CITY AIRPORT DEVELOPMENT PROGRAMME (CADP)

CONSOLIDATED ENVIRONMENTAL STATEMENT ADDENDUM (CESA) NOVEMBER 2014

VOLUME II - PART B AND C: SUPPLEMENTAL INFORMATION REGARDING 120,000 EIA SENSITIVITY TEST AND PROPOSED NOISE CONTROLS

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CITY AIRPORT DEVELOPMENT PROGRAMME (CADP)

CONSOLIDATED ENVIRONMENTAL STATEMENT ADDENDUM

INCORPORATING ALL FURTHER INFORMATION PROVIDED SINCE THE SUBMISSION OF THE ENVIRONMENTAL STATEMENT OF JULY 2013

VOLUME II PARTS B & C:

SUPPLEMENTAL INFORMATION REGARDING 120,000 MOVEMENT SENSITIVITY TEST AND PROPOSED NOISE CONTROLS

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PART B

9 120,000 ACTUAL AIRCRAFT MOVEMENT EIA SENSITIVITY TEST

a) Introduction

9.1 This section comprises Part B of this CESA. It describes the ‘likely significant environmental effects’ of 120,000 actual aircraft movements being reached at some point in the future within the existing noise factored movements limit of 120,000 per year.

9.2 For the sake of brevity, this ‘120,000 Actual Aircraft Movements (2023) EIA Sensitivity Test’ is herein abbreviated to the ‘120,000 Movement Sensitivity Test’.

9.3 The purpose of the 120,000 Movement Sensitivity Test is to demonstrate that there is no reason to impose new planning conditions which might act to reduce the current permitted cap of 120,000 actual aircraft movements (as consented by LBN in 2009; ref 07/01510/VAR). It has also helped to inform the Aircraft Categorisation Review (ACR) and, in particular, the formulation of the Quota Count (QC) noise control system which is described further in Part C of this CESA.

9.4 The 120,000 Movement Sensitivity Test constitutes a technical assessment which acts to augment the Environmental Impact Assessment (EIA) applied to the 2023 ‘With Development’ Principal Case as well as to two previous sensitivity tests already contained in the ES, namely: the Fleet Mix Sensitivity Test (2023 Higher Passenger Case) completed at the request of TfL; and, Public Safety Zones (PSZs) (2023 Higher Risk Case) completed at the request on the GLA and LBN. The aircraft fleet mix and other assumptions behind these earlier sensitivity tests are detailed within Chapter 3: Methodology of the Consolidated ES (CES) (November 2014).

9.5 The ‘most likely’ Principal Case of 111,000 actual movements (comprising 107,000 scheduled and 4,000 business aviation movements) underpins the assessment work completed to-date; including that presented in the July 2013 ES, its two subsequent addendums (the ESA of March 2014 and the ESSA of May 2014) and the CES.

9.6 In all cases, the environmental effects of this uplift in aircraft movements (e.g. air quality and noise) and the associated effects from the corresponding increase in passenger numbers, surface access transport, employment and other factors, has been quantified in absolute terms against the ‘Without CADP’ base case for 2023. The test still assumes a 2012 Baseline Year comprised of 75,502 aircraft movements (64,775 scheduled movements and 5,727 business aviation movements) conveying 3.03 million passengers, whilst the 2023 ‘Without CADP’ scenario comprises a forecast of 96,713 actual movements (87,713 scheduled movements and 9,000 business aviation movements) generating 4.46 million passengers. These assessment parameters and forecast scenarios are set out Chapter 3: EIA Methodology of the CES.

9.7 The Airport, advised by York Aviation and Bickerdike Allen Partners (BAP), has developed a plausible aircraft fleet mix for this 120,000 Movement Sensitivity Test (shown in Table 10.1 below). This applies a balance of existing aircraft types that can be accommodated by the CADP infrastructure by 2023, and which would meet both the ‘actual’ 120,000 movements limit and the noise factored movement (NFM) limit of 120,000.

9.8 As described below, this forecast is considered plausible but less likely than the 2023 óWith Development Principal Caseô because it relies on changes in airline behaviour, including a degree of ópeak spreadingô in order to achieve 120,000 actual movements by 2023.

9.9 The assessments undertaken on the 120,000 Movement Sensitivity Test fleet mix demonstrates that such a scenario would not give rise to unacceptable environmental effects and/or impacts which are materially different from those identified for 2023 Principal Case, as assessed and presented in the CES (November 2014).

b) Logic behind Sensitivity Fleet Mix

9.10 The basis of the CADP forecasts is set out in the Need Statement that was submitted with the CADP1 planning application in July 2013. At paragraph 3.36 of the Need Statement, it is made clear that the forecasts are subject to a number of constraints:

> **“The forecasts are effectively capacity constrained forecasts having regard to how airlines can viably increase frequencies to serve each route, the appropriate frequency of service (simply adding middle of the day frequencies on business routes is not appropriate to the demand base) and appropriate aircraft size. Overall, by 2021, the forecasts are restricted by the Airport capacity available given the movement limit of 120,000 noise factored movements per annum and limits on the size of aircraft which can use the Airport as well as the weekend closure of the Airport on Saturday afternoons and Sunday mornings.”**

9.11 On the basis of the expected mix of aircraft using the Airport at 2023, it was stated (paragraph 3.42) that:

> **“it will reach its noise factored movement limit of 120,000 annual aircraft movements at approximately 111,000 actual aircraft movements in 2023.”**

9.12 The forecast aircraft fleet mix was presented in Table 3.10 of the Need Statement, as reproduced below :

Need Statement Table 3.10: Annual Movements by Aircraft Type With Development				
Aircraft Type	**2017 Annual**	**2019 Annual**	**2021 Annual**	**2023 Annual**
Airbus A318	1,220	1,220	1,220	1,220
ATR-42	2,218	4,990	4,436	4,990
Avro RJ85	7,208	-	-	-
Bombardier Q400	11,643	23,841	27,722	26,613
Canadair C100	8,871	9,980	9,980	14,416
Embraer E170	12,752	15,524	16,633	6,653

Need Statement Table 3.10: Annual Movements by Aircraft Type With Development				
Aircraft Type	**2017 Annual**	**2019 Annual**	**2021 Annual**	**2023 Annual**
Embraer E190	36,039	43,247	44,910	53,227
Fokker F50	12,198	-	-	-
Commercial/Scheduled	**92,149**	**98,802**	**104,901**	**107,119**
Beechjet 400A	701	737	582	357
Cessna 550 Citation Bravo	1,560	1,641	1,297	794
Cessna 560XL Citation XL	2,361	2,483	1,962	1,202
Embraer Legacy	88	93	73	45
Dassault Falcon 7X	589	619	489	300
Raytheon Hawker 800XP	1,972	2,075	1,639	1,004
Learjet 45	430	452	357	219
Business Aviation	**7,700**	**8,100**	**6,400**	**3,920**
Total	**99,849**	**106,902**	**111,301**	**111,039**
Source: York Aviation				

9.13 Given what is known about airline re-fleeting plans, the aircraft fleet mix as presented in Table 3.10 of the Need Statement is still expected to be the ómost likelyô forecast.

