

6 NOISE

6.1 Introduction

- 6.1.1 Since opening in 1987, LCY has operated in a manner that ensures noise emissions to the environment have caused minimal impact on the community. The levels of complaints received by the Airport have been, and continue to be, very low in comparison to those received by other airports. This has been achieved by operational controls such as the steep approach, abatement procedures and also by management including noise monitoring, categorisation and flight track keeping. The aircraft that operate at LCY are required to meet stringent noise criteria, and their noise emissions are continually monitored.
- 6.1.2 This chapter, written by Bickerdike Allen and Partners (BAP), considers the current (2006) noise environment at LCY and compares this with the 2010 without consent case ('Base Case') and what is expected in 2010 under the Proposed Scheme. 2006 has been adopted as the 'current year', as it is the most recent, full calendar year for which a complete log of aircraft operations is available. Consideration is given to the effects of air noise, ground noise and road traffic noise.
- 6.1.3 Air noise encompasses that produced by aircraft during their departure from LCY and during their arrival. It is produced when an aircraft starts its departure roll, runs along the runway and climbs into the air as well as when an aircraft approaches the airport, touches down and slows to taxiing speed on the runway. It therefore includes reverse thrust noise when occasionally this takes place.
- 6.1.4 Ground noise encompasses that produced by aircraft activities on the ground, such as during taxiing, manoeuvring, holding on the runway prior to departure and running engines on the stand. Noise from engine running for test and maintenance purposes is also considered as ground noise.
- 6.1.5 Road traffic noise includes noise from road vehicles accessing the Airport.
- 6.1.6 This chapter describes the planning context against which this proposal will be considered. It goes on to consider the air, ground and road traffic noise assessments in Sections 6.3, 6.4 and 6.5 respectively. Within these sections the assessment

criteria and methodology are presented, the baseline noise conditions discussed, and assessments are made of any impacts associated with the Proposed Scheme. Mitigation measures are also described as are any residual effects.

6.1.7 This assessment considers the noise effects of increasing the number of aircraft movements from approximately 80,000 in 2006 to the proposed maximum of 120,000 aircraft movements by 2010. The current levels of activity are now very close to the ceiling of current permitted levels. The analysis concentrates on assessing the future impact in 2010 from the proposed increase in aircraft movements. This is compared with the noise environment in the current 2006 year and from the full permitted usage of the Airport in 2010 without consent to increase the movement limit.

6.1.8 The noise factored movement limit currently in place and applicable to all aircraft movements is 73,000 per annum. A limit of 135,000 is proposed for the future based on the aircraft movements and mix anticipated in 2010. Later in this chapter, the noise impact of this is assessed in the conventional way using noise contours.

6.1.9 It is of note that the current proposal involves:

- No alteration to the strict restrictions on the noise of individual aircraft types.
- No change in hours of operations.
- No change in types of operations, ie. retained ban on helicopters, recreational flying.
- No change in unique high approach glide slope.
- No change in airport apron or runway layout or terminal infrastructure, beyond the consented operational improvements still to be built-out.
- No off-site road access alterations.

6.1.10 In view of the separation distances between the nearest dwellings and airport operational activities, vibration from aircraft and related machinery affecting these dwellings will be negligible. It has therefore been excluded from the scope of this ES.

6.1 Planning Context

Existing Planning Noise Controls at LCY

6.2.1 The planning consents of May 1983, September 1991 and the Section 106 Agreement formed with the LBN in 1998 (as amended by the 2007 consent and S106) embody a number of environmental noise control measures at LCY. These are each briefly described below.

Number of Aircraft Movements

6.2.2 The current annual limit on ATMs at LCY is 73,000. There are also an unrestricted number of GA movements from the Jet Centre for which no planning limit applies, currently comprising 61% of non-ATM traffic from this source (2006).

Noise Factored Movements

6.2.3 The annual limit of NFMs is presently 73,000. Aircraft types using the Airport are placed in categories and allocated noise factors depending on their noise reference level (see Table 6.1). The noise reference level is the departure noise level at the four noise categorisation points which are defined as being 2000 metres from the start-of-roll and 300 metres sideline to the extended centre line of the runway. The noise reference level is determined using the mean annual departure noise levels as measured by the noise monitoring system (see paragraph 6.2.8). The noise factors are multiplying factors applied to the actual number of aircraft movements (both ATMs and non-ATMs) and are used to obtain the number of factored movements at the Airport.

Operating Hours

6.2.4 No aircraft are permitted to fly at the Airport between 2200h and 0630h during the week, nor between 12.30h on a Saturday and 12.30h on a Sunday, except due to exceptional circumstances (see Chapter 1). There are also additional limits on operating hours on Bank and Public Holidays See Chapter 1: Introduction).

Noise Categorisation

6.2.5 Aircraft operating at LCY are required to be categorised by their departure noise levels which should fall into one of five noise categories as shown in Table 6.1 below. Since the first year of operation with the extended runway (1992) when the aircraft were provisionally categorised on the basis of manufacturers' data, categorisation has been made with respect to measured data from LCY's noise monitoring system.

Table 6.1: Noise Categorisation Table

Category	Noise Ref. level	Noise Factor
A	91.6-94.5	1.26
B	88.6-91.5	0.63
C	85.6-88.5	0.31
D	82.6-85.5	0.16
E	Less than 82.6	0.08

Sound Insulation Scheme

6.2.6 This scheme of sound proofing eligible properties was developed and implemented when the Airport first opened, as part of the Section 52 Agreement, as a measure to be taken at the request of the LDDC and LBN. It provides for eligible residential units which fall into the 57 dB $L_{Aeq,16h}$ contour (associated with the onset of community disturbance) to be provided with sound insulation treatment or a grant if adequate levels of sound insulation are in place already. This eligibility contour level is far more stringent than the requirements of current noise insulation schemes at many other UK Airports; for instance, at Stansted Airport, the daytime eligibility criterion has been 66 dB $L_{Aeq,16h}$.

6.2.7 The works involve the treatment of habitable rooms within eligible dwellings to upgrade the windows and doors of relevant elevations to provide an average sound reduction of not less than 25 dB (100 – 3150 Hz average). The scheme also provides for the provision of acoustically treated ventilation measures in accordance with standards given in the Noise Insulation Regulations ^(6.1).

Noise and Flight Track Keeping System

- 6.2.8 The noise levels produced by arriving and departing aircraft at LCY are continuously monitored by a sophisticated four-point noise monitoring system.
- 6.2.9 Two noise monitors are located at each end of the runway, in the form of a gateway pair. Each pair is located around 2km from the start of roll of the runway. With this configuration, when an aircraft departs between a pair of monitors, a mean departure noise level is derived. This value is used in the noise categorisation and management process at the airport.
- 6.2.10 The flight track keeping system records each aircraft departure and approach at LCY. This provides a management tool to observe and inspect the operational behaviour of individual aircraft and airlines.
- 6.2.11 This has been, and will continue to be used to ensure that the air noise climate is controlled to an acceptable level.

Noise Management Scheme

- 6.2.12 A system of incentives and penalties has been agreed between the Airport and LBN, which provides the airport with the ability to reward and penalise airlines for quiet and noisy operations respectively.
- 6.2.13 In addition to the above, the Noise Management Scheme at LCY controls the use of auxiliary and ground power units, engine test runs, logging of aircraft movements to facilitate complaints handling, reporting noise levels, and meetings of the Airport Consultative Committee.

National Planning Policies

Planning Policy Guidance 24

- 6.2.14 Current guidance given in PPG 24 "Planning and Noise"^(6.2), which has been in force since September 1994, deals mainly with new housing development in relation to existing noise generating development. The relevant guidance from this document is presented in detail for the air, ground, and road traffic noise assessments respectively.

