 3: Noise Model Plant Noise Emissions

As can be seen the night time criteria will meet with this plant scenario with predicted levels of below 39 dB $L_{Aeq,T}$. This represents the worst case as much plant will not operate at night, or if it does then it will be at reduced capacity. The upper floors have line of greater line of sight of the plant compared to the lower floors which are effectively screened from most sources.

The Local Authority requirements from Condition 60 and Policy 28 are considered to be met by these proposals which is also consistent with British Standards.

5.2 Operational Noise

5.2.1 Night Time Operation

The A3/A4 units and Lower Stable Street kiosk units associated with the Application Site are proposed to operate during the following hours:

Monday to Thursday	08:00-00:30
Friday and Saturday	08:00-01:30
Sunday	08:00-23:30

This infers operational noise will occur at night (deemed to be 23:00 – 07:00). For the purpose of the assessment the following operational parameters have been considered for the night:

- Doors closed
- Internal noise level 79 dB $L_{Aeq,T}$, high occupancy background music

A shopfront sound insulation value of R'$_w$ 27 dB which allows for doors and glazing combined has been included in the calculations. Tenant noise would be limited by the terms of any Lease to ensure the noise emissions are controlled.
In a similar manner to the plant noise emissions the operational noise emissions have been assessed using a 3D noise model. The complexity of the buildings and propagation paths renders the use of hand calculations inappropriate. The model result is as shown below in Figure 4.

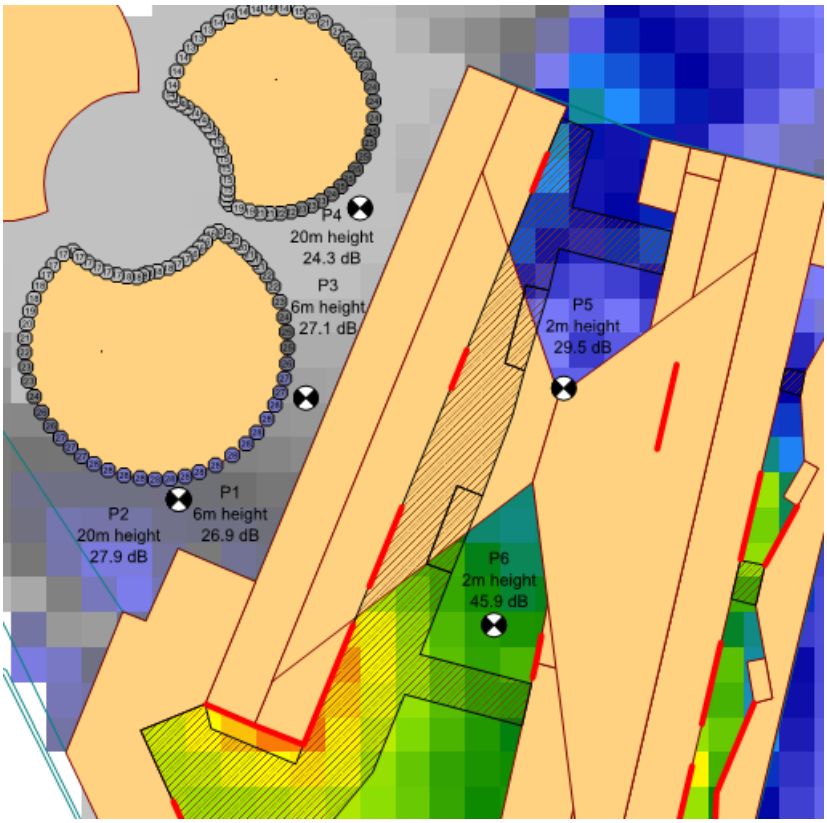

Figure 4: Noise Model Result Night

As can be seen from the results the worst case noise level at Gasholder Triplets at the upper floors worst case receiver location is predicted to be 28 dB $L_{Aeq,T}$. This can be compared with the existing ambient noise climate of 52.7 dB $L_{Aeq,T}$. As can be seen the predicted emissions are appreciably lower than the prevailing night time ambient noise level. The assessment is based on indicative positions of A3 units, and is considered to be a worst case scenario in terms of the quantum of retail units operating at night.

The resulting operational noise from the relevant A1 and A3 Units should not increase the ambient noise level prevailing at night. Camden Policy DP28 requires that noise emissions from places of entertainment should not increase noise level at night by more than 3 dB, this implies that the noise from entertainment should be no greater than the prevailing ambient noise without the entertainment noise.