9.14 It is considered less likely that there would be parity between the noise factored and actual aircraft movement limits of 120,000 at 2023 due to the trend for airlines to introduce larger aircraft. Nonetheless, it is also quite possible that some airlines could retain smaller aircraft in their fleets for longer than anticipated and introduce higher frequency operations on some routes, so spreading the peaks to some degree. At the same time, other airlines might accelerate the rate of introduction of larger and quieter aircraft like the C-Series, within the limits assessed in the original 2023 Higher Passenger Case described in the CES. In these circumstances, the slot allocation rules would see these additional commercial services displace more of the business jet operations than previously considered likely. If this were to happen, there could be virtual parity between the number of actual and the number of noise factored movements at 120,000. This is considered a plausible alternative scenario consistent with current planning controls, albeit with lower probability than the ómost likelyô Principal Case. It has therefore been considered below.

9.15 The aircraft fleet mix subject to the 120,000 Movement Sensitivity Test is set out in Table 9.1 below.

Table 9.1 – EIA Sensitivity Fleet Mix

120,000 Sensitivity Test – Annual Movements by Aircraft Type 2023				
Aircraft Type	**Code**	**Category**	**Annual movements**	**Noise Factored Movements**
Airbus A318	A318	1.26	1,220	1,537
ATR-42	AT4	0.63	4,990	3,144
Bombardier Q400	DH4	0.63	44,688	28,153
Canadair C100	C10	1.26	16,230	20,450
Embraer E170	E70	1.26	6,653	8,383
Embraer E190	E90	1.26	45,315	57,097
Corporate Aircraft				
Jet Centre All Types	-			
Beechjet 400A	BE40	1.26	82	103
Cessna 550 Citation Bravo	C550	1.26	183	231
Cessna 560XL Citation XL	C56X	1.26	277	349
Embraer Legacy	ER3	1.26	10	13
Dassault Falcon 7X	F7X	1.26	69	87
Raytheon Hawker 800XP	H25B	1.26	232	292
Learjet 45	LJ45	1.26	51	64
	Total		120,000	119,903

9.16 As shown above, the key feature of the 120,000 Movement Sensitivity Test fleet mix compared to 2023 Principal Case forecast (as shown in Table 3.10 of the Need Statement, above) is the additional movements by Bombardier Q400 (turbo-prop aircraft) and Canadair C100 (ôC-Seriesô aircraft). This reflects a plausible assumption that airlines could opt to increase frequencies of service on some routes and operate smaller aircraft to maintain viable load factors while seeking to maximise the use of the latest and most economical larger aircraft (the ‘C-Series’) within the limits of the CADP infrastructure. In this case, these two aircraft types would replace some of the (noisier) Embraer E190s, which represented approximately half of the movements (53,227) in the Principal Case forecast.

9.17 This shift in the mix would permit 12,000 additional scheduled aircraft movements to be accommodated within the NFM constraint, so that 120,000 actual movements (including approximately 1,000 corporate aircraft) could plausibly occur by 2023.

9.18 In summary, this plausible fleet mix achieves parity between 120,000 NFM and actual movements.

c) Passenger Numbers Derived from the EIA Sensitivity Fleet Mix

9.19 Passenger numbers derived from the 120,000 Movement Sensitivity Test, as compared to the 2023 Principal Case and the previous 2023 Higher Passenger Case are presented in Table 9.2 below:

Table 9.2 – Forecast Passengers under the EIA Sensitivity Fleet Mix

	Passengers Numbers (Pax) in 2023		
	Most Likely Principal Case	**Higher Passenger Case Sensitivity Test**	**120,000 Movement EIA Sensitivity Test**
Scheduled Movements	107,119	107,119	119,096
Passengers (mppa)	5.9	6.0	6.25

9.20 The 120,000 Movement Sensitivity Test (of 119,000 scheduled movements and 1,000 business aviation movements) by 2023 would lead to an approximate increase of 350,000 additional passengers (excluding de minimis users of the Jet Centre) compared to the Principal Case forecast, and 250,000 more passengers compared to the previous Higher Passenger Sensitivity Test, both of which were based on approximately 107,000 scheduled movements (but with the latter applying a higher load factor).

d) Alternative Fleet Mixes to Achieve 120,000 Movements

9.21 Whilst there will always remain some uncertainty regarding the scale and timing of actual airline re-fleeting decisions, the extent to which there could be variations will remain constrained by both the CADP infrastructure (i.e. limiting the number of larger Code C aircraft which could be operated particularly in peak periods) and by the overarching constraint imposed by the existing 120,000 noise factored movement limit. The 120,000 Movement Sensitivity Test fleet assumes smaller aircraft on average and some degree of peak spreading, within the bounds of plausibility.

9.22 Several alternative fleet mix scenarios have also been subject to ‘stress testing’ against the proposed Noise Quota (QC) system in order to demonstrate the effectiveness of this new noise control system - these are presented and discussed in Part C and Appendix 10.2. However, as these fleet mixes are considered less likely than the EIA 120,000 Movement Sensitivity Test, not least as they do not provide for the introduction of the new aircraft types already ordered by some airlines, it was not considered necessary or appropriate to undertake a full impact assessment of these mixes.

e) <u>Basis of EIA 120,000 Movement Sensitivity Test</u>

9.23 To provide a direct comparison to the "most likely" With Development Principal Case forecast in 2023, the 120,000 Movement EIA Sensitivity Test adopts the same baseline and base case figures as used in the original ES. In other words, where applicable, the environment effects of the 120,000 Movement Sensitivity Test fleet mix have been assessed against the ‘Without CADP’ base case.

9.24 The assessment of the 120,000 Movement Sensitivity Test fleet mix, as presented in the following sections, considers the ‘likely significant environmental effects’ due to both the predicted increase in aircraft movements and the number of passengers by 2023 under this scenario.

9.25 The increase in aircraft movements has been assessed for the effects of:

- Air Noise, informed by the preparation of new air noise contours;
- Ground Noise, from aircraft on the stands, taxiway and apron;
- Changes to the Public Safety Zones (PSZ) and associated socio-economic effects;
- Air quality, due to changes in emissions from aircraft on the ground and in the LTO (Landing and Take-Off) cycle; and
- Climate change, due to minor differences in the GHG/ CO_2 emissions presented in the ES.

9.26 The increase in passenger numbers has been assessed for the principal effects of:

- Surface access and traffic, including any changes to traffic flows on local roads;
- Demand on the DLR and other Public Transport modes;
- Road traffic emissions, including NO_2 and PM_{10} concentrations at key receptor sites;
- Road traffic noise;
- Socio-economic effects, including changes to employment and GVA; and
- Waste, due to additional generation from the increase in passengers.

9.27 After due consideration of other environmental topics dealt with in the 2013 ES (e.g. cultural heritage, landscape, flood risk, ecology and ground conditions) it was determined that none of these factors/ impacts would be influenced by the uplift in aircraft movements and passengers under the 120,000 Movement Sensitivity Test fleet mix.

f) <u>Potential Environmental Effects</u>

Introduction

9.28 The following sets out the potential significant environmental effects resulting from the 120,000 Movement Sensitivity Test fleet mix, and compares these to the previous EIA findings (as presented in the corresponding CES chapters and sections of the CESA, where applicable).

9.29 For the majority of these topics, no new or materially different environmental effects from the sensitivity fleet mix (i.e. which would change the category of significance from say ‘negligible/ minor adverse’ to ‘moderate/ major adverse’) have been identified.

i. Noise (Prepared by BAP)

9.30 The following assessments have been undertaken by Bickerdike Allen Partners (BAP) and relate to the potential impacts on air noise, ground noise and road traffic.