White Paper: Future of Air Transport (December 2003)

6.2.15 The Department of Transport, in the Future of Air Transport, set out in December 2003 the Government's strategic approach for the development of air travel over the next 30 years. It emphasises the need to make best use of existing airport capacity and to encourage growth at regional airports. In particular, it states that small airports in the South East have an important part to play in the future provision of airport capacity in the South East. (See Chapter: Planning Policy and Regulatory Context).

Regional Planning Policies

***The London Plan – Spatial Development Strategy for Greater London
(February 2004)***

6.2.16 Policy 4A.14 of the London Plan – Reducing noise, states that The Mayor will, and boroughs should reduce noise by: minimising the existing and potential adverse impacts of noise on, from, within, or in the vicinity of, development proposals; separating new noise sensitive development from major noise sources wherever practicable; supporting new technologies and improved practices to reduce noise at source, especially in road, rail and air transport; reducing the impact of traffic noise through highway management and transport policies; containing noise from late night entertainment and other 24-hour activities; and, where appropriate promoting well-managed designated locations.

6.2.17 It is stated that, in terms of both abating adverse effects and maintaining or enhancing soundscape quality noise is expected to gain a higher profile in design and management during the life of the London Plan. As it becomes more compact and even busier, London will need a more vigorous approach to noise reduction at the strategic and local level. At the strategic level, main roads, major rail corridors and aircraft are the principal sources of ambient noise. Reducing aircraft noise should be a priority for government, which is responsible for regulation at airports.

6.2.18 The London Plan's transport policies, together with the impact of quieter technologies, have been designed to assist in tackling the main sources of noise. Many more local sources of noise can be addressed through sensitive design, management and operation.

Souther City – The Mayor’s Ambient Noise Strategy (March 2004)

- 6.2.19 The Ambient Noise Strategy ^(6.3) is one of a series of strategies dealing with environmental issues in London. The main elements of the environmental strategy are reflected in the overall London Plan and, where appropriate, in the Transport and Economic Development Strategies. Together these strategies provide the basis for improving London’s environment. They also provide an integrated framework for sustainable development.
- 6.2.20 The Mayor’s Transport Strategy recognises that provision of adequate airport capacity to meet London’s needs, as a world city and the international gateway to the UK, is important. However, London’s environment also needs to be protected (Transport Strategy, Policy 4L.1). Noise is, of course, one of the key environmental issues for air transport.
- 6.2.21 The document focuses mainly on Heathrow Airport, but mentions some of the noise control measures already in place at LCY, such as the planning agreement between the Airport and the LBN, the steep approach, ban on night flights, and the sound insulation scheme where homes are eligible for sound insulation at lower levels than at any other airport in the UK. It also states that The Mayor supports the improvement of public transport access to LCY.

Local Planning Policies

- 6.2.22 The Airport is located within Newham. Small areas of Thamesmead, Greenwich, and Tower Hamlets are overflown by arriving and departing aircraft. The noise policies from the UDP (UDP) for each of these Boroughs are now discussed. Chapter 3: Planning Policy and Regulatory Context, of this ES discusses planning policy for LBN in much more detail.

London Borough of Newham UDP Noise and Transportation Policies

- 6.2.23 The current UDP was adopted on 6th June 2001 and provides the land use planning framework for guiding the Borough’s physical change and improvement.
- 6.2.24 Reference to the Airport is made in the transport policy T29, in which the Council states that it will not permit further operational expansion of LCY beyond the limits set out by the Secretary of State for the Environment in the planning permissions dated

23rd May 1983, as amended on 26th September 1991 and 21st July 1998, unless it can be demonstrated that such development would not result in unacceptable effects on the local environment.

6.2.25 This particular policy is in keeping with Environmental Protection Policy EQ47 which states that where a proposed development is likely to produce a considerable increase in noise relating to its use, the Council will require an assessment of noise impact to be carried out by a developer for submission with the planning application. This policy indicates that planning permission for any development will be resisted only if they involve unacceptable levels of noise generation beyond the boundary of the site.

Greenwich Council UDP Noise and Transportation Policies

6.2.26 The Greenwich UDP is the revised statutory development plan for the whole of the Borough of Greenwich, setting out policies for the period to 2011 and in some instances to 2016.

6.2.27 Within the UDP transport policies is policy M14, which states that the whole Borough is considered sensitive to over flying by all types of aircraft due to its predominantly residential nature, existing or planned. As such, reductions in existing levels of over flying will be sought and proposals generating an increase in noise and/or frequency will normally be opposed. Any planning applications for such a proposal would be required to address and make clear environmental impacts when submitted.

6.2.28 Environmental policy E2 states that planning permission will not normally be granted for new developments or extensions of existing commercial uses that produce significant and unacceptable levels of noise and/or vibration at site boundaries or within adjacent sensitive areas, especially residential areas. Policy E4 also states that the Council will seek to reduce nuisance caused by existing uses from the emission of noise or vibration by: negotiating reduction of activity or installation of ameliorating measures, encouraging relocation where appropriate, refusing planning permission for consolidation or expansion of problem uses, or imposing conditions on planning permissions and taking enforcement action where appropriate.

Tower Hamlets UDP Noise and Transportation Policies

6.2.29 The Tower Hamlets UDP was adopted as the Council's statutory development plan on 2nd December 1998 and, as part the planning process, is undergoing a structured review under the new provisions of the Planning & Compulsory Purchase Act 2004.

6.2.30 There are no policies within the Transport or Environmental sections of the UDP which make reference to noise from over-flying aircraft.

6.2 Air Noise

Methodology

Air Noise Assessment Criteria

6.3.1 The impact of air noise in the UK is assessed in absolute terms using various impact criteria. This process, which is common to sources of transportation noise, does not compare the levels of aircraft noise to the background noise in the vicinity. This contrasts with an industrial noise impact analysis where the relative level of the new industrial noise to the background noise is considered. The impact of air noise is assessed using noise contours indicating the dB $L_{Aeq,T}$ values. This measure is the equivalent continuous sound pressure level which is defined as the level of a notional continuous sound which (over a defined period of time, T) would deliver the same A-weighted sound energy as the actual fluctuating sound. The use of these values results from detailed work relating community annoyance to noise levels for aircraft noise. The $L_{Aeq,T}$ unit is used for other environmental noises, e.g. railway noise, road noise, construction noise and industrial noise.

6.3.2 The criteria used in the analysis here takes into account the information given in PPG 24 tabulated in Table 6.2, together with the criteria used in other UK airport assessments (e.g. Manchester, Coventry, Luton and Heathrow), the DETR Appraisal Framework ^(6.4), and the national consultation on the Future of Air Transport White Paper ^(6.5). This is in keeping with CAP 725 ^(6.6) which summarises the results of aircraft noise studies that formed the basis of the PPG 24 advice on aircraft noise and confirms this as the basis of Government policy currently.

6.3.3 A summary of the PPG 24 guidance regarding daytime air noise and its impact on new housing development is given in Table 6.2 below.

Table 6.2: PPG 24 guidance with regard to air noise

L_{Aeq,16h} dB	Guidance/Experience with regard to air noise (daytime)
< 57	Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as a desirable level. PPG 24 Category A
57 – 66	Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection against noise. PPG 24 Category B
66 – 72	Planning permission for housing should not normally be granted. Where it is considered that planning permission should be given, for example because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise. PPG 24 Category C
> 72	Planning permission for housing should normally be refused. PPG 24 Category D

Note: L_{Aeq,16h} – Equivalent continuous sound level. This is a notional steady sound level which would cause the same A-weighted sound energy to be received as that due to the actual and possibly fluctuating sound from 07.00 to 23.00 (day-time).

