



PLANNING APPLICATION ENVIRONMENTAL STATEMENT ACOUSTIC REVIEW

Date: 28 October 2015

Application Reference: HGY 2015 3000

Site Address: Tottenham Hotspur Football Club, 748 High Road, London N17 0AP.

Application

1. Planning Application reference HGY 2015 3000, was submitted on 18 September 2015; seeking permission for proposed demolition and comprehensive phased redevelopment for stadium (Class D2) with hotel (Class C1), Tottenham Experience (sui generis), sports centre (Class D2); community (Class D1) and / or offices (Class B1); housing (Class C3); and health centre (Class D1); together with associated facilities including the construction of new and altered roads, footways; public and private open spaces; landscaping and related works at Tottenham Hotspur Football Club, 748 High Road, London N17 0AP.
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Summary

2. Sanctum Consultants are instructed by LB Haringey Council (the LPA) to review the Applicant's Environmental Statement; Noise and Vibration impact assessment (the Report), for planning application reference: HGY/2015/3000. And to review planning conditions attached to the previous extant scheme planning application reference: HGY/2010/1000.
3. The Report identifies that noise emanating from the construction and operational use of the proposed development is likely to have an adverse aural impact on local residents and future residents. And, may give rise to complaints of noise nuisance, prior to mitigation measures being implemented.

4. If the LPA is minded to grant planning permission, effective noise mitigation measures are required, to protect the aural amenity of local residents and reduce the likelihood of complaints of noise nuisance.
5. The development will take 6-7 years to construct, with construction work proposed for 12 hour working days, 7 days a week, at noise levels which are assessed as significant. In accordance with the provisions of the Control of Pollution Act 1974, Section 61; it is appropriate for the contractor or developer to agree noise and vibration requirements, and an appropriate noise monitoring and control regime, with the local authority, prior to construction.
6. The Report states the increased level of operational road traffic noise is assessed as insignificant, so no specific noise mitigation measures are necessary.
7. The proposed operational noise limits for fixed mechanical plant and equipment do not accord with Condition 50 of the previous extant scheme, reference: HGY/2010/1000.
8. No specific information regarding the proposed plant types and locations has been provided. Proposed fixed plant noise limits are derived from historic baseline noise data from 2008. Operational noise is likely to be audible at the façade of residential properties. Operating fixed plant at night-time, at **45 dBLAeq_{8hr}**, is likely to cause sleep disturbance, with windows open. To protect aural amenity, the LPA may therefore wish to consider retaining Conditions 50-52 from the extant scheme, reference: HGY/2010/1000.
9. Football event noise is predicted to increase by **0.4dB**, compared to the extant planning permission. This is likely to be an imperceptible change, so no additional noise mitigation measures are considered necessary.
10. The Report does not assess the noise impact of non-sport major events (concerts) in accordance with the Noise Council's Code of Practice on Environmental Noise Control at Concerts (CoP, 1995). Instead, the Report proposes to use a higher noise criterion, of **75 dB LAeq,15min** for 6 music

concerts, and **75 dB LAeq, event** for 10 non-football, sporting events (including 2 American Football, NFL matches).

11. To protect existing and future residents from noise pollution, the LPA may wish to consider retaining the extant Planning Condition 22 and not permit a higher noise criterion for music concerts. The LPA may also wish to consider amending and attaching Planning Conditions 17, 18, 20, 21, 23, to Non-Football Events and Non-Sport Major Events, from the extant planning permission.
12. The site suitability assessment concludes; to protect aural amenity, windows to the proposed residential development, should normally be kept closed, and a suitable form of mechanical ventilation installed. The LPA may wish to consider attaching a planning condition to ensure a suitable design criterion for windows and mechanical ventilation is implemented.

Introduction

13. Planning application reference: HGY/2010/1000 was previously granted conditional planning consent, under the provisions of the Town and Country Planning Act 1990, for the construction of a new Tottenham Hotspur Football Club Stadium, with associated non-football development.
14. Since the approval of application HGY/2010/1000 on 20 September 2011, the Applicant affirms, there 'has been a change in the Club's requirements (including technical requirements and specifications for a world class stadium).'
15. On 18 September 2015 the Applicant submitted a new planning application reference: HGY/2015/3000; for a redesigned Stadium with increased capacity, of 4,850 more than the extant scheme. The Applicant also seeks permission for non-football development including a 180 bedroom hotel, the 'Tottenham Experience' (incorporating existing Grade II Warmington House), sports centre, community health building, four residential towers, community / office space and public realm works.