Air noise

9.31 Consideration has been given, as a sensitivity test, to the air noise effects likely to arise from an aircraft mix of 120,000 actual aircraft movements per annum and 120,000 noise factored movements.

9.32 The current mix of aircraft envisaged for the 2023 With Development Principal Case allows for a total of 111,000 actual aircraft movements per annum due to the cap of 120,000 noise factored movements and expected changes in airline fleets. In this case, the noise factored cap is reached before the permitted actual movement limit, as the fleet mix comprises a significant proportion of Noise Exposure Category A aircraft. One movement by a Category A aircraft, which are normally turbofan types, counts as 1.26 noise factored movements. The 120,000 Movement Sensitivity Test fleet mix includes a higher proportion of turbo-prop aircraft, which are normally categorised as Noise Category B aircraft and are factored by 0.63; the greater proportion of Category B operations means that a greater number of actual aircraft movements can take place within the 120,000 noise factored movements limit subject always to the actual annual movements limit of 120,000.

9.33 The mix of aircraft utilised in the 120,000 Movement Sensitivity Test, with the addition of the movements during the key summer period (used to calculate noise contours) is set out in Table 9.3 below.

Table 9.3 – Number and Mix of Annual Movements – 120k Movement Sensitivity Test 2023

	120k Movements 2023	
A/C Type	**Annual**	**Summer Period**
A318	1220	305
ATR 42	4990	1248
BE40	82	21
C550	183	46
C56X	277	69
CS100	16230	4058
DH8D	44688	11172
E Legacy	10	3
E170	6653	1663
E190	45315	11329
H800XP	232	58
Falcon7X	69	17
Learjet 45	51	13
Total	**120,000**	**30,000**

9.34 The LAeq,16h average mode noise contour for the 120,000 Movement Sensitivity Test fleet mix is provided in Appendix 9.1 and shows a slight reduction in size compared with the 2023 ôWith Developmentô Principal Case, shown on the same figure. The base case 2023 ôWithout Developmentô contour is also presented in Appendix 9.1, which relates to a total of 96,713 annual movements. The associated area, dwelling and population counts with and without permitted developments are included in Tables 9.4 to 9.8.

Table 9.4- Contour areas (km2), LAeq,16h average mode, summer day

Scenario	Sensitivity Test 120k Movements 2023	Principal 2023	
Contour, $L_{Aeq,16h}$	With dev.	With dev.	Without dev.
Annual mvts	120k	111k	96.7k
57 dB	8.8	9.1	7.8
63 dB	2.3	2.4	2.0
69 dB	0.7	0.7	0.6

Table 9.5 - Approximate number of dwellings in contours (not including permitted developments), LAeq,16h average mode, summer day

Scenario	Sensitivity Test 120k Movements 2023	Principal Case 2023	
Contour, $L_{Aeq,16h}$	With dev. .	With dev.	Without dev.
Annual mvts	120k	111k	96.7k
57 dB	14,600	15,100	12,400
63 dB	1,000	1,300	900
69 dB	0	0	0

Table 9.6 - Approximate population in contours (not including permitted developments), LAeq,16h average mode, summer day

Scenario	Sensitivity Test 120k Movements 2023	Principal Case 2023	
Contour, $L_{Aeq,16h}$	With dev. .	With dev.	Without dev.
Annual mvts	120k	111k	96.7k
57 dB	32,700	34,100	27,800
63 dB	2,400	2,900	2,100
69 dB	0	0	0

Table 9.7 - Approximate number of dwellings in contours (including permitted developments), LAeq,16h average mode, summer day

Scenario	Sensitivity Test 120k Movements 2023	Principal Case 2023	
Contour, $L_{Aeq,16h}$	With dev. .	With dev.	Without dev.
Annual mvts	120k	111k	96.7k
57 dB	29,800	30,600	26,400
63 dB	6,200	6,700	5,500
69 dB	0	0	0

Table 9.8 - Approximate population in contours (including permitted developments), LAeq,16h average mode, summer day

Scenario	Sensitivity Test 120k Movements 2023	Principal Case 2023	
Contour, $L_{Aeq,16h}$	With dev.	With dev.	Without dev.
Annual mvts	120k	111k	96.7k
57 dB	73,800	76,000	65,600
63 dB	16,300	17,500	14,500
69 dB	0	0	0

9.35 The above tables indicate that by 2023, a mix of aircraft operating to the maximum permitted limit of 120,000 actual movements (and also within the 120,000 annual noise factored limit), would bring about a slight reduction (3%) in the size of the 57 dB noise contour as compared to those predicted in 2023 using the Principal Case aircraft mix assuming the CADP is fully built and operational. Comparing this noise contour for the 120,000 Movement Sensitivity Test mix against the óWithout Developmentô96,700 Movement base case shows an increase in the size of the contour (13%), although the increase is less than forecast under the With Development Principal Case mix (17%).

9.36 Annoyance ratings for this scenario are given in Tables 9.9 and 9.10.

Table 9.9 - Annoyance, dB LAeq,16h % Highly Annoyed – 120k Movements 2023 (not including permitted developments)

Noise Contour Band, $L_{Aeq,16h}$ dB	% Highly Annoyed	Sensitivity Test 120k Movements 2023	Principal Case 2023	
		With dev.	With dev.	Without dev.
Annual mvts	-	120k	111k	96.7k
54 ï 57	6.6%	2,694	2,833	2,326
57 ï 60	11.1%	2,476	2,560	2,130
60 ï 63	18.0%	1,448	1,468	1,165
63 ï 66	28.0%	462	582	517
66 ï 69	40.7%	300	324	105
69 ï 72	54.9%	0	0	0
72 ï 75	68.2%	0	0	0

Table 9.10 - Annoyance, dB LAeq,16h % Highly Annoyed – 120k Movements 2023 (including permitted developments)

Noise Contour Band, $L_{Aeq,16h}$ dB	% Highly Annoyed	Sensitivity Test 120k Movements 2023	Principal Case 2023	
		With dev.	With dev.	Without dev.
Annual mvts	-	120k	111k	96.7k
54 ï 57	6.6%	3,557	3,669	3,343
57 ï 60	11.1%	4,457	4,603	3,935
60 ï 63	18.0%	3,126	3,059	2,820
63 ï 66	28.0%	3,059	3,391	2,701
66 ï 69	40.7%	2,168	2,192	1,974

Noise Contour Band, $L_{Aeq,16h}$ dB	% Highly Annoyed	Sensitivity Test 120k Movements 2023		Principal Case 2023	
		With dev.		With dev.	Without dev.
Annual mvts	-	120k		111k	96.7k
69 – 72	54.9%	0		0	0
72 – 75	68.2%	0		0	0

9.37 The above tables indicate a small reduction in the total number of people likely to be 'highly annoyed' as a result of the 120,000 Movement Sensitivity Test fleet mix case as compared to the 2023 Principal Case. Based on CAP 725[1], taking the total population within the 54 dB noise contour without the CADP (including permitted developments), there would be an estimated increase of 0.7 % in the number of people 'highly annoyed' with the CADP in place under the 120,000 mix of aircraft as described above. This is less than under the 2023 With Development Principal Case in place (0.9%).