5.2.2 Daytime Operations

During daytime use there are retail units which will be operational in addition to the A1 and A3 food uses discussed above. Some of the A1 and A3 uses will have external trading.

The noise emissions from the Application Site have been modelled for the daytime operational mode with the following parameters.

- External trading
- Open shopfronts
- Operational noise level 79 dB $L_{Aeq,T}$ high occupancy, background music

The following Figure shows the resulting noise levels at Gasholder Triplets.

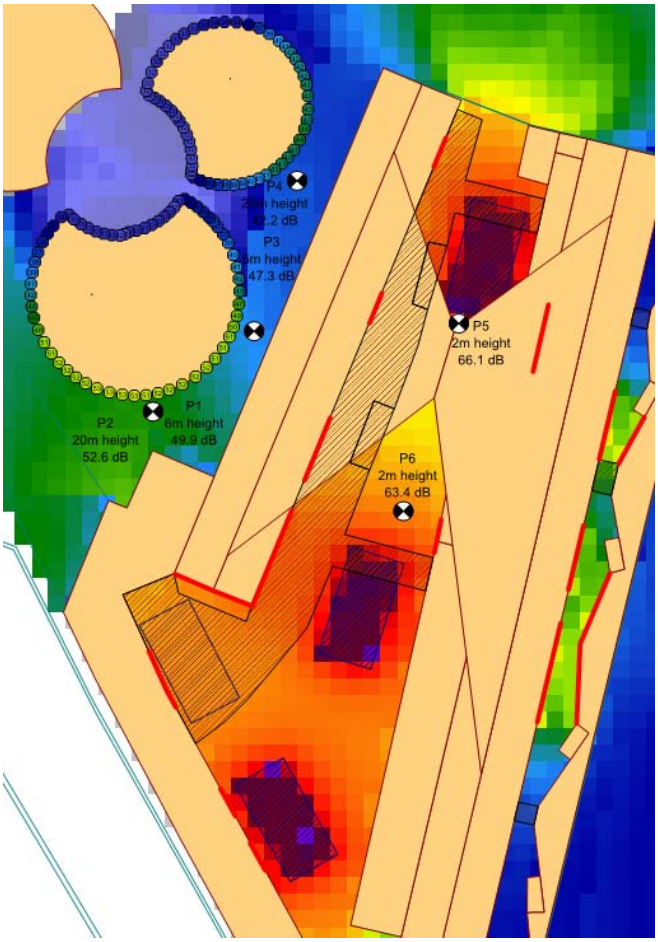

Figure 5: Noise Model Results Daytime Operation

As can be seen the predicted noise level is 53 dB $L_{Aeq,T}$ daytime and evening. This can be compared with the existing ambient noise level of 54.6 dB $L_{Aeq,T}$ (evening). The resulting operational noise from the Application Site will increase the existing ambient noise level both in the daytime and evening by a maximum of 1.5 dB.

The requirement of Camden Policy DP28 for daytime and evening is that this noise source will not increase existing noise by more than 5 dB, the predicted operational noise is appreciably lower than this and on this basis the requirements of Camden Policy DP28 should be met.

5.3 Retail Servicing Noise

5.3.1 Servicing Strategy

During the design of the proposals Arup, has considered logistics, likely uses, times, methods of delivery and waste to develop a servicing and waste strategy. Full details of the Arup servicing strategy are contained in the Transport Statement accompanying this planning application. The assessment of noise has been made using this information.

The deliveries are proposed to start at 6:00 am and conclude by 10:00am seven days per week and this will be managed.

The total deliveries per hour range from 22 – 26 vehicles.

The following vehicle types are typically proposed to be used to service the Application Site.

Service Type	Vehicle Type	Typical Arrivals	Duration
Deliveries	44t Artic 16.5m	0-5%	25 mins
	Rigid LGV 10-12m	5-15%	25 mins
	7.5t LGV 8m	34%	20 mins
	3.5t PLGV 6m	48%	15 mins
Waste Collection	Skip compactor loader	2 per day	15 mins
	Refuse collection vehicle	1 per day	

Table 9: Typical Servicing Vehicles

The Loading Bay arrangement is as show in in Figure 6 below.