6.3.4 PPG 24 guidance given in Table 6.2 nominally relates to the development of new housing in an existing noise environment, rather than to existing housing being affected by changes in the noise environment. It is however generally accepted that the thresholds set out above are of considerable assistance and offer a reasonable way forward in assessing the impact of an airport development of this type.

6.3.5 In summary, daytime air noise should be taken into account when it exceeds 57 dB L_{Aeq,16h} as the onset of significant community annoyance, 63 dB L_{Aeq,16h} for moderate levels of significant community annoyance (PPG 24 Category B) and 69 dB L_{Aeq,16h} for high levels of significant community annoyance (PPG 24 Category C).

6.3.6 It is convention to assess the impact of aircraft noise in terms of daytime L_{Aeq,16 hour} contours determined from an average summer day of aircraft movements. This is the procedure that has been followed in this analysis. The airport, in any event, is closed during the night period, other than a few aircraft movements scheduled for the early morning shoulder period of 06.30 to 07.00 hours. The number of these movements are currently limited to six and will remain limited in the future to no more than ten.

During the weekends, airport operations are limited by condition and the airport is closed for a continuous 24 hour period from the middle of Saturday to the middle of Sunday. This will continue to be the case in the future (see Chapter 1: Introduction).

Air Noise Significance Criteria

6.3.7 In terms of the perceptibility and significance of changes in air noise exposure around an airport, the following observations have been made:

- *“a change of less than 2 dB L_{Aeq} units would not be discernible to most people...,*
- *..changes between 2 and 3 dB L_{Aeq} units might be discernible, but would not usually be significant..,*
- *...changes of between 6 and 9 dB L_{Aeq} units would be recorded by most people as significant and noticeable, and, especially at around an increase of 9 dB, as causing a marked deterioration in their environment.”*

6.3.8 These observations were first reported at the Airport Inquiries:1981-83 by the Inspector Graham Eyre QC ^(6.7). They were adopted at the public inquiries into the second runway at Manchester Airport ^(6.8) and at the recent inquiry into the conversion of RAF Finningley to become Robin Hood Airport ^(6.9). They were also reiterated in the Aircraft Noise Study prepared for the London Borough of Bromley ^(6.10).

6.3.9 These observations are in line with advice in PPG 24 where Central Government guidance advises that a change of 3 dB(A) is the minimum perceptible under normal conditions. Table 6.3 below simply expresses the relationship between change in air noise level and subjective impression.

Table 6.3: The relationship between change in air noise level and subjective impression

Change in air noise level, dB(A)	Subjective impression
< 2	Negligible
2 to 3	Minor
3 to 6	Moderate
6 to 9	Substantial
>9	Very Substantial

6.3.10 The effect of a change in noise exposure was considered in some depth at the Heathrow Terminal 5 Inquiry ^(6.11) where there was some criticism of relying solely on the Leq index to consider the impact of changes in noise exposure level. Evidence was presented to suggest that consideration should also be given to the change in the number of aircraft movements associated with any change in noise level. No recognised criteria are available however to judge the impact arising from such a change and, until further Government guidance is available on this subject, the above previously accepted scale is considered appropriate. This is in line with the Secretary of State's decision on Terminal 5 development where he acknowledged that a precautionary approach should be taken to any criticism of the Leq index until completion of further research on the subject.

Air Noise Assessment Method

6.3.11 The assessment method used in this chapter is consistent with that used at other UK airports and which is recognised by Central Government as suitable for the preparation of strategic noise mapping in compliance with the Environmental Noise (England) Regulations 2006 ^(6.12).

6.3.12 Air noise has been expressed in the form of contours, showing dB $L_{Aeq,16h}$ for day time levels during the busy summer period.

6.3.13 The contours have been computed using the US FAA Integrated Noise Model (INM) version 6.2a ^(6.13). The INM airport noise contour model is the most widely used worldwide method. The contours produced apply to a flat open site, and so do not include for the effects of local screening or topography. At LCY, no large local adverse topographical effects are present.

6.3.14 The INM model has been used in the recent past for noise contouring work at LCY, and also at many other airports in the UK, Europe and throughout the USA. Validation studies have been carried out at several European Airports on the INM model.

6.3.15 The predictions assume that all aircraft arrivals will be in line with the extended centre-line of the runway, without dispersion. There are several departure tracks;

dispersion around these tracks has been taken into account. Figure 6.1 indicates the assumed arrival and departure routes to and from the Airport. The departure route dispersion assumptions have been determined on the basis of that observed at other UK airports. When a departing aircraft reaches 3,000 ft, Air Traffic Control may order the aircraft to take a more direct routing. The noise level of aircraft activity is thus further dispersed.

6.3.16 The predictions use the noise information for the particular aircraft given in the INM software. This information applies to aircraft approaching on a 3 degree glide-slope, as opposed to the 5.5 degree glide-slope used at LCY. A detailed noise validation study ^(6.14) was reported in March 2007, and the results used to modify the aircraft noise information accordingly to reflect actual operations at LCY.

6.3.16 The contours take into account all flying operations.

6.3.17 Noise contour predictions have been based on the existing (2006) aircraft movement data provided by LCY, and forecast aircraft movement data provided by LCY (see Chapter 1: Introduction). These data and aircraft mix assumptions are summarised in Tables 6.4 - 6.6 below. Refer to Appendix C.1 for contour input data.

Table 6.4: Number of annual aircraft movements at LCY

Annual	2006 Current	2010 Without consent	2010 With consent
Total aircraft movements	79,616 (71,000 ATMs)	80,000 (71,000 ATMs)	120,000 (No ATMs)
Scheduled movements	65,860	66,000	95,000
Corporate aviation movements	13,756	14,000	25,000

Table 6.5: Typical aircraft types operating at LCY

A/C Size (seats)	2006 Current	2010 Without consent	2010 With consent
Corporate	Citation Excel	Citation Excel	Citation Excel
31 – 50	Dornier 328	Embraer 135	Embraer 135
51 – 70	Fokker 50	Bombardier Q400	Bombardier Q400
71 – 100+	BAe RJ 80, BAe RJ 100	Embraer 170, Airbus 318	Embraer 170, Airbus 318

Table 6.6: Annual mix of aircraft types

A/C Size (seats)	2006 Current(%)	2010 Without consent (%)	2010 With consent (%)
31 – 50	20	4	16
51 – 70	45	58	26
71 – 100+	35	38	58

6.3.18 Variations in the ratio of scheduled movements to Jet Centre movements could occur depending on changes in commercial demand. Noise predictions for the 2010 with consent scenario have therefore incorporated sensitivity testing: 85,000 scheduled plus 35,000 Jet Centre movements, and 105,000 scheduled plus 15,000 Jet Centre movements.

Baseline Air Noise Conditions

6.3.19 A mixture of turbo-prop and turbo-jet aircraft types is currently in operation at the Airport. These range from small general aviation aircraft including corporate jets, up to passenger aircraft such as the Fokker 50 (turbo-prop) and BAe-146 regional jet.

6.3.20 The current level of activity at the airport is close to the currently permitted full usage of the Airport.

6.3.21 Figure 6.2 depicts the noise contours arising for the 2006 Baseline noise scenario. The contour representing high levels of annoyance, 69 dB $L_{Aeq,16h}$, is completely contained within the airport site and associated dock area and does not encompass any residential locations in the area.

6.3.22 The contour representing moderate levels of annoyance, 63 dB $L_{Aeq,16h}$, in 2006 is also largely contained within the Airport site and dock area although it does extend slightly to the south into the Camel Road area and just reaches the Millennium Mill in Royal Victoria Dock. The small number of properties located within this contour have already been treated under the Airport's sound insulation scheme.