9.38 The general finding is that there is little change in the impacts arising from air noise under the 120,000 Movement Sensitivity Test as compared to under the 111,000 Principal Case assessed in the ES for 2023 'With Development'. The conclusions of the ES in relation to air noise therefore remain unaltered and this assessment finds no change to the environmental noise impact descriptions provided in the ES.

Ground Noise

9.39 Consideration is given below to the ground noise effects likely to arise from the 120,000 Movement Sensitivity Test which equates to 120,000 noise factored movements. This mix includes a larger proportion of Noise Exposure Category B aircraft than used in the 2023 Principal Case of 111,000 aircraft movements per annum.

9.40 Ground noise modelling has been carried out as per the methodology outlined in paragraphs 8.209 to 8.212 within the ES. Aircraft ground noise levels are predicted using ISO 9613 methodology using proprietary software package Datakustik CadnaA. The CadnaA model has been updated since the publication of the July 2013 ES. This was done to account for additional topographic information and a software update. The 2023 'With' and 'Without' Development ES assumption models have therefore been re-calculated using the updated model to enable direct comparison with the results of the 120,000 Movement Sensitivity Test assessment. The detailed results of the revised ground noise assessment are presented in the replacement ES Chapter 8: Noise and Vibration, which is presented in the Consolidated Environmental Statement (November 2014) (CES).

[1] CAP 725 CAA Guidance on the Application of the Airspace Change Process, Civil Aviation Authority, 30 March 2007

Table 9.11- Aircraft total movements and mix types used by scenario

Scenario	EIA Sensitivity Test 120k Movements 2023	Principal Case 2023	
Aircraft type	With dev.	With dev.	Without dev.
Annual mvts	120k	111k	96.7k
Turbo-fan	57.7%	68.0%	59.7%
Turbo-prop	41.4%	28.5%	31.0%
Corporate	0.008%	0.035%	0.093%

9.41 To assess the importance of the magnitude of absolute ground noise levels and also any changes in ground noise levels, the criteria adopted in the ES have been used. Table 9.12 sets out the absolute criteria derived from Table 8.32 of the CES (November 2014).

Table 9.12 - Ground noise impact classification – absolute criteria

Absolute Ground Noise Criteria, $L_{Aeq,16h}$	Impact classification
<50	Negligible
50 - 55	Minor
55 ï 60	Significant - moderate
60 -65	Significant - substantial
>65	Significant - severe

9.42 The subjective importance of changes in noise level on people relates to the magnitude of the change. An indication of the importance is given in CES Chapter 8 and represented below in Table 9.13.

Table 9.13 - Subjective importance of changes in noise level

Change in Level (dB)	Subjective Impression	Impact classification
0 to 2	Imperceptible change	Negligible
2 - 3	Barely perceptible change	Minor
3 to 6	Perceptible change	Significant moderate
6 to 9	Up to a halving or a doubling of loudness	Significant substantial
>9 or more	Equal to or more than a halving or doubling of loudness	Significant very substantial

9.43 The results of the modelling are presented in Table 9.14. Figures of the CadnaA contours are included in Appendix 9.2.

Table 9.14 - Ground noise assessment 2023 with development (111,000) movements and 120,000 Movement Sensitivity Test mix

Assessment location	120,000 Movement Sensitivity Test 2023 With dev.	Principal Case 2023 With dev.	Change	Impact classification Relative
Annual mvts	120k	111k	-	-
A ï Drew Road	53.4	52.7	0.7	Negligible
B ï North Side of Royal Albert Dock	62.0	61.3	0.7	Negligible
C ï Camel Road Flats	54.3	53.7	0.6	Negligible
D ï Parker Street	53.1	52.5	0.6	Negligible
E ï Newland Street	49.1	48.4	0.7	Negligible
F ï Storey Road School	51.9	51.2	0.7	Negligible
G ï Great Eastern Quays / ñNorton Pharmaceuticalò	48.6	47.9	0.7	Negligible
H ï University of East London	59.3	58.6	0.7	Negligible
I ï Royal Docks Business	61.8	61.1	0.7	Negligible
J ï Brixham Street	51.9	51.2	0.7	Negligible

9.44 The above table indicates a negligible increase in ground noise with the 120,000 Movement Sensitivity Test fleet mix incorporating a greater proportion of turboprop aircraft. This is because the Principal Case 111,000 fleet mix contains a greater proportion of operations by modern turbo-fan type aircraft, which are generally quieter when taxiing and manoeuvring than the turbo-prop aircraft. Category A aircraft are typically turbo-fan types, whereas Category B aircraft are typically turbo-props.

9.45 Table 9.15 and Table 9.16 present an analysis of 2,390 receptors in terms of the impact arising from the absolute levels of noise, comparing the original ES results with the 120,000 Movement Sensitivity Test scenario.

Table 9.15 - Ground noise assessment comparison with absolute criteria ES assumptions

Impact Classification Absolute	120,000 Movement Sensitivity Test 2023 With dev.	Principal Case 2023 With dev.	Change
	120k	111k	120k ï 111k
Negligible	1273	1381	- 108
Minor	668	625	43
Significant-Moderate	308	273	35
Significant-Substantial	134	109	25
Significant-Severe	7	2	5

Table 9.16 - Ground noise assessment comparison with absolute criteria ES assumptions in terms of percentage

Impact Classification Absolute	120,000 Movement Sensitivity Test 2023 With dev.	Principal Case 2023 With dev.	% Change*
	120k	111k	-
Negligible	53%	58%	- 5%
Minor	28%	26%	2%
Significant-Moderate	13%	11%	1%
Significant-Substantial	6%	5%	1%
Significant-Severe	0%	0%	0%

* values rounded to nearest whole number

9.46 The table above indicates the effect of the 120,000 Movement Sensitivity Test aircraft mix will be to expose an additional 108 receptors (out of 2,390) to adverse noise effects, with increases in noise classified as having a minor or significant impact. In terms of the percentage receptors within each impact classification category, the results indicate a 2% increase in receptors exposed to ground noise of minor impact, and a 3% increase in receptors exposed to a significant impact.

9.47 Table 9.17 below, provides a comparison of the ground noise levels at key receptors for the 120,000 Movement Sensitivity Test aircraft mix with the 2023 ôWithout Developmentô scenario.

Table 9.17- Ground noise at key receptors, 120k sensitivity mix in 2023 with development and 2023 Base Case without development

Assessment location	120,000 Movement Sensitivity Test 2023 With dev.	Bse Case 2023 Without dev.	Change	Impact classification Relative
Annual mvts	120k	96.7k	-	-
A ï Drew Road	53.4	52.0	1.4	Negligible
B ï North Side of Royal Albert Dock	62.0	60.6	1.4	Negligible
C ï Camel Road Flats	54.3	52.7	1.6	Negligible
D ï Parker Street	53.1	51.6	1.5	Negligible
E ï Newland Street	49.1	54.0	-4.9	Beneficial, Significant-Moderate
F ï Storey Road School	51.9	49.8	2.1	Adverse, Minor
G ï Great Eastern Quays / ñNorton Pharmaceuticalò	48.6	46.9	1.7	Negligible
H ï University of East London	59.3	58.0	1.3	Negligible
I ï Royal Docks Business	61.8	60.4	1.4	Negligible
J ï Brixham Street	51.9	48.1	3.8	Adverse, Significant-Moderate

9.48 For most of the above ten key receptors, comparing the 2023 Without Development base case with the 120,000 Movement Sensitivity Test mix results in a negligible change in ground noise. Both reductions and increases in ground noise are calculated. There are more increases than reductions, although increases are generally small. Two receptors are exposed to significant changes in ground noise level. The Newland Street receptor will be exposed to a significant reduction in ground noise. This is due to the increased noise screening provided by the development. The Brixham Street receptor will be exposed to a significant increase in ground noise. This is due to the closer proximity of this site to the new aircraft stands for the with development case. This general finding is in keeping with that found under the 2023 With Development Principal Case presented in the CES.