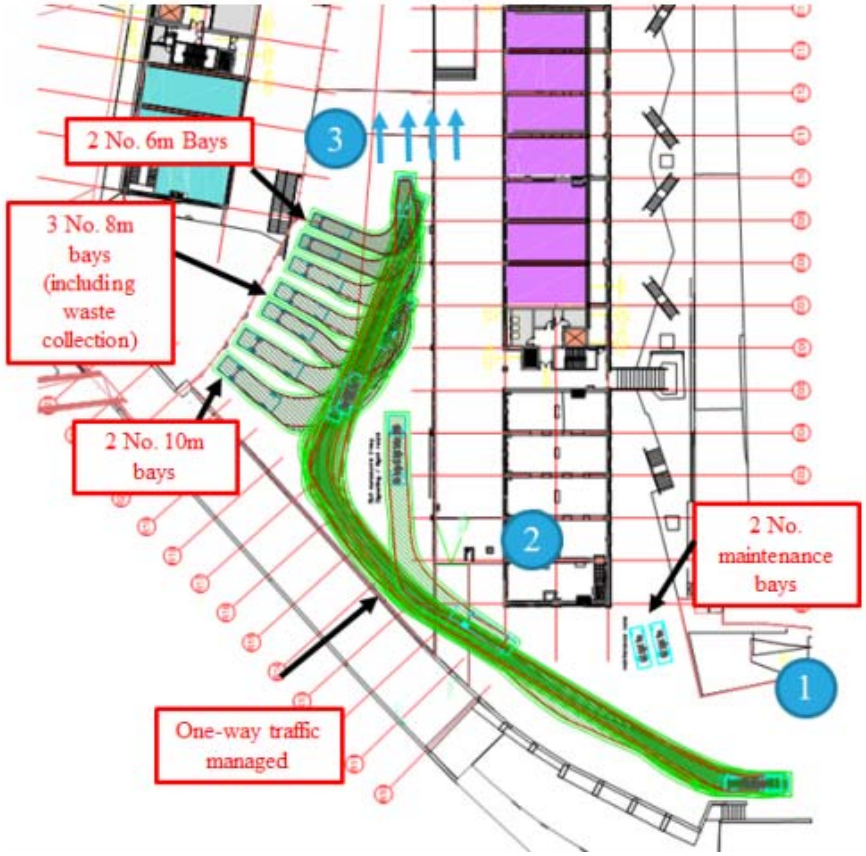

Figure 6: Service Yard Layout

Goods will be generally delivered in the following ways:

- Food and beverage deliveries are often palletized, or delivered in plastic or wooden crates or trolleys, or boxed in roll cages
- Drink cans are often delivered on a pallet
- Cleaning and sanitary suppliers are delivered in boxes or crates
- Equipment and furniture is sometimes wrapped in plastic or delivered in cardboard boxes
- Palletized goods and heavy or large crates will be handled by using a hand pallet truck which will be provided by the deliverer. Roll cages will be pushed.

The range of activities associated with the servicing of the Application Site will result in varying noise levels. Typical noise levels from typical activity may be from 67 – 92 dB $L_{Amax(Fast)}$ at 10 metres.

The following table shows potential average noise levels ($L_{Aeq,T}$) from unloading activity for the whole event, these may vary with the means of unloading/distribution goods being transported and surface of distribution route.

Activity	Sound Pressure level at 10 metres
LGV Roll Cages	55 dB $L_{Aeq,T}$
HGV Pallet Trucks	68 dB $L_{Aeq,T}$

Table 10: Typical Delivery Noise levels

5.4 Assessment

5.4.1 Operational Noise Data

The service operation operates during the night time period (23:00-07:00) from 6:00 am to 7:00 am and then continues during the day until 10:00 am. On this basis two separate assessments are required, with the night being more onerous.

During the night period it is considered prudent to include average activity noise during a delivery and maximum event noise levels associated with the various activities.

5.4.2 Night Time Noise

During the night time period of 6:00am – 7:00am the maximum event noise level is calculated to be in the range of 60 – 66 dB $L_{Amax(Fast)}$ at facades for the higher noise level events. The building envelope of the Gasholder Triplets Building is anticipated to provide a sound reduction of R'_w 30 dB with windows closed. Based on this sound insulation value the internal noise level is predicted to be in the range of 20 – 40 dB $L_{Amax(Fast)}$ for typical activities during the servicing operation on the Application Site. With windows open this is likely to be in the range 31-51 dB $L_{Amax(Fastt)}$. These levels can be compared with guidance in World Health Organisation Guidelines for Community Noise 1999 which suggests internal noise levels of 45 dB $L_{Amax(Fast)}$ are acceptable.