6.3.23 The contour representing the onset of significant community annoyance, 57 dB $L_{Aeq,16h}$, in 2006 extends to the western extremity of Thamesmead to the east and eastern extremity of Blackwall to the west. To the south, some properties south of the

terminal pier are exposed, all of which fall into the Airport's existing sound insulation grant scheme. Properties in Britannia Village to the south of Royal Victoria Dock are contained within the contour. Recently built properties in Thamesmead and in North Woolwich also lie within the contour. Many of these new properties will have been built in compliance with planning conditions to ensure sound proofing against aircraft noise is provided to a standard at least comparable with that provided under the Airport's noise insulation scheme.

6.3.24 During the years of LCY's operations, a complaint system has been operated. All complaints are investigated and responses made to the complainant. The complaint analysis is regularly advised to the local authorities, and reported annually at the Annual Noise Review meetings. Despite the location of this Airport within an urban area, the number of complaints relating to air noise received by LCY has been low. For example: 2006/7 [24], 2005/6 [23], 2004/5 [28], 2003/4 [20], 2002/3 [38, where 22 came from the same two complainants], 2001/2 [35, where 24 complaints came from the same three complainants] and 2000/1 [23].

Assessment of Effects of Future Air Noise

2010 Without Consent (Base Case)

6.3.25 Figure 6.3 depicts the noise contours for the base case (2010 Without Consent). The contours are of a very similar shape and size to those shown in Figure 6.2 for the 2006 'Current Situation'. This reflects the fact that without consent, there is very little scope for any increase in aircraft movement numbers at LCY, current levels of activity already being close to the maximum permitted levels.

6.3.26 The principal difference will arise from the change in aircraft mix forecast to occur gradually over the next few years. In particular, the older fleet of BAe146 aircraft are envisaged to be replaced in part by more modern twin engined turbofan aircraft, such as the Embraer 170 and Airbus 318. Whereas these aircraft produce similar noise to that of the BAe 146 series, their improved climb performance will reduce the length of the contours slightly as compared to now.

2010 With Consent

6.3.27 The forecast contours for 2010 shown in Figure 6.4 are similar in shape to those for 2006 and the base case in 2010 but are greater in size. They assume no change in

the flight routes but an increased level of activity of around 50% in aircraft movements. In the future, aircraft of similar low noise characteristics to those in use today are expected to operate but some with increased climb performance. This will help to reduce the noise impact arising from this increased activity. The contour representing high levels of annoyance in 2010, 69 dB $L_{Aeq,16h}$, is almost completely contained within the Airport site and dock areas.

6.3.28 The contour representing moderate levels of annoyance, 63 dB $L_{Aeq,16h}$, in 2010 extends eastward to the River Thames and westward to the western end of Royal Victoria Dock. In so doing, it encompasses properties to the south of the airport terminal pier and also housing in Britannia Village to the south of Royal Victoria Dock.

6.3.29 The contour representing the onset of significant community annoyance, 57 dB $L_{Aeq,16h}$, in 2010 extends into Thamesmead to the east and Blackwall to the west. In doing so it includes a number of new properties in Thamesmead and North Woolwich, existing properties to the south of the airport (most of which have already been treated under the airport's sound insulation scheme) and properties to the north and south of Royal Victoria Dock, including some to the south of Canning Town.

6.3.30 The changes in noise level expected as a result of a change in operations in 2010, with and without consent, are set out below for representative areas around the Airport.

Table 6.7: Change in noise level relative to the 'Current (2006) Situation' at key locations

Location	Typical Noise Level, dB $L_{Aeq,16h}$	Change in noise level, dB	
	2006 Baseline	2010 Without consent	2010 With consent
Blackwall / A125	57	-0.5	+ 1
Britannia Village	61	0	<+3
Silvertown / A1020	57	0	<+3
Canning Town (south)	56	0	+2
Custom House	55	0	<+3
Camel Road	65	0	<+3
Royal Albert Dock (north)	60	0	<+3

Location	Typical Noise Level, dB L _{Aeq,16h}	Change in noise level, dB	
	2006 Baseline	2010 Without consent	2010 With consent
North Woolwich (north)	56	0	+2
Galleons Reach (Pumping Station)	57	0	+2
Thamesmead	58	-0.5	+1

6.3.31 With the consented scheme, an increase in noise is evident at all locations reasonably close to the Airport, varying from 1 dB (a negligible change) at the eastern and western ends of the contours (Thamesmead and Blackwall), to just under 3 dB or less at other locations which when assessed subjectively, gives rise to a minor impact.

6.3.32 Estimates of the areas of the contours, the number of dwellings and population contained within contour bands for each assessment scenario are presented in Tables 6.8, 6.9 and 6.10 below.

Table 6.8: Contour areas (km²)

Scenario	2006 Baseline	2010 Without consent	2010 With consent
Contour, L _{Aeq,16h}			
57 dB,	5.1	4.8	7.2
63 dB	1.4	1.4	2.2
69 dB	0.5	0.5	0.7

Table 6.9: Approximate Number of dwellings in contours

Scenario	2006 Baseline	2010 Without consent	2010 With consent
Contour, L _{Aeq,16h}			
57 dB,	3300	2900	6600
63 dB	80	120	700
69 dB	0	0	0

Table 6.10: Approximate Population in contours

Scenario	2006 Baseline	2010 Without consent	2010 With consent
Contour, L_{Aeq,16h}			
57 dB,	7100	6000	14100
63 dB	150	200	1700
69 dB	0	0	0

6.3.33 The approximate dwelling counts and population numbers within each contour band have been determined from a consideration of current Census data by postcode location (data provided by CACI Ltd).

6.3.34 The tables show that without consent, the contour areas will remain largely unchanged in 2010, with the exception of a small reduction in the 57 dB contour from 5.1 to 4.8 km². Dwelling and population counts show a corresponding decrease within this contour in the future although for the 63 dB contour, a slight increase in dwelling count and population is evident. No properties lie in the 69 dB contour.

6.3.35 In 2010 with consent, contour areas increase over the no consent base case by approximately 50%. Dwellings in the 57 dB contour rise by a similar percentage whereas those in the 63 dB contour rise from around 100 to 700. No dwellings become exposed to levels of 69 dB or more in the future.

6.3.36 Consideration has also been given to how the mix of aircraft might alter the shape and size of the noise contours should the proposed scheme proceed. For example, should the mix of corporate jets increase or decrease in 2010 from the proposed 25,000 by + or – 10,000, with a corresponding change in scheduled traffic, very little change in these findings is predicted. Contours showing these sensitivity tests are provided in Appendix C.1.

6.3.37 The 2006, 2010 without consent and 2010 with consent contours consider the daytime period from 07:00 until 23:00 hours. Due to the operating restrictions on LCY almost all the movements will be contained within this time period, although it is proposed that a maximum of 10 will be permitted to occur between 06:30 and 07:00. For some airports where movements occur throughout the night period, contours are produced for the eight-hour night-time period. Given that operations at LCY can only

occur for half an hour of this period, and will be relatively few in nature, such contours are not considered appropriate.

Schools, Colleges and Hospitals

Schools and Colleges

6.3.38 Table 6.11 lists the existing schools and colleges that lie close to, or inside of the 57 dB $L_{Aeq,16h}$ noise contours, both now and in the future, along with their predicted noise exposure level arising from airborne aircraft noise.