9.49 The overall finding concerning ground noise is that due to the slight increase in aircraft movements and the greater proportion of turboprop aircraft in the 120,000 Movement Sensitivity Test, ground noise levels generally rise slightly as compared to under the 111,000 Movement 2023 Principal Case. The change in noise and associated relative impact classification between the 120,000 Movement Sensitivity Test and the 2023 Without Development base case however differs little from that reported in the ES. This indicates that the ground noise impacts between the two scenarios do not differ materially from those identified and reported in the ES for the Principal Case. The residual ground noise impact is therefore still assessed as ***negligible to minor adverse***.

Road Traffic

9.50 Road traffic noise modelling has been carried out as per the methodology and assumptions outlined in paragraphs 8.259 to 8.260 within the ES. Consideration has been given to how the road traffic flows around the airport will differ under the 120,000 Movement Sensitivity Test as compared to the 2023 With Development Principal Case and also the Without Development Base Case (96,700 movements per annum). This section considers the change in noise that will arise as a result of these different scenarios.

9.51 An indication of the importance of a change in road traffic noise is given in Chapter 8 of the ES and presented below as Table 9.18 and Table 9.19 respectively. The importance depends on whether the change occurs all of a sudden or gradually.

Table 9.18 - Classification of magnitude of road noise impacts in the short term

Noise change dB $L_{A10,18h}$	Magnitude of Impact
0	No change
0.1 ï 0.9	Negligible
1.0 ï 2.9	Significant minor
3.0 ï 4.9	Significant moderate
Ó5.0	Significant major

Table 9.19 - Classification of magnitude of noise impacts in the long term

Noise change dB $L_{A10,18h}$	Magnitude of Impact
0	No change
0.1 ï 2.9	Negligible
3.0 ï 4.9	Significant minor
5.0 ï 9.9	Significant moderate
Ó10	Significant major

9.52 Table 9.20 shows the predicted road traffic noise levels at selected receptors along the roads which have been assessed for 2023 With Development Principal Case of 111,000 movements and the 120,000 Movement Sensitivity Test. For each road assessed, the $L_{A10,18h}$ noise level has been calculated at a distance of 10 m and at the worst affected property or properties. The distance to the nearside kerb has been presented.

Table 9.20 - 2023 Predicted road traffic noise levels with development (free-field)

Assessment location	Distance to nearside kerb (m)	Daytime noise level, dB $L_{A10,18h}$		Diff. dB 120k – 111k	Long term impact
		2023 111k Mov	2023 120k Mov		
Connaught Bridge	10	73.9	74.0	0.1	Negligible
Connaught Bridge PH (A)	16	72.3	72.4	0.1	Negligible
Hartman Road	10	67.6	67.9	0.3	Negligible
2 Camel Road (B)	14	66.5	66.8	0.3	Negligible
Connaught Road	10	67.0	67.0	0.0	No change
Connaught Road (C)	4	69.5	69.5	0.0	No change
Royal Albert Way East	10	73.1	73.0	-0.1	Negligible
Royal Albert Way East (D1)	28	69.5	69.3	-0.2	Negligible
Royal Albert Way East (D2)	33	68.8	68.7	-0.1	Negligible
Royal Albert Way West	10	73.3	73.1	-0.2	Negligible

Assessment location	Distance to nearside kerb (m)	Daytime noise level, dB $L_{A10,18h}$		Diff. dB 120k – 111k	Long term impact
		2023 111k Mov	2023 120k Mov		
Royal Albert Way West (E)	40	68.3	68.1	-0.2	Negligible
Woolwich Manor Way	10	71.0	71.1	0.1	Negligible
Woolwich Manor Way (F1)	11	70.7	70.8	0.1	Negligible
Woolwich Manor Way (F2)	15	69.7	69.8	0.1	Negligible
29 Woodman St (G)	26	60.5	60.9	0.4	Negligible

9.53 The above table indicates that for all receptors there will be no noticeable change in noise as a result of the change in aircraft mix and increase in aircraft movement numbers in 2023 with the development. Some areas will see a slight increase in traffic flow, primarily towards the west and east of the Airport. However, other areas, such as to the north of the airport on Royal Albert Way, a slight decrease is forecast.

9.54 Table 9.21 shows the predicted road traffic noise levels with the sensitivity mix in 2023 at selected receptors along the same roads, assessed against 2023 Without Development base case (96,700 aircraft movements).

Table 9.21- 2023 Predicted road traffic noise levels (free-field)

Assessment location	Distance to nearside kerb (m)	Daytime noise level, dB $L_{A10,18h}$		Diff. dB 120k – 96.7k	Long term impact
		2023 no dev. 96.7k Mov	2023 120k Mov		
Connaught Bridge	10	73.6	74.0	0.4	Negligible
Connaught Bridge PH (A)	16	72.1	72.4	0.3	Negligible
Hartman Road	10	68.5	67.9	-0.6	Negligible
2 Camel Road (B)	14	67.4	66.8	-0.6	Negligible
Connaught Road	10	67.8	67.0	-0.8	Negligible
Connaught Road (C)	4	70.3	69.5	-0.8	Negligible
Royal Albert Way East	10	73.8	73.0	-0.8	Negligible
Royal Albert Way East (D1)	28	70.2	69.3	-0.9	Negligible
Royal Albert Way East (D2)	33	69.5	68.7	-0.8	Negligible
Royal Albert Way West	10	73.9	73.1	-0.8	Negligible
Royal Albert Way West (E)	40	68.9	68.1	-0.8	Negligible
Woolwich Manor Way	10	69.4	71.1	1.7	Negligible
Woolwich Manor Way (F1)	11	69.1	70.8	1.7	Negligible
Woolwich Manor Way (F2)	15	68.1	69.8	1.7	Negligible
29 Woodman St (G)	26	N/A	60.9	Ó10	Major

9.55 As reported in the ES, some areas considered in the assessment will experience an increase in road traffic noise of around 1.7 dB, and some a small reduction as a result of the proposed development (of up to 0.9 dB) due to a reduction in traffic flows forecast to the west of the Airport. This is a result of the easterly access road being opened up taking traffic away from roads to the west. As assessed in the ES for the 2023 Principal Case, once the eastern access road is opened under the CADP, it will give rise to a substantial increase in road traffic noise for these few properties at the eastern end of Woodman Street. The absolute levels of road traffic noise are however low, typically around 60 dB LA10,18h and not significant.