16. In accordance with the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 (as amended). The Applicant has undertaken an Environmental Impact Assessment (EIA) for this 'Urban Development Project,' and submitted an Environmental Statement, dated September 2015, in support of the Application.
17. The EIA provides a systematic and objective process through which the likely significant environmental effects of a project can be identified, assessed and, wherever possible, mitigated.
18. Sanctum Consultants are instructed by the LPA to review the Applicant's Environmental Statement; Chapter 13 - Noise and Vibration impact assessment and Appendices 13.1-13.11. The Applicant's Report assesses the site's suitability for residential development and the likely impact from;
 - Construction Noise
 - Operational Road Traffic Noise
 - Operational Noise from Fixed Plant
 - Football Event Noise
 - Non-Football Sport Major Event Noise
 - Non-Sport Major Event Noise (Concerts)
19. Sanctum Consultants are also instructed to review noise and vibration planning conditions attached to the previous extant scheme reference: HGY/2010/1000. And, consider whether they should be applied to the new scheme, amended, or if additional conditions are required.

Material Considerations

20. When considering a planning application, the LPA has a statutory duty to have regard to the provisions of the National Planning Policy Framework, Development Plan and any other material considerations.
21. The National Planning Policy Framework, Planning Policy Guidance 11 (NPPF, PPG11) for Conserving and Enhancing the Natural Environment, states that Planning policies and decisions should aim to:
 - a) avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;

- b) 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;
- c) 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 on them because of changes in nearby land uses since they were established; and
- d) 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.

22. The London Plan 2011 (as amended) sets out planning policies, strategies, and guidance at national and regional level. Policy 7.15 states, development proposals should seek to manage noise by:

- a) avoiding significant adverse noise impacts on health and quality of life as a result of new development;
- b) mitigating and minimising the existing and potential adverse 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 of business;
- c) improving and enhancing the acoustic environment and promoting appropriate soundscapes (including Quiet Areas and spaces of relative tranquillity);
- d) 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;
- e) 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 adverse effects should be controlled and mitigated through the application of good acoustic design principles;
- f) having particular regard to the impact of aviation noise on noise sensitive development;

- g) promoting new technologies and improved practices to reduce noise at source, and on the transmission path from source to receiver.
23. The Town and Country Planning (Environmental Impact Assessment) Regulations 2011 (as amended) Schedule 2 section 10(b) 'Urban Development Projects' requires an Environmental Impact Assessment (EIA) to be undertaken when the proposed development exceeds an applicable threshold of 150 dwellings.
24. The Local Plan: Strategic Policies for Haringey is the main statutory plan for the LPA (from 18 March 2013), with saved Policies from the UDP (adopted 17 July 2006). The UDP contains a number of saved Environmental Protection Policies.
25. The LPA's Planning Policy UD3: General Principles states: 'the Council will require development proposals to demonstrate that: a) there is no significant adverse impact on residential amenity or other surrounding uses in terms of loss of daylight or sunlight, privacy, overlooking, aspect and the avoidance of air, water, light and noise, pollution (including from the contamination of groundwater/water courses or from construction noise) and of fume and smell nuisance.'
26. The LPA's Planning Policy ENV6 Noise Pollution states: 'the Council will ensure that new noise sensitive development is located away from existing, or planned sources of noise pollution. Potentially noisy developments should only be located in areas where ambient noise levels are already high and where measures are proposed to mitigate its impact.'
27. The LPA's Planning Policy CLT4: Hotels, Boarding Houses and Guest Houses states: 'applications for hotels, boarding houses and guest houses will be permitted provided that: c) the proposal does not have an adverse impact on the amenity of nearby residential properties or other uses. Proposals should not have an adverse impact on the environment by reason of noise, disturbance, traffic generation, exacerbation of parking problems, or detract from the character of the area. In general the local need for uses will be assessed in light of a strong presumption against the loss of residential accommodation.'

28. Noise is defined as 'unwanted sound' and deemed to be a material planning consideration which can have detrimental impacts to the amenity of noise sensitive residential receptors.
29. Noise is a material consideration where new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment.
30. The LPAs' decision making should take account of the acoustic environment and consider:
 - whether or not a significant adverse effect is occurring or likely to occur;
 - whether or not an adverse effect is occurring or likely to occur; and
 - whether or not a good standard of amenity can be achieved.
31. The Explanatory Note of the Noise Policy Statement for England 2010 states; the significant observed adverse effect level is the level of noise exposure above which significant adverse effects on health and quality of life occur. The lowest observed adverse effect level is the level of noise exposure above which adverse effects on health and quality of life can be detected. No observed effect level is the level of noise exposure below which no effect at all on health or quality of life can be detected.
32. Excessive noise or 'unwanted sound' from any premises may cause a statutory noise nuisance under Section 79(1)(g) of the Environmental Protection Act 1990. Noise emitted from or caused by a vehicle, machinery or equipment in a street may cause statutory a noise nuisance under Section 79(ga).
33. There is no set level at which a noise becomes a nuisance. For noise to be deemed a statutory nuisance, the nuisance complained of must be, or likely to become, prejudicial to people's health or wellbeing or cause unreasonable interference with a person's legitimate use and enjoyment of their home, materially impacting on comfort and amenity.