Table 6.11: Air Noise Levels on Schools and Colleges (dB $L_{Aeq,16h}$)

Schools	Location	2006 Baseline	2010 Without consent	2010 With consent
Drew Primary School	Wythes Road, E16	61	61	64
Winsor Primary School	East Ham Manor Way, E6	<54	<54	55
The Royal Docks Community School	Prince Regent Lane, Custom House	55	55	57
St Joachim's R.C. Primary School	Shipman Road, Custom House	55	55	57
Hallsville Primary School	Radland Road, Canning Town	54	54	56
St Luke's CEVA Primary and Nursery School	Ruscoe Road, E16	<54	<54	55
Britannia Village Primary School	Westwood Road, West Silvertown	59	59	<62
Colleges				
University of East London	North of Royal Albert Dock	63	63	<66
Woolwich Polytechnic for Boys	Thamesmead	56	56	<57

6.3.39 For most of the schools listed above, noise exposure levels resulting from aircraft will be modest and in keeping with the prevailing ambient noise level. For some, such as Drew Primary School and the University of East London, which have been built or

insulated to cope with higher noise levels from the Airport, levels will increase slightly in the future over those experienced now.

6.3.40 At Drew Primary School for example, an increase from 61 dB $L_{Aeq,16h}$ to <64 dB $L_{Aeq,16h}$ is predicted between now and in 2010 with consent. These noise levels are predicted on the assumption of flat terrain and a clear line of sight between departing and arriving aircraft on the runway and the school. In practice, the school is screened from some aircraft operations by virtue of its low elevation and the height and extent of the terminal pier building and DLR viaduct construction. Received noise levels at this school are therefore likely to be slightly lower than predicted by the noise contours.

6.3.41 A recent study undertaken on behalf of the European Commission, the RANCH Study ^(6.15), concludes there is evidence that schools exposed to high levels of aircraft noise could impair cognitive development in children – specifically reading comprehension, although no impairment of working memory, prospective memory, or sustained attention was found. The largest sample of schools considered in this study were single glazed. This is in contrast to those at LCY exposed in the future to moderately high noise levels (63 dB L_{Aeq} or more) which are already better sound insulated. Further research is required, the study concludes, to investigate this.

6.3.42 The Government suggestion for protecting schools set out in the White Paper - The Future for Air Transport, is that those located in the 63 dB $L_{Aeq,16h}$ contour and subject to an increase of 3 dB or more resulting from airport development should be eligible for a sound insulation, comparable to grant schemes for households in place at various airports in the UK. At LCY, continuing the present policy, sound insulation measures will be offered to any existing eligible schools that lie within the 57 dB $L_{Aeq,16h}$ contour.

Hospitals

6.3.43 There are no hospitals located inside the 57 dB $L_{Aeq,16h}$ noise contours either now or in the future in 2010, with or without consent.

6.3.44 There is a hospice located in Custom House, close to Richard House Drive, that would become exposed to a noise level of around 57 dB $L_{Aeq,16h}$ in the 2010 'With Consent' scenario, experiencing an increase of just under 3 dB on the 2006 situation.

However, this is a new building and so should be well insulated against external noise.

Land Proposed for Development and Regeneration

6.3.45 Table 6.12 below sets out current and future air noise levels at sites around LCY that have either already received planning permission for residential development, have been allocated for such development in the LBN UDP emerging LDF or, where pre-planning studies for residential development have been undertaken. The table also denotes which PPG 24 noise exposure category would apply to each site as a result of aircraft noise alone. Table 6.2 sets out the implications of these categories on future residential development.

Table 6.12: Air Noise Levels on Development Land (dB L_{Aeq,16h}) and Corresponding Noise Exposure Category

Site	Planning Designation	2006 Baseline		2010 Without consent		2010 With consent	
		dB	Category	dB	Category	dB	Category
North Side Royal Victoria Dock	Consented	63	B	63	B	<66	B
Silvertown Quays	Consented	66	C	66	C	<69	C
Royal Albert Dock Business Park	Allocated	64	B	64	B	67	C
Albert Island	Pre-planning	67	C	67	C	69	C

6.3.46 In 2010 with consent, the two residential schemes with planning permission are both predicted to receive relatively high levels of noise, as occurs now. Both sites will receive levels of noise from individual aircraft of very similar magnitude to now. They will experience a greater number however, giving rise to overall increases in noise exposure of just under 3 dB.

6.3.47 For sites that lie in Noise Exposure Category B, PPG 24 states that conditions should be imposed to ensure an adequate level of protection against noise. For sites that lie in Noise Exposure Category C, PPG 24 states that planning permission for housing should not normally be granted but where it is considered permission should be given, for example because there are no quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.

- 6.3.48 In view of the general noise climate found in a city such as London, it is commonplace that residential sites, both existing and new, are exposed to noise levels that would place them in Category C.
- 6.3.49 The Royal Albert Dock Business Park is exposed to relatively high air noise levels which, on their own would place the site in Category C in 2010 with the consented scheme. In view of the proximity of this site to the airport apron, it will also receive moderately high levels of ground noise (see Section 6.3.86). It will also receive moderately high noise levels from road traffic along Royal Albert Way. To determine the actual noise category applicable to this site, detailed consideration would need to be given to the proposed site layout and all of these various transportation and other sources of noise affecting the Site.
- 6.3.50 The Albert Island site is exposed to air noise now that places it within PPG Category C, experiencing levels in the range 66 to 69 dB LAeq,16h over the site. This will remain the case in the future although levels will rise by around 2 dB.

Open Spaces and Outdoor Recreational Areas

- 6.3.51 The policies and proposals of the LBN relating to open spaces and outdoor recreational areas is set out in Chapter 9 of its UDP. Whilst not specifically mentioning the effects of noise on such areas, it is stated that the aim of the Borough is to increase the amount of publicly accessible and useable open space available to the public for recreation, as well as bring about major improvements in the attractiveness, image, environmental quality and biodiversity of open spaces in the borough, especially in the town centres and densely populated residential areas.
- 6.3.52 The World Health Organisation ^(6.16, 6.17) sets out ideal targets for controlling noise within open spaces and outdoor recreational areas. A target value of 55 dB LAeq is suggested although in practice, in town centres and densely populated residential areas, daytime ambient noise levels will generally be at or above this figure, as is the case around LCY.
- 6.3.53 Under the consented scheme, noise contours will increase slightly over now, producing slightly higher noise levels for open spaces and outdoor recreational areas in the near vicinity of the Airport. The expected noise level in various open spaces and recreational areas in close proximity to the Airport are set out below.

Table 6.13: Air Noise Levels in Open Spaces and Outdoor Recreational Areas (dB L_{Aeq,16h})

Open Spaces & Outdoor Recreational Areas	Designation⁽ⁱ⁾	2006 Baseline	2010 Without consent	2010 With consent
Drew Road	Open Space	63	63	<66
Winifred Street	Open Space	54	54	56
Fernhill Street	Open Space	55	55	57
Albert Road	Open Space	54	54	56
Royal Victoria Gardens	Small Local Park	54	54	56
New Beckton Park	Local Park	<54	<54	55
Becton District Park (Playing Fields)	Local Park	55	55	57
Shipman Road	Small Local Park / Open Space	56	56	58

Note (i): From London Borough of Newham UDP Chapter 9 'Open Space and Outdoor Recreation'.

6.3.54 Typical daytime ambient noise levels in the area around LCY have been found to lie around 55 dB L_{Aeq} which is typical for an urban area of this type. The table above indicates that noise levels are currently similar to the underlying ambient noise level in the area and for most of the open spaces and outdoor recreation areas around the airport, this will remain the case in the future with the consented Scheme.