9.56 The general finding is that there is little change in the impacts arising from road traffic under the 120,000 Sensitivity Case as compared to under the 111,000 Principal Case assessed in the ES for 2023. The conclusions of the ES in relation to road traffic noise therefore remain unaltered and this assessment finds no change to the environmental noise impact classification for long term impact.

ii. Air Quality (by AQC)

Introduction

9.57 The following assessments have been undertaken by Air Quality Consultants (AQC) and relate to the potential changes to emissions from aircraft, car parks and road traffic under the 120,000 Movement Sensitivity Test.

9.58 The increase in the number of aircraft movements from 111,000 to 120,000 per annum has the potential to increase emissions from aircraft operations (e.g. aircraft engines and Auxiliary Power Units (APUs)) and from road traffic and car park movements (associated with the increase in passenger numbers). These are considered separately below.

Airport Operations

9.59 A comparison between the aircraft movements assumed for the 2023 With Development Principal Case scenario in Chapter 9 of the ES, and the 120,000 Movement Sensitivity Test, has been carried out by York Aviation and is summarised above.

9.60 The main changes between the 2023 Principal Case and the 2023 Sensitivity Case are:

- There is a substantial increase in the number of Bombardier Q400 movements (+18,075)
- There is a small increase in the number of Canadair C100 movements (+1,814)
- There is substantial reduction in the number of Embraer E190 (-7,912) movements, and smaller reduction in the overall number of Corporate aircraft.

9.61 The NOx and PM_{10} emissions associated with the aircraft operations and APU use for 2023 Base Case (Without CADP), 2023 Principal Case, and 2023 Sensitivity Test have been calculated, based on the methodology described in Chapter 9 of the ES. The assessment has been carried out for the entire Landing and Take-off (LTO) cycle, which calculates emissions up to a ceiling of 912 metres (3000 feet), and for that part of the LTO cycle more closely representing ground operations (i.e. accounting for ground manoeuvring (Idle) and Take-off, but excluding emissions during Climb-out and Approach[2]. The results are summarised in Table 9.22.

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[2] Emissions released from aircraft at altitude (above 100 metres or so) will make a very small contribution to ground-level pollutant concentrations.

Table 9.22: Comparison of NOx and PM_{10} Emissions Associated with the Base Case, Principal Case and Sensitivity Test (2023)

	NOx Emissions (te/yr)			PM_{10} Emissions (te/yr)		
	Base Case	Principal Case	Sensitivity Test	Base Case	Principal Case	Sensitivity Test
LTO Cycle + APU	268.8	360.5	337.8	17.9	20.4	17.1
LTO Cycle (excluding Climbout and Approach) + APU	151.1	202.5	192.0	10.2	11.3	9.6

9.62 The emissions of both NOx and PM10 are lower for the 120,000 Movement Sensitivity Test forecast as compared to the Principal Case, for both the total LTO Cycle, and when Climb-out and Approach emissions are excluded. This is primarily due to the lower emissions of the Bombardier Q400 as compared with the Embraer E170, and which more than offsets any increase due to higher number of aircraft movements.

9.63 It can be confidently concluded that the contribution of aircraft and APU emissions with the assumed 120,000 Movement Sensitivity Test would be lower than those predicted in Chapter 9 of the ES. The results in Chapter 9 of the ES therefore represent a worst-case assessment of the 120,000 movements per annum, and with this proviso, no further analysis is required.

Car Park Operations

9.64 The increased number of aircraft movements would give rise to an increase of approximately 350,000 passengers in the 120,000 Movement Sensitivity Test, which would increase the number of movements into both the Short-Term and Long-Term car parks. An analysis of this change has been carried out by Vectos (see below). This indicates that with the 120,000 Movement Sensitivity Test, the number of daily movements at the Short-Term car park would increase by 92 movements per day, and at the Long-Term car park by 67 movements per day (approximately a 5% change), as compare with the 2023 Principal Case. This compares with a 32% and 82% increase respectively for the Short-Term and Long-Term car park movements when comparing the Principal and Base Case scenarios.

9.65 The assessment work carried out for Chapter 9 of the ES demonstrated that car park emissions make an extremely small contribution to annual mean nitrogen dioxide concentrations; the highest predicted contribution assigned to car park emissions at any receptor was <0.002 µg/m3. It can be concluded that a 5% increase in car park movements would have an imperceptible effect of pollutant concentrations, and no further analysis is required.

Road Traffic

9.66 The change to 24-hour AADT and HDV flows on the local road network for the 120,000 Movement Sensitivity Test has been provided by Vectos, the Airportõs surface access expert consultants. The results are summarised in Table 9.23 below.

Table 9.23: Comparison of 24-hr AADT Flows and HDV Movements

	24-hr AADT Flow				24-hr AADT HDV Movements			
	Base Case	Principal Case	Sensitivity Test	% change[a]	Base Case	Principal Case	Sensitivity Test	Increment (Movements)[a]
Royal Docks Road	28,629	30,231	30,632	1.31%	2,577	2,716	2,752	36
Woolwich Manor Way North of Roundabout	10,094	10,094	10,094	0.00%	1,035	1,035	1,035	0
Royal Albert Way East of Cyprus DLR	24,078	20,574	20,574	0.00%	1,353	1,353	1,353	0
Woolwich Manor Way South of Roundabout	12,055	17,161	17,561	2.28%	855	1,222	1,250	28
Pier Road	6,353	6,397	6,408	0.16%	857	861	863	2
Connaught Road - East of Airport/Hartmann Road	7,507	6,330	6,340	0.16%	773	653	655	2
Airport/Hartmann Road	12,140	10,214	10,853	5.89%	837	705	750	45
Connaught Road - East of Roundabout	18,971	18,222	18,850	3.33%	834	807	835	28
Connaught Road - West of Roundabout	18,971	18,222	18,850	3.33%	834	807	835	28
Connaught Bridge South of Connaught Road Roundabout	28,143	30,212	30,700	1.59%	2251	2,405	2,444	39

	24-hr AADT Flow				24-hr AADT HDV Movements			
	Base Case	Principal Case	Sensitivity Test	% change[a]	Base Case	Principal Case	Sensitivity Test	Increment (Movements)[a]
North Woolwich Road East of Roundabout	6,471	6,471	6,471	0.00%	577	577	577	0
North Woolwich Road West of Roundabout	25,178	27,247	27,735	1.76%	1,360	1,484	1,511	27
Connaught Bridge North of Connaught Road	25,392	22,574	22,715	0.62%	1,879	1,679	1,689	10
Royal Albert Way West of Stanfield Road	26,843	23,339	23,339	0.00%	1,365	1,365	1,365	0
Victoria Dock Road - 2 Way	14,820	15,506	15,646	0.90%	904	939	948	9
Hartmann Road East	-	6,621	7,022	5.70%	-	439	466	27

Notes

a The changes shown compare the 120,000 Movement Sensitivity Test with the Principal Case

9.67 Across the majority of road links, the change in AADT flow is small when comparing the 120,000 Movement Sensitivity Test with the Principal Case. The change in the number of HDV movements is also small, and highly unlikely to be significant in air quality terms. However, an increase to 120,000 aircraft movements would increase AADT flows along Hartmann Road by more than 5%, and the potential impacts of this change have therefore been quantified.

9.68 The traffic data for the 120,000 Movement Sensitivity Test have been explicitly modelled using ADMS-Roads, based on the same methodology as set out in Chapter 9 of the ES. The outcome is summarised in Table 9.24 below. These calculations do not take into account the small reduction in aircraft contributions that would apply with the 120,000 Movement Sensitivity Test (see above).