34. The 'test' of nuisance considers are number of factors; location, time of occurrence, duration, frequency, convention, importance and value to the community and difficulty in avoiding external effects of the activity and effect on receptors. Frequent, unreasonable, obtrusive noise resulting in impact to wellbeing and interference with a person's use or enjoyment of their home or garden is more likely to amount to a statutory nuisance.
35. The frequency and nature of noise, along with the time (of day or night) when it occurs, its tone, character, duration, and effect are more likely to demonstrate material impacts to amenity or effects to wellbeing, than simple loudness. Noise which does not exceed background levels, may still amount to a nuisance.
36. Noise which relates to irregular bursts of sound and impulsive noise is more likely to cause noise nuisance, because of its sudden nature, intensity, and fluctuations in noise levels. Noise assessments which consider average ambient noise levels (LAeq) must be treated with caution, as ambient noise levels do not accurately depict how a recipient 'hears' or experiences noise as it occurs, or the sudden alarming effect of loud impulsive noise. Noise arising from a single event may amount to a statutory nuisance.
37. Environmental Health Practitioners are the recognised experts for assessing statutory nuisances and abating them through enforcement action, by service of an abatement notice under Section 80 of the Environmental Protection Act 1990.
38. Section 82 of the Environmental Protection Act 1990 enables summary proceedings to be issued by any person aggrieved by a statutory nuisance.
39. The phrase 'amenity' is defined as the extent to which people are able to enjoy public places and their own dwellings without undue disturbance or intrusion from nearby uses.
40. World Health Organisation Community Guidelines (WHO, 1999) provide guideline values for community noise in specific environments. For outdoor living areas, the noise guideline value for 'serious annoyance, daytime and evening' (07.00-23.00 hours) is **55 dBLAeq_{16hour}**, and for 'moderate

annoyance, daytime and evening' **50 dBLAeq_{16hour}**. The level of noise outside bedrooms at night (23.00-07.00 hours) that is likely to result in sleep disturbance with the window open (outdoor values) is **45 dBLAeq_{8hour}**, and / or night time impulsive noise levels of **60dB LAmax**.

41. For inside, indoor living areas, the WHO noise guideline value for 'speech intelligibility and moderate annoyance, daytime and evening' is **35 dBLAeq_{16hour}**. For inside bedrooms, the noise guideline value for 'sleep disturbance, night-time' is **30 dBLAeq_{8hour}** or **45dB LAmax**.
42. BS8233:2014 provides guidance for the control of noise in and around buildings. It applies 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.
43. The Calculation of Road Traffic Noise (CRTN) 1988 and HD 213/11, revision 1, Design Manual for Roads and Bridges (DMRB), Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 7 Noise and Vibration are used to predict the likely change in road traffic noise as a result of a proposed development.
44. There is no set level at which a noise becomes a nuisance. Therefore the use of acoustic recordings in accordance with various prescribed criteria, such as BS 5228:2009 or BS4142:2014 cannot conclusively prove whether the level of a noise will or will not amount to a nuisance.
45. BS4142:2014 provides methods for comparing and rating the difference between the specific sound level of the source (LAeq,_T) and the typical background sound level (LA90,_T). If appropriate, the specific sound level is corrected, for acoustic features such as tonal qualities and/or impulsive noise, to give a 'rating' level (LAR,Tr).
46. BS4142:2014 allows additive corrections for tonality; **0 dB to +6 dB** for and impulsivity **0 dB to +9 dB**. Where the specific sound features are otherwise readily distinctive or comprise identifiable on/off conditions, a penalty of **+3 dB** may be applied.

47. Comparing the rating level with the background sound level, BS 4142:2014 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.'
48. If noise levels from a new noise source are predicted to be the same as existing background noise levels, noise is likely to be audible. If noise levels are predicted to be **5dB** below background levels, this should protect local amenity, although the noise source may still be audible. Noise levels predicted to be **10dB** below background will usually be inaudible.
49. The following general rules illustrate how changes in noise levels are perceived. A measured increase or decrease of **3dB** is usually regarded as the change in level that the average human ear can normally just detect. A measured increase or decrease of **5dB** represents a marginal difference. An increase or decrease of **10dB** represents a significant difference and sounds twice as loud.
50. The Licensing Act 2003 (as amended) requires that Licensing Authorities publish a Statement of Licensing Policy every 5 years. The Haringey (LA) Statement of Licensing Policy came into effect on 7 January 2011, and will remain in force for 5 years (until 6 January 2016).
51. The LA's Statement of Licensing Policy 2011-2014 promotes the four Licensing objectives:
- prevention of crime and disorder;