Mitigation and Enhancement

6.3.55 LCY operates many mitigation measures to ensure that air noise is adequately controlled, and the measures will be retained and implemented, such that in future years the noise is contained within projected forecasts of the proposed scheme presented in this ES. These will include both maintaining the successful measures that are in place today, and introducing some new measures (identified by italics) such as:

- Maintaining restrictions on flights outside the daytime period.
- The restriction that all aircraft operating at the Airport must lie within one of the categories set out in the Noise Categorisation System as agreed with the London Borough of Newham. All such aircraft will meet the new ICAO Chapter 4 limits

(6.18)

- The continued operation of a Noise Monitoring and Flight Track Keeping System.
- Maintaining a public noise complaint handling service.
- Maintaining an Airport Consultative Committee.
- Encouraging aircraft operators to adopt quiet operating procedures and to observe published noise abatement procedures.
- Maintaining Preferred Noise Routes.
- Maintaining an Approach Glide Slope of 5.5 degrees for all aircraft.
- Maintaining a Sound Insulation Scheme using the current stringent eligibility criterion trigger level of 57 dB LAeq,16h for air noise. (This is in contrast to the eligibility criterion trigger level of 63 dB LAeq,16h recommended by Central Government for major airports.)
- Where appropriate seek to improve the various noise mitigation measures in place.
- Purchase Offer for properties that lie within the high annoyance contour (69 dB) in line with Government recommendations.

6.3.56 The Airport will continue to operate its present policies for protecting the environment from the effects of air noise and will seek to improve its policy in light of any new quieter operational techniques to ensure that its development to 2010 and beyond is achieved with the minimal practicable noise impact.

Residual Effects

6.3.57 Due to the limits on aircraft movements and noise factored movements applicable at the airport, there are no residual effects anticipated with regard to air noise over and above those identified above.

Air Noise - Summary and Conclusions

- 6.3.58 An assessment of air noise has been undertaken to appraise conditions both now and in 2010 with and without consent for the proposed increase in aircraft movements. The Airport is now operating close to its permitted maximum usage without any undue complaint from the local community concerning noise (i.e. only 24 noise and flight path related complaints received during the year April 2006 to March 2007).
- 6.3.59 In 2010, without consent, very little change in the resultant noise climate will arise since there is little scope for additional movements. A change in aircraft mix and type is expected to increase passenger throughput somewhat although negligible noise impact will result as compared to now.
- 6.3.60 The Airport is seeking to increase the current limit of air transport movements of 73,000 with unlimited non-ATM traffic to an overall aircraft movement limit of 120,000. This will not involve any noisier aircraft than now, only more events, representing an uplift of approximately 50% on the 2006 situation.
- 6.3.61 'With Consent' for additional movements, the contours in 2010 increase in area by approximately 50% comparative to those 'Without Consent' scenarios. This change gives rise to an increase in noise generally for the local community; of between 1 dB, a negligible amount, and just under 3 dB. The impact of this change will generally be minor although it will have the effect of exposing more people to Aircraft noise levels producing some significant community annoyance. For those people close to the airport, and thus most affected by noise, protection has for most properties already been operated as a result of the sound insulation scheme provided for many years by LCY.
- 6.3.62 In keeping with previous years, the Airport will continue to operate the sound insulation scheme using the most stringent UK airport trigger limit of 57 dB $L_{Aeq,16h}$ as an eligibility criterion, thereby protecting all eligible housing and schools that come into this contour.
- 6.3.63 In addition, LCY will continue to operate and, where appropriate, seek to improve the various noise mitigation measures in place at the Airport that have successfully

ensured that noise effects to the local community have been, and will continue to be, controlled to acceptable levels.

6.3.64 In conclusion, the air noise impacts associated with the Proposed Scheme will, at worst, be of a minor adverse nature.

6.4 Ground Noise

6.4.1 Noise generated other than by aircraft in flight or taking off or landing is termed ground noise. The main sources of airport ground noise are:

- Taxiing and manoeuvring aircraft
- Operation of aircraft Auxilliary Power Units (APUs)
- Mobile ground equipment such as Ground Power Units (GPUs)
- Testing (ground running) of aircraft engines
- Construction

6.4.2 Airport ground noise is heard in the context of off-airport ambient noise sources. The most dominant contributor to the noise climate in the residential areas surrounding LCY is road traffic and, to a lesser extent, industrial activity. The new DLR along the southern perimeter of the airport also contributes both positively and negatively to the ambient noise environment.

6.4.3 The proposed scheme will affect the environment by virtue of noise from increased ground operations of aircraft at LCY. The noise from these future operations will be similar to the noise levels that are currently generated from ground operations with two main differences. It is envisaged that in the future, more of the aircraft operations will be carried out by turbo-jet type aircraft which are generally quieter when taxiing and manoeuvring than the turbo-prop aircraft. Therefore, the future mix of aircraft will provide quieter noise levels from ground operations of individual aircraft than currently exist.

6.4.4 The other main difference will be that there will be longer busy periods during which ground noise will continue for a longer period, and periods with more ground noise than currently exists during the busiest hour of the day.

6.4.5 The noise from ground operations will therefore have an impact on residential areas close to the Airport boundary, although many properties to the south of the Airport

are currently well shielded by the barrier formed by the airport terminal and pier structure, as well as the new blast screens at the Jet Centre.

6.4.6 A new parking apron is being built to the east of the current terminal building over part of the Royal Albert Dock. A change in ground noise in this area will therefore arise by 2010 irrespective of whether an increase in aircraft movements is permitted. However, a noise barrier of height 8 metres will be provided to protect the residential zone to the south.

6.4.7 With the consented scheme, no further infrastructure works are proposed for the time being, so that ground noise in 2010 with and without consent will be influenced solely by the aircraft mix and number of movements that occur.

Methodology

Ground Noise Assessment Criteria

6.4.8 Unlike the assessment of air noise, there is no definitive agreement on the method of assessment of ground noise. Various methods have been adopted in the past, and these have led to the assessment of ground noise in terms of the equivalent continuous sound level, $L_{Aeq,T}$. Various time periods have been used, and in this report consideration has been given to the $L_{Aeq,16h}$ metric for the daytime period: 0700-2300h.

6.4.9 The level of such noise assessed at various nearby locations can be compared to the existing ambient environmental noise, World Health Organisation (WHO) general environmental criteria ^(16,17), the Minerals Planning Guidance (MPG)⁽¹⁹⁾ and the general criteria given in PPG 24 on planning and noise issued by the Department of the Environment (now DEFRA). These criteria are noted below:

Table 6.14: General noise criteria

Source	Sound Level, dB $L_{Aeq,16h}$	Form of Criterion
WHO	55	Daytime (prevents any significant/serious community annoyance)
MPG 11	55	Daytime (tolerable noise level)
PPG 24	57	Daytime (noise not a determining factor in planning)

6.4.10 To put these guidance criteria into context, the results of the National Noise Survey can be considered:

Table 6.15: Results of National Noise Survey

Environmental Noise Levels in UK, daytime (dB L_{Aeq,16h})	Population of UK so exposed (%)
40	99.9
50	89.3
55	56.0
60	26.0
70	1.8

Ground Noise Assessment Method

6.4.11 A noise survey was carried out at LCY during March 2007 to investigate both the typical prevailing background noise level around the Airport and also to obtain reference noise data for scheduled and corporate aircraft relating to ground operations, such as taxiing, manoeuvring, and engine idling at hold positions and on apron stands. Measurements of auxiliary power units (APU's) were also obtained for relevant turbofan aircraft. Results of this survey are presented in Appendix C.2.1

6.4.12 The assessment of ground noise has been undertaken utilising the commercially available acoustic software package, CADNA. This package has been used in conjunction with reference noise level data and event duration information determined from field noise measurements taken at LCY over a period of years, as discussed above. The details of this latest survey and the reference noise level, duration and other associated data utilised in this assessment are provided in Appendix C.2.1 and C.2.2 respectively. Predictions have been based on movements for the average summer day (as for air noise contours), taking account of average mode operations.

Baseline Ground Noise Conditions

6.4.13 The use of APU's and aircraft taxiing produce the most significant airport ground noise source due to the duration of exposure. The rare occurrence of engine testing at high power settings after an aircraft has had significant maintenance can give rise

to the greatest instantaneous noise levels, but it occurs only on occasion and is often of comparatively limited duration.