9.69 The predicted changes to annual mean pollutant concentrations and the number of days in which PM10 exceeds >50 µg/m3 are imperceptible.

Table 9.24: Predicted Pollutant Concentrations Assuming Principal Case and 120,000 Movement Sensitivity Test AADT Flows

	Annual Mean NO_2 [a]				Annual Mean PM_{10} [a]				No. Days>50 µg/m^3 PM_{10} [b]				Annual Mean $PM_{2.5}$ [a]			
	Base Case	Principal Case	Sensitivity Test	Change	Base Case	ES Scenario	Sensitivity Test	Change	Base Case	ES Scenario	Sensitivity Test	Change	Base Case	ES Scenario	Sensitivity Test	Change
R1	28.9	28.79	28.77	0.08	20.6	20.36	20.38	0.02	4	3.86	3.88	0.02	14.7	14.52	14.53	0.01
R2	28.2	27.98	27.94	0.06	20.2	20.06	20.08	0.01	4	3.48	3.50	0.02	14.4	14.29	14.30	0.01
R3	24.3	24.63	24.55	0.02	18.9	18.91	18.92	0.00	2	2.20	2.21	0.00	13.2	13.21	13.21	0.00
R4	23.7	24.50	24.54	0.04	18.7	18.85	18.86	0.01	2	2.14	2.15	0.01	13.0	13.14	13.14	0.01
R5	22.5	24.22	24.25	0.03	18.4	18.83	18.84	0.01	2	2.12	2.13	0.01	12.8	13.13	13.14	0.00
R6	20.8	21.92	21.95	0.03	18.2	18.38	18.38	0.01	2	1.71	1.71	0.00	12.5	12.70	12.70	0.00
R7	19.5	20.10	20.12	0.02	17.7	17.84	17.85	0.00	1	1.28	1.29	0.00	12.1	12.23	12.23	0.00
R8	20.2	20.49	20.50	0.01	18.0	18.02	18.03	0.00	1	1.42	1.42	0.00	12.3	12.31	12.31	0.00
R9	20.0	20.30	20.30	0.00	18.0	18.06	18.06	0.00	1	1.44	1.45	0.00	12.3	12.35	12.35	0.00
R10	21.5	21.83	21.85	0.02	18.1	18.11	18.11	0.00	1	1.49	1.49	0.00	12.3	12.37	12.37	0.00
R11	20.3	20.62	20.63	0.01	18.0	17.97	17.97	0.00	1	1.38	1.38	0.00	12.3	12.31	12.31	0.00
R12	21.1	21.29	21.29	0.00	18.1	18.07	18.07	0.00	1	1.45	1.46	0.00	12.4	12.42	12.42	0.00
R13	24.1	24.31	24.33	0.02	18.7	18.71	18.72	0.01	2	2.01	2.01	0.01	12.6	12.62	12.63	0.00
R14	24.0	24.28	24.29	0.01	18.8	18.82	18.82	0.00	2	2.11	2.12	0.00	13.0	13.03	13.03	0.00
R15	22.1	22.22	22.23	0.01	19.5	19.48	19.48	0.00	3	2.79	2.80	0.00	12.9	12.96	12.96	0.00
R16	19.4	19.57	19.58	0.01	17.9	17.89	17.90	0.00	1	1.32	1.32	0.00	12.1	12.16	12.16	0.00
R17	25.0	25.37	25.42	0.05	19.0	19.16	19.17	0.01	2	2.45	2.46	0.01	13.3	13.43	13.43	0.01
R18	20.6	21.26	21.29	0.03	17.8	17.92	17.93	0.01	1	1.34	1.34	0.01	12.2	12.26	12.26	0.00
R19 (1.5m)	22.2	22.32	22.32	0.00	18.4	18.45	18.45	0.00	2	1.77	1.77	0.00	12.4	12.41	12.41	0.00
R19 (20m)	22.2	22.30	22.30	0.00	18.4	18.44	18.45	0.00	2	1.77	1.77	0.00	12.4	12.40	12.40	0.00
R20 (1.5m)	22.5	22.57	22.57	0.00	18.4	18.42	18.42	0.00	2	1.75	1.75	0.00	12.3	12.34	12.34	0.00
R20 (20m)	22.5	22.55	22.55	0.00	18.4	18.41	18.42	0.00	2	1.74	1.74	0.00	12.3	12.34	12.34	0.00
R21 (20m)	24.4	24.78	24.78	0.00	19.0	19.05	19.05	0.00	2	2.34	2.34	0.00	13.3	13.34	13.34	0.00
R22 (40m)	20.4	20.78	20.79	0.01	18.0	18.11	18.11	0.00	1	1.49	1.49	0.00	12.4	12.46	12.46	0.00
R23	23.0	23.09	23.10	0.01	18.9	18.82	18.82	0.00	2	2.11	2.11	0.00	13.0	12.92	12.92	0.00
R24 (1.5m)	22.7	22.68	22.69	0.01	18.9	18.87	18.87	0.00	2	2.16	2.16	0.00	13.0	12.96	12.96	0.00
R24 (20m)	21.8	21.98	21.98	0.00	18.6	18.61	18.61	0.00	2	1.91	1.91	0.00	12.8	12.75	12.75	0.00

	Annual Mean NO_2 [a]				Annual Mean PM_{10} [a]				No. Days>50 µg/m³ PM_{10} [b]				Annual Mean $PM_{2.5}$ [a]			
	Base Case	Principal Case	Sensitivity Test	Change	Base Case	ES Scenario	Sensitivity Test	Change	Base Case	ES Scenario	Sensitivity Test	Change	Base Case	ES Scenario	Sensitivity Test	Change
R25 (1.5m)	21.5	21.60	21.60	0.00	18.6	18.56	18.56	0.00	2	1.87	1.87	0.00	12.7	12.66	12.66	0.00
R25 (20m)	21.4	21.48	21.49	0.01	18.5	18.52	18.52	0.00	2	1.83	1.83	0.00	12.6	12.62	12.62	0.00
R26 (1.5m)	20.0	20.46	20.48	0.02	17.6	17.71	17.72	0.01	1	1.19	1.19	0.00	12.1	12.13	12.13	0.00
R26 (20m)	19.5	19.85	19.86	0.01	17.5	17.53	17.53	0.00	1	1.06	1.06	0.00	12.0	12.02	12.02	0.00
R27 (1.5m)	19.6	19.99	20.00	0.01	17.5	17.53	17.53	0.00	1	1.06	1.06	0.00	12.0	12.01	12.02	0.00
R27 (20m)	19.4	19.72	19.72	0.00	17.4	17.46	17.46	0.00	1	1.02	1.02	0.00	11.9	11.97	11.97	0.00
R28 (1.5m)	19.7	20.19	20.20	0.01	17.7	17.73	17.73	0.00	1	1.20	1.20	0.00	12.1	12.15	12.16	0.00
R28 (20m)	19.5	19.85	19.86	0.01	17.6	17.62	17.62	0.00	1	1.12	1.13	0.00	12.1	12.09	12.09	0.00
R29 (1.5m)	19.9	20.41	20.41	0.00	17.7	17.74	17.74	0.00	1	1.21	1.21	0.00	12.1	12.18	12.19	0.00
R29 (20m)	19.7	20.20	20.21	0.01	17.7	17.70	17.70	0.00	1	1.18	1.18	0.00	12.1	12.15	12.15	0.00
R30 (1.5m)	19.2	19.36	19.36	0.00	17.3	17.34	17.35	0.00	1	0.94	0.94	0.00	11.9	11.90	11.90	0.00
R30 (20m)	19.1	19.31	19.32	0.01	17.3	17.33	17.33	0.00	1	0.94	0.94	0.00	11.9	11.89	11.89	0.00
R31	22.0	22.18	22.18	0.00	18.4	18.40	18.40	0.00	2	1.73	1.73	0.00	12.6	12.65	12.65	0.00
R32 (1.5m)	22.0	22.30	22.30	0.00	18.2	18.29	18.29	0.00	2	1.64	1.64	0.00	12.6	12.68	12.68	0.00
R32 (20m)	21.9	22.11	22.11	0.00	18.2	18.21	18.21	0.00	2	1.57	1.57	0.00	12.6	12.61	12.61	0.00
R33 (1.5m)	21.7	22.40	22.40	0.00	18.2	18.34	18.34	0.00	2	1.67	1.68	0.00	12.6	12.73	12.73	0.00
R33 (20m)	21.5	22.08	22.08	0.00	18.2	18.24	18.24	0.00	2	1.60	1.60	0.00	12.6	12.65	12.65	0.00
R34 (1.5m)	22.8	22.90	22.91	0.01	18.4	18.38	18.38	0.00	2	1.71	1.71	0.00	12.6	12.57	12.57	0.00
R34 (20m)	22.6	22.70	22.70	0.00	18.3	18.31	18.31	0.00	2	1.65	1.65	0.00	12.5	12.53	12.53	0.00