- public safety;
 - prevention of public nuisance;
 - protection of children from harm.
52. The LA's Statement of Licensing Policy 2011-2014 states that 'Planning and Licensing are separate regimes and will be dealt with separately to avoid duplication and inefficiency' and 'the Licensing Authority will give appropriate weight to relevant Planning decisions and to the views of the Planning Authority on the compliance of the application with the licensing objectives.'
53. For music events, which rely on the use of high powered amplification, Acoustic Conditions attached to a Premises Licence should reflect guidance provided in the Noise Council's Code of Practice on Environmental Noise Control at Concerts published by the UK Noise Council in 1995 (CoP).
54. The CoP is designed to assist both LA's and event organisers, giving guidance on the prevention of public nuisance, setting 'Music Noise Levels' (MNLs) for the event, and procedures for dealing with noise complaints.
55. The CoP states, for urban stadia or arenas where 3 concert days are proposed per calendar year MNLs 'should not exceed **75dB(A) over a 15 minute period.**'
56. For all venues where 4-12 concert days are proposed per calendar year, the CoP states, MNLs 'should not exceed the background noise level by more than **15dB(A) over a 15 minute period**'.
57. The Control of Pollution Act 1974 Sections 60 and 61 provide the local authority with statutory powers to control noise (which includes vibration) arising from construction and demolition works, regardless of whether a statutory nuisance has been caused or is likely to be caused.
58. Section 60 enables a local authority to serve a notice of requirements for noise control on the person who appears to be carrying out, or to have control over, the works. Section 61 provides a mechanism for the contractor

or developer to approach the local authority to agree noise and vibration requirements prior to construction.

Limitations of Assessment

59. Sanctum Consultants are instructed to carry out a desktop review of the Applicant's Environmental Statement; Chapter 13 - Noise and Vibration Impact Assessment. The desktop review only considers information provided by the LPA and data provided in the Report, which has not been independently verified.

Baseline Noise Survey

60. The Applicant's baseline noise survey was undertaken between Tuesday 11 November and Monday 24 November 2008 at various locations detailed in the Report's Appendix 13.3. Continuous acoustic monitoring was undertaken at five unattended noise monitoring sites, obtaining weekday, and weekend data. The hourly measurement results for continuous monitoring are detailed in the Report's Appendix 13.5.
61. Attended acoustic monitoring was undertaken on 12 November 2008, at the existing White Hart Lane stadium before, during, and after an evening Carling Cup football match, to determine acoustic levels associated with a typical Premier League football match.
62. The Report states, 'as this was a relatively high scoring game with a final result of 4:2 to Tottenham Hotspur, the data collected is considered to be representative of 'worst case' conditions for noise during a match.' The acoustic levels measured inside and outside the stadium are detailed in the Report's Appendices 13.6-13.9.
63. A further 3-hour attended CRTN road traffic noise measurement on Park Road was undertaken on 19 November 2008.
64. The baseline noise survey identifies the dominant noise source as road traffic noise. The Report also identifies, 'background noise levels were

determined by the noise of fixed plant at the existing stadium or other commercial / industrial noise sources in the vicinity of a particular location.'

Acoustic Assessment – Construction Noise

65. The methodology adopted for the prediction of construction noise, is in accordance with BS 5228:2009. The Report states, the total construction phase is expected to be approximately 6 years, however this is based on construction works continuing for 12 hour working days, 7 days a week.
66. This does not accord with Planning Condition 40 of the extant planning permission, which states: 'no demolition, construction or building works shall be carried out except between the hours of 0800 and 1800 hours Monday to Friday or before 0800 and 1200 hours on Saturday and not at all on Sundays or bank holidays unless written approval from the Local Planning Authority has been obtained prior to works taking place.'
67. The Report affirms that, 'if the construction programme follows Haringey Council's standard construction hours (Monday to Friday 08:00 to 18:00 hours and Saturday 08:00 to 13:00 hours) the programme will be extended by one year.'
68. The Report proposes the LPA grant permission for extended periods of construction work, to include Saturdays 13:00 to 18:00 hours, and Sundays 08:00 to 18:00 hours. These are particularly noise sensitive times, when residents would not usually expect to be disturbed by noisy construction work.
69. The Report confirms 'the exact details regarding the construction phase plant and type, their locations etc are unknown' and proposes 'a detailed assessment should be undertaken once contractors are on board to determine the noise and vibration levels that will be generated and any necessary mitigation measures.'
70. The Report also confirms that 'people living within approximately 100m of the site are likely to be significantly affected by construction noise.' The predicted 'worst case' noise levels, at some of the nearest properties, could

exceed **75dB LAeq,T** during the demolition, site preparation and/or piling and foundation phases. This noise impact is assessed as 'Major Negative' / 'Significant,' prior to noise mitigation measures being implemented.