The average noise level is derived as below for an hour period:

Vehicle Type	Number	Noise Level at 10 metres	Time
LGV/PLGV	18 vehicles	55 dB $L_{Aeq,T}$	15 mins
Rigid LGV	4 vehicles	68 dB $L_{Aeq,T}$	25 mins

Table 11: Vehicle Information for Night Assessment

From this table the event noise levels can be determined and the cumulative noise level calculated, allowing for screening effects and distance corrections. The resultant calculated hourly noise level at the facades of the Gasholder Triplets is 39 dB $L_{Aeq,T}$ for this combination of vehicles. This noise level is likely to be below the prevailing ambient noise level; on this basis this is unlikely to be significant even considering the character of the noise differing from the prevailing noise climate.

5.4.3 Daytime Noise Assessment

The daytime noise level is assessed over a one hour period and considers the average noise level only. For the daytime period the following applies.

Vehicle Type	Number	Noise Level	Time
LGV/PLGV	22 vehicles	55 dB $L_{Aeq,T}$	15 mins
Rigid LGV	5 vehicles	68 dB $L_{Aeq,T}$	25 mins

Table 12: Vehicle Information for Day Assessment

Using the same basis as the night assessment the calculated noise level is 39 dB $L_{Aeq,T}$ at the facades of Gasholder Triplets.

This noise level is below the existing ambient noise climate by a substantial margin, on this basis, even considering the differing character of the noise it is unlikely to be significant.

5.4.4 BS 4142 Assessment

The methodology of BS 4142 is not entirely suited to this assessment as the source does not currently exist, data from other sites has been used which will vary due to surface, use, equipment used, weight of products and other factors. The data used for the assessment has considerable variability, the worst case of HGV deliveries has been considered here without mitigation which is discussed in the following sections.

Using the data available for these type of delivery the best case is a roll cage and the worst case is a pallet truck. The source noise may not be continuous during the fifteen minute assessment period, if a shorter operational period were used a correction would be applied reducing the resultant noise level. This has not been applied so is the worst case. In addition a 6 dB impulsivity correction has been applied to the results, this is also potentially pessimistic. This is defined as clearly perceptible in BS4142:2014.

The assessment for night is as below:

Specific sound level	39 dB $L_{Aeq(15\ minutes)}$
Acoustic feature correction	+6 dB
Rating level	45 dB
Background level	44 dB $L_{A90\ (15\ minutes)}$
Excess of rating level over background level	1 dB

The assessment is 1 dB rating level above background noise, this is considered to be of less than marginal significance using BS 4142:2014. It is of note that smaller van deliveries are 13 dB quieter than the worst case set out above (see Table 11) which would produce an assessment of below background noise indicating a low impact.

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The assessment for day is as below:

Specific sound level	39 dB $L_{Aeq(15\ minutes)}$
Acoustic feature correction	+6 dB
Rating level	50 dB
Background level	44 dB $L_{A90\ (15\ minutes)}$
Excess of rating level over background level	-6 dB

This assessment shows the rating level is below background even for the worst case of HGV vehicle unloading, according to BS 4142:2014 this indicates a low impact.

The noise levels shown in this section are without particular mitigation. The following mitigation options can be considered.

5.5 Scope for mitigation

The foregoing assessment is based on no mitigation, strategies will be developed to mitigate some of the higher noise activities. These potential mitigation measures are outlined below for all deliveries:

- All engines off during deliveries
- White noise reversing alarms
- Empty roll cages loaded after 07:00am
- Doors not to be slammed and radios off when doors are open
- Rubber matting under tail lifts / some areas of roll cage/pallet truck route where practical
- Smooth surface in the South Yard

6.0 Summary

Relevant National, Regional and Local Planning Policy in conjunction with recognised acoustic guidance documents have been considered. Local Policy and Outline Planning Permission Planning Conditions are the most relevant to the Application Site and have been used to undertake this assessment. The assessment has had regard to other policy and guidance.

The operational noise associated with servicing the Application Site, typical day and night occupancy noise and plant emissions have been considered. The initial plant noise assessment indicates Condition 60 and development plan policy requirements will be met.

Assessment of the noise due to servicing the development indicates reasonable levels will be achieved, however, as noted above, variables, such as, the 'as built' situation, the type of equipment used and weight of products gives rise to some uncertainty, therefore proposals for potential mitigation have been made that would provide a lower noise level, if required.

The operational noise is predicted to be in compliance with Policy DP28 in respect of entertainment noise.

The outcome of the assessments in all cases is that no significant effect is predicted at Gasholder Triplets, deemed to be the closest affected noise sensitive location to the Application Site. The effects on less sensitive uses such as offices are also therefore acceptable.

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