6.4.14 A large proportion of the area near to ground operations of the aircraft at LCY is water, airport land, or undeveloped land. The impact of Airport ground operations on these areas is negligible. The Apron, however, is near the residential area of North Silvertown although most residential properties near the dockside, such as those along Newland Street, no longer have any view of the taxiway following completion of the Docklands Light Railway retaining structures.

6.4.15 The general noise climate in this area, in the absence of airport noise, is dominated by noise of an industrial nature from the 24hr operation of the Tate and Lyle factory to the south of the Airport and by road traffic noise from the various surrounding roads. Representative daytime ambient noise levels in the area have been found to lie around 55 dB L_{Aeq} which is typical for an urban area of this type.

6.4.16 Other recent developments close to the Airport include an office building located approximately 300 m to the north of the main apron on the edge of the Royal Albert Dock (known as Building 1000), and the University of East London (UEL) at approximately 300 m to the north of the holding bay at the eastern end of the runway.

6.4.17 The results of BAP studies have been used to produce reference noise levels for each operation. These have been used to predict the combined existing daytime noise levels near the Airport, specifically at the assessment locations labelled A to J as shown on Figure 6.5. The results of these predictions are presented in Table 6.16.

6.4.18 The Airport keeps records of any complaints from the local community over noise. There have been very few complaints due to ground noise, namely ten in the last four years (2006/2007 [1], 2005/2006 [6], 2004/5 [1], 2003/4 [2]) mostly as a result of construction related activity.

Assessment of Effects of Ground Noise

6.4.19 The predicted daytime $L_{Aeq,16h}$ noise levels for each of the assessment scenarios are summarised in Table 6.16 for the assessment locations shown in Figure 6.5.

Table 6.16: Predicted noise from airport ground operations

Assessment Location	Daytime Noise Level, dB L_{Aeq16h} (0700h-2300h)		
	2006 Current (Baseline)	2010 Without consent (Base Case)	2010 With consent
A – Drew Road	52.6	52.3	54.3
B – North Side of Royal Albert Dock	64.3	65.4	66.2
C – Camel Road Flats	55.9	56.4	57.3
D – Parker Street	53.6	55.1	54.3
E – Newland Street	56.6	53.8	55.7
F – Storey Road School Site (now derelict)	57.5	57.1	59.5
G – Norton Pharmaceutical	54.2	54.5	56.1
H – University of East London	61.4	61.4	63.3
I – Royal Docks Business	63.0	63.9	64.9
J – Brixham Street	54.6	54.4	56.3

6.4.20 Comparing 2010 without consent with now shows increases of up to little more than 1 dB at most locations. The principal exception lies to the south of the Airport in Newland Street where a reduction of up to 2.5 dB is predicted as a result of the new noise barrier built adjacent to the five stands.

6.4.21 In 2010 with consent, increases are again modest compared to 2010 without consent with most areas showing increases of less than 2dB. Drew Road and the former Storey Road School site will experience the greatest increase in ground noise, 2 dB and 2.4 dB respectively, giving rise to a minor impact.

6.4.22 In absolute terms, ground noise levels currently lie at or below the PPG 24 limit suggested in Table 6.14 at most receiver positions. The exceptions are those positions close to the Airport apron and runway to the north of the Royal Albert Dock where no barrier exists to provide protection. In the future, this will remain the case with or without the development.

Mitigation and Enhancement

6.4.23 The Airport has developed and implemented measures to ensure that ground operations are carried out as quietly as practicable to minimise impact. These include:

- Encouraging the minimum use of reverse thrust on landing, consistent with safety constraints.
- Except in emergencies, engine testing shall be restricted to areas designated for that purpose.
- Maintaining a noise limit for policing the level of high powered ground runs for engine testing and maintenance purposes.
- Limiting engine test and maintenance activities to those associated with engine rectification, rather than routine testing.
- Limiting the use of APU's to no more than 10 minutes prior to departure and 10 minutes after landing.

Residual Effects

6.4.24 Due to the limits on aircraft movements and noise factored movements applicable at the Airport, there are no residual effects anticipated with regard to ground noise over and above those identified above.

Ground Noise – Summary and Conclusions

6.4.25 A detailed ground noise assessment has been undertaken to appraise the existing and future noise levels around the Airport as a result of aircraft ground activities. The area local to the Airport is exposed now to ground noise as a result of aircraft taxiing, manoeuvring, holding on aprons and stands, and operating APU's. In addition, occasional ground running takes place for engine test purposes although this is generally of limited duration.

- 6.4.26 The local residential communities are currently well protected from any significant effects of ground noise by the barrier provided adjacent to the Airport terminal and pier structure. A blast screen has recently been erected between the western end of the pier and the Jet Centre which will assist in reducing the effects of ground noise on housing locally.
- 6.4.27 In 2010, without consent for any further aircraft movements, ground noise levels will remain similar to current levels. By this date, new stands will have been erected to the east of the terminal building over the Royal Albert Dock. Ground noise effects will be mitigated by the provision of an 8 metre high barrier adjacent to these stands. This assessment indicates minor reductions in noise to Newland Street as a result of this new barrier.
- 6.4.28 In 2010, with consent, the increased activity of aircraft will give rise to a slight increase in ground noise for all locations in close proximity to the Airport. The impact of these changes is predicted to be minor and, for residential accommodation, ground noise levels will remain within recommended noise criteria. As is the case now however, ground noise levels along the northern edge of the Royal Albert Dock will continue to be relatively high in view of its close proximity to the airport and the lack of any noise barriers. However, all properties in the location are believed to be insulated to a high standard.
- 6.4.29 In conclusion, the impact of the Proposed Scheme from ground noise sources from the airport will generally be negligible compared with the 2010 base case, and minor adverse in places.

6.5 Road Traffic Noise

- 6.5.1 The proposed scheme will affect the environment by virtue of noise from road traffic derived from a greater number of staff and passengers using LCY in 2010, as well as a general intensification of service vehicle traffic.
- 6.5.2 The environmental impact assessment of future road traffic noise has been made in conjunction with the access road traffic assessment carried out by Savell Bird and Axon, see Chapter 5. There are no new access roads required to facilitate the

scheme, and therefore the study relates to the existing local traffic network and the associated predicted future traffic flows.

Methodology

Road Traffic Noise Assessment Criteria

- 6.5.3 As for the air noise assessment, the criteria used in the analysis here takes into account the information given in PPG 24, and also the Design Manual for Road and Bridges ^(6.20).
- 6.5.4 A summary of the PPG 24 guidance regarding daytime road traffic noise is given in Table 6.17 below. The guidance given in PPG 24 is considered by Local Authorities in actions and decisions relating to planning application for dwellings near roads.

Table 6.17: PPG 24 Guidance with regard to road traffic noise

L_{Aeq,16h} dB	Guidance/Experience with regard to road traffic noise (daytime)
< 55	Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as a desirable level. PPG 24 Category A
55 – 63	Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection against noise. PPG 24 Category B
63 – 72	Planning permission for housing should not normally be granted. Where it is considered that planning permission should be given, for example because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise. PPG 24 Category C
> 72	Planning permission for housing should normally be refused. PPG 24 Category D

Note: L_{Aeq,16h} – Equivalent continuous sound level. This is a notional steady sound level which would cause the same A-weighted sound energy to be received as that due to the actual and possibly fluctuating sound from 07.00 to 23.00 (daytime).