71. Average construction noise levels are predicted to be below **75dB LAeq,T**. Indicating that during core construction site hours, for the majority of the time, noise impact will not exceed 'Moderate Negative' / 'Significant' criteria, prior to the implementation of noise mitigation measures.
72. The 'worst case' vibration levels are predicted to be at Park Lane. Vibration levels are likely to be above **1.0 PPV mm/s**, which is assessed as 'Moderate Negative' / 'Significant'. A 'Negative' effect or less is predicted at all other vibration sensitive residential receptors.
73. Mitigation measures for construction noise and vibration are proposed within a comprehensive Construction Environmental Management Plan (CEMP), operating the regulatory principal of using Best Practicable Means (BPM). For instance, auger piling is proposed to be the predominant method of piling, in preference to using driven piles, to reduce noise and vibration levels.
74. A construction compound is proposed at 44 White Hart Lane, London N17 8DP, to reduce noise impact from vehicular movement's offsite, and to provide welfare facilities, a material storage area, and concrete batching plant. The use of the site as a construction compound is the subject of a separate planning application.
75. The Report does not state whether the contractor or developer will agree specific noise and vibration requirements, prior to construction, with the local authority, in accordance with the Control of Pollution Act 1974, Section 61.
76. The development will take 6-7 years to construct, with construction work proposed for 12 hour working days, 7 days a week, at noise levels which, at times, are assessed as significant. In accordance with the provisions of the Control of Pollution Act 1974, Section 61; it is appropriate for the contractor or developer to agree noise and vibration requirements, and an appropriate

noise monitoring and control regime, prior to construction, with the local authority.

77. A Section 61 Agreement provides an appropriate statutory mechanism, for assisting and expediting the construction programme. A Section 61 Agreement ensures a flexible, controlled, managed, and proactive, partnership approach is adopted for regulating the noise and vibration impacts predicted to arise during the construction phase of the Project.
78. If planning permission is granted, the LPA may wish to consider encouraging / requiring the developer to enter into a Control of Pollution Act 1974, Section 61 Agreement with the local authority.

Acoustic Assessment – Operational Road Traffic Noise

79. The methodology adopted for the prediction of changes in road traffic noise, is in accordance with the Department of Transport technical memorandum, Calculation of Road Traffic Noise (CRTN) 1988. And, HD 213/11, revision 1, Design Manual for Roads and Bridges (DMRB), Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 7 Noise and Vibration.
80. Road traffic noise predictions, with and without the proposed development, have been undertaken using the Annual Average Daily Traffic (AADT) flows provided in Chapter 15 (CTRN, 1988) 'Traffic and Transport.' And, are 'based on the following assumptions:
 - 50kph vehicle speed on all roads;
 - Zero gradient on all roads; and
 - Standard bituminous, impervious surface (e.g. hot rolled asphalt) on all roads.'
81. The Report states 'the assessment of operational road traffic noise is a worst-case assessment and does not consider the restrictions on car movements to the proposed residential and hotel developments on match days.' The Report assesses the change in the Annual Average Daily Traffic

(AADT) flows between the baseline year of 2015 and 2018, and 2015 and 2021.

82. The Report states, there will be a direct, permanent 'Negligible Impact' / 'Insignificant' on all road links, modelled for the transport assessment, with a potential increase in operational road traffic noise levels of **0 - 0.9 dBA**.
83. For Park Lane and Worcester Road, where road traffic flows are below the CRTN threshold, the Report states there will be a direct, permanent 'Minor Negative' Impact / 'Insignificant', with a potential increase in operational road traffic noise levels of **1.0 - 2.9 dBA**.
84. As the increased level of operational road traffic noise is assessed as insignificant, no specific noise mitigation measures are considered necessary.

Acoustic Assessment – Operational Noise from Fixed Plant

85. The appropriate methodology for the prediction of operational noise from fixed mechanical plant and equipment is in accordance with BS 4142:2014.
86. The Report confirms 'at this stage in the scheme design, no information regarding the proposed plant types and locations has been assessed - this will be determined during the detailed design stages.'
87. Introducing new noise sources, such as fixed mechanical plant and equipment, into an area, where residents are already exposed to relatively high ambient noise levels, may intensify daytime / evening and night-time disturbance and annoyance. Unless appropriate noise mitigation measures are implemented.
88. The Report states 'providing the cumulative effect from all building services plant on site can be designed to meet a rating level that is equal to the existing background noise level(s), at worst only negligible residual effects would remain.'

89. The Report proposes a daytime (07.00 - 23.00hrs) 'Cumulative Fixed Plant Noise Control Limit,' set at four monitoring locations, in the range **42-53 dBLA_{r1hr}**. The proposed daytime noise control limits are derived from the lowest daytime background noise levels (**LA₉₀_{1hr}**), recorded during baseline noise monitoring in November 2008; at Park Lane, Northumberland Park, Worcester Avenue, and High Road.
90. The Report also proposes a night-time (23.00 - 07.00hrs), noise control limit, derived from the WHO guideline limit **45 dBLA_{eq8hr}**, for outside bedrooms, which may result in sleep disturbance with windows open.
91. The proposed operational noise limits for fixed plant do not accord with Condition 50 of the previously consented scheme, which states; 'at 1 metre outside the windows of any neighbouring habitable rooms the level of noise from plant and machinery shall be at all times at least **5 decibels** below the existing background noise levels, expressed in dB (A) at such locations. Where the noise from plant and machinery is tonal in character the differences in these levels shall be at least **10dB (A)**.'
92. No specific information regarding the proposed plant types and locations has been provided. Proposed fixed plant noise limits are derived from historic baseline noise data from 2008.
93. Operational noise is likely to be audible at the façade of residential properties. Operating fixed plant at night-time, at **45 dBLA_{eq8hr}**, may cause sleep disturbance, with windows open. To protect aural amenity, the LPA may therefore wish to consider retaining Conditions 50-52 from the extant scheme, reference: HGY/2010/1000.

Acoustic Assessment – Football Event Noise

94. For the acoustic assessment of football event noise, predicted noise levels are assessed against actual acoustic levels measured in November 2008. In addition, predicted noise levels from the proposed stadium are compared to predicted noise from the stadium approved in the extant permission (HGY/2010/1000).

95. The Report states, 'the approach adopted has been for the assessment of crowd noise to be undertaken using measurement data taken over very short periods, typically 30 seconds. This time period encompasses most of the significant occurrences of crowd noise, for example when a goal has been scored.' This approach is appropriate for the assessment of football event noise.
96. Football event noise is intermittent, varies, but can suddenly increase when thousands of supporters cheer a goal. The use of longer assessment periods will not provide a clear indication of how crowd noise might interfere with residential amenity, or how residents actually hear the noise.
97. Noise which relates to irregular bursts of sound and impulsive noise is more likely to cause noise nuisance, because of its sudden nature, intensity, and fluctuations in noise levels.
98. The Report also assesses predicted noise levels for the entire duration of a football match; including the pre-match announcements, pre-match music, crowd noise and half-time entertainment, for a 2 hour and 45 minute period.
99. The new Application proposes to increase the Stadium's capacity from the consented scheme's 56,250 capacity football stadium, to 61,100; hosting approximately 30 football matches per annum.
100. The Report states 'the existing noise sensitive residential areas around the site already experience noise from the existing stadium and have done so for many years.' And, the proposed stadium 'is essentially very similar to that of the existing one and that approved under the extant permission being totally enclosed around the perimeter and although larger, it is a more substantial structure and so would be expected to provide a generally improved sound reduction performance with respect to noise break-out.'
101. The football event noise impact 'has been assessed mainly on the basis of the noise level measurements made during the Tottenham Hotspur -v- Liverpool Carling Cup match played on the evening of Wednesday 12 November 2008.' 'Based simply on the increased number of spectators, the noise that they create within the stadium would be expected to increase by

0.4dB when comparing the proposed development with the extant permission and **2.3dB** when comparing the proposed development with the existing stadium.'

102. The Report states 'a similar assumption can be made for the noise from supporters making their way to the stadium on foot on the major routes between the stations and the ground for which the proportional change in numbers has been assumed to be similar to that of the increase in stadium capacity.'
103. The Report concludes, there will be a 'direct, permanent, Negligible to Minor effect at existing receptors as a result of stadium noise.' The Report also states, the proposed 'public address system and other such noise sources' have not yet been assessed and may cause noise disturbance. These 'will be addressed at the detailed design stage with mitigation measures recommended, where necessary.'
104. It is important, when carrying out a noise impact assessment to consider local character and convention, to determine what a reasonable person would find objectionable. Even though an activity may have economic importance, there should be a balance as to whether reasonable steps have been taken to minimise noise impacts on neighbouring noise sensitive residential occupants.
105. As the Report states that based on the increased number of spectators, the noise that they create within the new stadium would be expected to increase by **0.4dB** compared to the extant permission. And, a measured increase of **3dB** is usually regarded as the change in level that the average human ear can normally just detect. The change in noise level assessed against acoustic levels set out in the extant permission is likely to be imperceptible, so no additional noise mitigation measures are necessary.
106. The LPA may wish to consider attaching a planning condition to control noise emissions from the proposed public address system and any associated noise generating equipment, which have not yet been assessed.