- 6.5.6 This guidance uses noise measured in terms of L_{Aeq,16h} to assess the noise situation. For road traffic noise, the trigger level of the noise insulation scheme ^(6.1) is expressed as a façade level of 68 dB L_{A10,18h}. A correction of -3 dB(A) is applied to convert from the façade level to a free-field level, and a further correction of -2 dB(A)

approximately converts from the $L_{A10,18h}$ to the $L_{Aeq,16h}$ metric. The resulting level of 63 dB $L_{Aeq,16h}$ is therefore taken to be the upper limit of PPG 24 Category B.

6.5.7 Based on the above, the following absolute criteria have been adopted for use in this assessment.

Table 6.18: Absolute Road Traffic Noise Criteria

Absolute noise level at facade, dB $L_{A10,18h}$	Subjective impression
>68 dB $L_{A10,18h}$	Substantial
61 - 68 dB $L_{A10,18h}$	Moderate
≤60 dB $L_{A10,18h}$	Minor

6.5.8 The subjective importance of changes in road traffic noise level on people relates to the magnitude of the change and, to some extent, when it occurs. An indication of the importance is given below for road traffic noise, derived from an interpretation of change criteria from the Department of Transport document “Design Manual for Roads and Bridges, Volume 11” (DMRB). The importance depends on whether the change occurs all of a sudden or gradually. As a worst case, the table below is based on the former, although in practice, any change will be gradual.

Table 6.19 Subjective importance in changes in noise level

Increase in noise level	Change in % People Bothered, Very Much or Quite a lot by noise	Interpreted significance
< 1 dB	< 20%	Negligible
1 – 3 dB	20% - 30%	Minor
3 – 5 dB	30% to 35%	Moderate

Road Traffic Noise Assessment Method

6.5.9 The assessment of road traffic noise has been undertaken utilising a commercially available acoustic software package CADNA. This package adopts the official calculation method given in the Department of Transport Calculation of Road Traffic Noise publication (CRTN) ^(6.21).

6.5.10 The details of the input data and assumptions utilised in this assessment are provided in Appendix C.3.

Baseline Road Traffic Noise Conditions

6.5.11 BAP have made predictions of existing daytime noise levels near the Airport, specifically at the assessment locations labelled A to F as shown on Figure 6.6. The results of these predictions are presented in Table 6.20. Absolute levels have been determined at a distance of 10 metres from the relevant road.

6.5.12 No complaints have been received in the last five years relating to the noise of current road traffic using the Airport.

Assessment of Effects of Road Noise

6.5.13 The predicted daytime $L_{Aeq,16h}$ noise levels for each of the assessment scenarios are summarised in Table 6.20 below for the assessment locations shown in Figure 6.6.

Table 6.20: Predicted noise from road traffic

Assessment Location	Daytime Noise Level, dB $L_{A10,18h}$ (0600h-00.00h)		
	2006 Baseline	2010 Without consent	2010 With consent
A. Connaught Bridge	69.9	70.0 (+0.1)	70.3 (+0.4)
B. Hartmann Road	67.7	67.3 (-0.4)	68.3 (+0.6)
C. Connaught Road	66.8	67.0 (+0.2)	67.2 (+0.4)
D. Royal Albert Way East	69.5	69.7 (+0.2)	70.4 (+0.9)
E. Royal Albert Way West	70.3	70.4 (+0.1)	70.6 (+0.3)
F. Woolwich Manor Way	68.4	68.8 (+0.4)	68.6 (+0.2)

(+0.2) – dB change relative to 2006 Baseline

Note: Each assessment location is 10m from nearside kerb of respective road.

6.5.14 This analysis shows that on the local roads around the Airport, traffic is such as to give rise to a substantial impact on any noise sensitive buildings located within 10 metres of the road. This impact arises as a result of the absolute noise levels generated by such traffic. For most of these roads however, dwellings are generally located farther back from the kerb than this

6.5.15 In 2010, with or without consent, the additional Airport-related road traffic is predicted to generate an increase of less than 1 dB along these roads, giving rise to a negligible effect.

Mitigation and Enhancement

6.5.16 No specific mitigation measures are required to address the negligible increases in road traffic noise expected from the with or without consent scenarios in 2010. In practice, any properties treated with an LCY sound insulation scheme package that lie close to major roads around the airport will benefit from protection against existing road traffic noise in addition to aircraft noise.

6.5.17 For Hartmann Road, a wooden noise barrier has been erected along the southern edge to provide some protection to nearby residential properties in the Camel Road area.

Residual Effects

6.5.18 Without any further mitigation, the effects as described above will exist in the future with noise levels tending to increase slightly over time as overall non-airport related road traffic activity on local roads increases with time.

Road Traffic Noise – Summary and Conclusions

6.5.19 A detailed assessment of the road traffic noise affecting the local road network has been undertaken using conventional noise modelling techniques. Traffic data has been provided by Savell Bird and Axon.

6.5.20 No road alterations are proposed as part of this scheme. Any changes in road traffic noise will therefore arise as a result of any changes to the vehicle flows along the existing local road network.

6.5.21 In view of the relatively low levels of additional traffic likely to be attracted to the road network as a result of the proposed airport development by 2010, with or without consent, the predicted changes in noise level are very small, less than 1 dB. Negligible noise impact is therefore predicted as a result of the proposed increase in surface access movements associated with the Proposed Scheme.

6.6 REFERENCES

- 6.1 Noise Insulation Regulations 1975, Statutory Instrument 1975 No. 1763
- 6.2 Planning Policy Guidance PPG 24 : Planning and Noise, DETR, September 1994
- 6.3 Sounder City: The Mayor's Ambient Noise Strategy. Mayor of London. March 2004
- 6.4 The Appraisal Framework for Airports in the South East and Eastern Regions of England, DETR, November 2000
- 6.5 The Future of Air Transport, Department of Transport, December 2003
- 6.6 CAP 725, CAA Guidance on the Application of the Airspace Change Process, Airspace Change Proposal – Environmental Requirements, Appendix B, Annex 4, 30 March 2007
- 6.7 The Airport Inquiries 1981 – 1983, Chapter 20 and Chapter 42, Inspector's Report
- 6.8 Manchester Airport : Second Runway: 15 January 1997 : Decision Letter
- 6.9 Robin Hood Airport (ex. Finningley) : 3 April 2003 : Decision Letter
- 6.10 Aircraft Noise Study, Cole Jarman Associates, March 1999
- 6.11 The Heathrow Terminal Five and Associated Public Inquiries, Report by Roy Vandermeer QC, Main Report, Chapter 21, Department for Transport , Local Government and the Regions, November 2001
- 6.12 The Environmental Noise (England) Regulations 2006, Statutory Instrument 2006 No. 2238
- 6.13 Federal Aviation Administration, Office of the Environment and Energy. Integrated Noise Model (INM) Version 6.1.
- 6.14 Bickerdike Allen Partners. Air Noise Contour Prediction using INM - Derivation of Assumptions. March 2007

- 6.15 Aircraft and road traffic noise and children's cognition and health: a cross national study'. Stansfeld et al, The Lancet, 2005;365;1942-49 (the 'RANCH' study)
- 6.16 WHO, Environmental Health Criteria: 12 – Noise, WHO Geneva, 1980
- 6.17 WHO, Community Noise, Environmental Health Criteria Document, External Review Draft, 1993
- 6.18 International Civil Aircraft Organisation noise certification requirements for aircraft prototypes certified for airworthiness on or after 1 January 2006 and for re-certification of Chapter 3 aircraft.
- 6.19 Department of the Environment, Minerals Planning Guidance Note 11, The Control of Noise at Surface Mineral Workings, April 1993
- 6.20 Design Manual for Roads and Bridges, Volume 11, Section 3, Part 7, Traffic Noise and Vibration, The Highways Agency, August 1997
- 6.21 Calculation of Road Traffic Noise, Department of Transport, HMSO, 1988