Acoustic Assessment – Non-Football Event Noise & Non-Sport Major Event Noise (Concerts)

107. The Report confirms, 'the most appropriate source of guidance for assessing noise impact from music events is: The Noise Council's Code of practice on environmental noise control at concerts (CoP, 1995).'
108. The CoP states, for urban stadia or arenas where 3 concert days are proposed per calendar year Music Noise Levels (MNLs) 'should not exceed **75dB(A)** over a 15 minute period' at a point one meter from the façade of noise sensitive premises.
109. For all venues where 4-12 concert days are proposed per calendar year, the CoP states, MNLs 'should not exceed the background noise level by more than **15dB(A)** over a 15 minute period'.
110. However, the Report proposes a higher noise criterion of **75 dB LAeq,15min** for 6 proposed music concerts, and **75 dB LAeq,event** for 10 proposed non-football, sporting events (including 2 NFL matches), for the daytime / evening period (07.00hrs to 23:00 hours).
111. The noise criterion for non-football, major sporting events, stated in the Report, appears to be derived from the CoP noise criterion of **75 dB LAeq,15min**. The Report states 'as these events will be sporadic throughout the year, much like the concerts, it is considered appropriate to assign the assessment criterion of **75 dB LAeq,T** with the time period (T) being the duration of the event.'
112. Acoustic modelling has been carried out to predict acoustic levels emanating from non-football event noise and non-sport major event noise (concerts).
113. Noise from the proposed non-football events is assessed as different in character to a football match, with more frequent use of the public address system and music.
114. The predicted off-site NFL noise levels, at existing dwellings, are noticeably lower than the assessment criterion of **75 dB LAeq,T**. The Report states

predicted noise levels from the music events will be at least **10dB** higher than the proposed NFL events.

115. During NFL events, Fan Zones are anticipated to be set up during and after the match, to accommodate a number of facilities including; food and beverage, potentially amplified music, and family friendly events. As details of the Fan Zones are currently unknown, the Report states, their noise impact not yet been assessed.
116. The Report concludes, as the predicted concert noise levels at existing receptors meet the proposed criterion of **75 dBLAeq** and NFL matches meet the target criterion of **75 dB LAeq,event** no mitigation measures are necessary. And, 'there will be a direct, permanent, Negligible to Minor effect at existing receptors as a result of stadium noise.'
117. The Report does not assess the noise impact of non-sport major events (concerts) in accordance with the Noise Council's Code of Practice on Environmental Noise Control at Concerts (CoP, 1995). Instead, the Report proposes to use a higher noise criterion, of **75 dB LAeq,15min** for 6 music concerts, and **75 dB LAeq,event** for 10 non-football, sporting events (including 2 American Football, NFL matches).
118. The Applicant proposes to increase the Stadium's capacity from the extant permission of 56,250, with 4 non-football events per annum; to 61,100 capacity, with 30 football events, 6 non-sport major events (music concerts) and 16 non-football related events (including 2 NFL matches) per annum.
119. To protect the surrounding residents from noise pollution, rather than accepting the Applicant's proposed higher noise criterion, the LPA may wish to consider retaining the extant Planning Condition 22: 'for the music concert events hereby permitted, amplified sound from concerts within the stadium must be controlled in accordance with guidance provided by The Noise Council's Code of Practice on Environmental Noise Control at Concerts,' and not permit a higher noise criterion if planning permission is granted, for music concerts.

120. As the Report states that the noise impact from NFL events has not yet been fully assessed, and the proposed noise criterion / limit of **75 dB LAeq,event** is relatively high. The LPA may wish to suitably adapt, amend, and attach appropriate Planning Conditions 17, 18, 20, 21, 23 for the extant planning permission, to regulate the proposed Non-Football Events and Non-Sport Major Events.

Acoustic Assessment – Site Suitability for Residential Development

121. The site's suitability for residential development assessment has appropriately been undertaken in accordance with the criteria in British Standard 8233 and the World Health Organisation's Guidelines for Community Noise. The target noise levels used for the assessment are the WHO noise guideline values; for inside habitable rooms; **35 dBLAeq,16hour** (daytime), inside bedrooms, **30 dBLAeq,8hour** and **45 dBLAFmax** (night-time).

122. The Report assesses the impact of the baseline road traffic noise survey results (2008), predicted future road traffic noise levels, and predicted acoustic levels from football matches, concerts, and NFL games.

123. The assessment concludes that to meet WHO internal target values, windows to the proposed residential towers should normally be kept closed. All residential units should therefore be provided with mechanical ventilation. But, windows should be designed to be openable, in case rapid or purge ventilation required, and to give future occupant's the choice to open their windows.

124. The Report concludes that with the above mitigation measures, there should be a direct, long-term Negligible impact on future noise sensitive residential receptors. And, recommends 'this assessment is revisited at the detailed design stage and that possibly another baseline noise survey be undertaken to validate the 2008 data.'

125. The site suitability assessment concludes, to protect aural amenity, windows to the proposed residential development, should normally be kept closed, and a suitable form of mechanical ventilation installed. The LPA may wish to

consider attaching a planning condition to ensure a suitable design criterion for windows and mechanical ventilation is implemented.

126. The Report recommends that 'possibly', another baseline noise survey is undertaken to validate the 2008 assessment data. The LPA may wish to consider attaching a suitable planning condition to ensure a noise impact assessment is undertaken (to validate the 2008 assessment data) prior to approving the window and mechanical ventilation design criteria.

127. The LPA may wish to consider adding an informative, for the attention of future residents, advising that windows to the proposed development should normally be kept closed to prevent a detriment to aural amenity.

Conclusion and Recommendations

128. For the reasons outlined above and having regard to all relevant material considerations, it is concluded that the Applicant's Environmental Statement demonstrates that noise emanating from the construction and operational use of the proposed development, is likely to have an adverse aural impact on local residents and future residents, and may give rise to complaints of noise nuisance, prior to mitigation measures being implemented.

129. If the LPA is minded to grant planning permission, effective noise mitigation measures should be required, to protect the aural amenity of local residents and reduce the likelihood of complaints of noise nuisance.

130. The development will take 6-7 years to construct, with construction work proposed for 12 hour working days, 7 days a week, at noise levels which, at times, are assessed as significant. In accordance with the provisions of the Control of Pollution Act 1974, Section 61; it is appropriate for the contractor or developer to agree noise and vibration requirements, and an appropriate noise monitoring and control regime, with the local authority, prior to construction.

131. A Section 61 Agreement provides an appropriate statutory mechanism, for assisting and expediting the construction programme. A Section 61 Agreement ensures a flexible, controlled, managed, and proactive,

partnership approach is adopted for regulating the noise and vibration impacts predicted to arise during the construction phase of the Project.

132. As the increased level of operational road traffic noise is assessed as insignificant, no specific noise mitigation measures are considered necessary.
133. The proposed operational noise limits for fixed plant do not accord with Condition 50 of the previously consented scheme; 'at 1 metre outside the windows of any neighbouring habitable rooms the level of noise from plant and machinery shall be at all times at least **5 decibels** below the existing background noise levels, expressed in dB (A) at such locations. Where the noise from plant and machinery is tonal in character the differences in these levels shall be at least **10dB (A)**.'
134. No specific information regarding the proposed plant types and locations has been provided. Proposed fixed plant noise limits are derived from historic baseline noise data from 2008. Operational noise is likely to be audible at the façade of residential properties. Operational noise is likely to be audible at the façade of residential properties. Operating fixed plant at night-time, at **45 dBLAeq_{8hr}**, may cause sleep disturbance, with windows open. To protect aural amenity, the LPA may therefore wish to consider retaining Conditions 50-52 from the extant scheme, reference: HGY/2010/1000.
135. The level of football event noise created by the proposed increased number of spectators within the new stadium, and from travelling to and from the stadium, is predicted to increase by **0.4dB**, compared to the extant permission. As a measured increase of **3dB** is usually regarded as the change in level that the average human ear can normally just detect. The change in noise level assessed against acoustic levels set out in the extant permission is likely to be imperceptible, so no additional noise mitigation measures are necessary.
136. As the proposed 'public address system and other such noise sources' has not yet been assessed and may cause noise disturbance. The LPA may

wish to consider attaching a planning condition to control noise emissions from the football event public address system.

137. The Report does not assess the noise impact of the proposed non-sport major event noise events (concerts) in accordance with The Noise Council's Code of Practice on Environmental Noise Control at Concerts (CoP, 1995). A higher noise criterion is proposed, of **75 dB LAeq,15min** for 6 music concerts, and **75 dB LAeq,event** for 10 non-football, sporting events (including 2 NFL matches).
138. To protect existing and future residents from noise pollution, the LPA may wish to consider retaining the extant Planning Condition 22 and not permit a higher noise criterion for music concerts, at the planning stage.
139. The Report states that noise impact from NFL events has not yet been fully assessed. Therefore, the LPA may wish to amend and attach Planning Conditions 17, 18, 20, 21, 23 from the extant planning permission to both Non-Football Events and Non-Sport Major Events.
140. The site suitability assessment concludes, to protect aural amenity, windows to the proposed residential development, should normally be kept closed, and a suitable form of mechanical ventilation installed. The LPA may wish to consider attaching a planning condition to ensure a suitable design criterion for windows and mechanical ventilation is implemented.
141. The Report recommends that 'possibly', another baseline noise survey is undertaken to validate the 2008 baseline noise assessment data. The LPA may wish to consider attaching a suitable planning condition to ensure a noise impact assessment is undertaken (to validate the 2008 assessment data) prior to approving the window and mechanical ventilation design criteria.
142. The LPA may also wish to consider adding an informative, for the attention of future residents, advising that windows to the proposed development should normally be kept closed to prevent a detriment to aural amenity.