Notes

a The predicted concentrations are given to 2 significant decimal places so that the small change can be identified

b The number of days> 50 µg/m3 can, by definition, only be integers. The values are expressed to 2 decimal places so that the very small changes can be identified.

Conclusions

9.70 An assessment to evaluate the potential air quality impacts of the 120,000 Movement Sensitivity Test has been undertaken.

9.71 The conclusions of Chapter 9 of the ES, with regard the 2023 Principal Case, were that concentrations of nitrogen dioxide, PM_{10} and $PM_{2.5}$ would all be well below the air quality objectives, and all predicted impacts were judged to be negligible. As a consequence, the operational air quality impacts in 2023 were judged to be insignificant.

9.72 An evaluation of the 120,000 Movement Sensitivity Test has demonstrated that NOx emissions from Airport Operations would be lower in comparison to the 2023 Principal Case, and thus, any associated air quality impacts would be reduced. Whist NOx emissions from car parks would be about 5% higher, the contribution from this source is extremely small (representing less than 0.005% of the objective) and can be confidently dismissed as being of any consequence.

9.73 The 120,000 Movement Sensitivity Test would change traffic flows on some local roads by almost 6%, and a detailed evaluation of this change has been carried out. This assessment has demonstrated that the incremental change to pollutant concentrations would be extremely small and classified as imperceptible, and that concentrations would remain well below the air quality objectives.

9.74 It is therefore concluded that the 120,000 Movement Sensitivity Test would not alter the conclusions drawn for the 2023 Principal Case, and that operational air quality impacts would remain insignificant.

iii. Surface Transport and Access (by Vectos)

Introduction

9.75 The following assessments have been undertaken by Vectos and relate to the potential changes to road traffic and other modes of transport as a result of the uplift in passengers under the 120,000 Movement Sensitivity Test.

9.76 The following section considers the impact of the passengers associated with the 120,000 Movement Sensitivity Test scenario on surface transport. The assessment methodology is consistent with the July 2013 ES and accompanying Transport Assessment (TA).

Assessment Methodology

9.77 A re-cap on the methodology for trip attraction is provided below.

CADP 2023 Principal Case Trip Attraction

9.78 In order to calculate the forecasts of passengers in the CADP 2023 Principal Case, the Airport's aviation consultants, York Aviation, provided a profile of flight movements and aircraft occupancy. From this, the annual and daily number of passengers can be calculated. Similarly, York Aviation provided the forecasts of staff in the 2023 Principal Case. The starting point in estimating the trip attraction associated with the proposed Hotel (CADP2) has been to interrogate the TRAVL v8.17 database.

120,000 Movement Sensitivity Test

9.79 York Aviation provided a profile of flight movements and aircraft occupancy for the 120,000 Movement Sensitivity Test. As with the CADP 2023 Principal Case test, the annual and daily number of passengers for the 120,000 Movement Sensitivity Test was calculated using this data.

Mode Split

9.80 The mode split applied to the passenger forecasts in the future year óWith Developmentô cases is based on quarterly surveys undertaken on behalf of the Airport in 2012. A further assumption has been made that there will be an additional shift to use of the Docklands Light Railway (DLR), given the Airportôs aspiration to maximise the use of public transport and recent trends in DLR usage which indicates a broad increase in the mode share. Specifically, in 2012 the DLR mode share was 55%, whilst the future year cases assume the mode share is 60%, which has been agreed with DLR during pre-application discussions. It is considered that, with appropriate encouragement and publicity, DLR mode share can realistically increase over time to reach this figure.

9.81 The mode split applied to the staff forecasts was obtained from the latest full Travel Plan monitoring survey undertaken by the Airport during September 2011 (see ES Technical Appendix 7.2) with an assumption being made of a further shift to sustainable modes following the implementation of the new action-focussed Staff Travel Plan. In future years, the Single Occupancy Vehicle mode share has been reduced by 14% from the 2011 level (44% down to 38%), with a proportional increase in sustainable modes.

9.82 The mode split applied to Hotel visitors has been derived from comparable hotels within the TRAVL v8.17 database.

9.83 The mode split is consistent across both tests (the 2023 Principal Case, and the 120,000 Movement Sensitivity Test) set out in this chapter.

Effect on Local Highway Network

9.84 Table 9.25 shows the overall effect of the CADP traffic flows on the surrounding links serving the Airport for the 2023 Principal Case, the assumed year of completion and full utilisation which constitutes the óworst caseô in terms of differences between the With and Without Development. The Base Case traffic flows refer to the future 2023 Without Development scenario.

Table 9.25 –2023 Annual Average Daily Traffic Flows (2023 Principal Case)

	Link	Base Case	CADP With Dev	Change	% Change	Category
1	Royal Docks Road	28,629	30,231	+1,602	+5.6%	Minor Adverse
2	Woolwich Manor Way (North)	10,094	10,094	-	-	-
3	Royal Albert Way (East)	24,078	20,574	- 3,504	- 14.6%	Minor Beneficial

	Link	Base Case	CADP With Dev	Change	% Change	Category
4	Woolwich Manor Way South	12,055	17,161	+5,106	+42.4%	Moderate Adverse
5	Pier Road	6,353	6,397	+44	+0.7%	Negligible
6	Connaught Road (East)	7,507	6,330	-1,177	-15.7%	Minor Beneficial
7	Hartmann Road (West)	12,140	10,214	-1,926	-15.9%	Minor Beneficial
8	Connaught Road (West)	18,971	18,222	-749	-3.9%	Negligible
9	Connaught Bridge (South)	28,143	30,212	+2,069	+7.4%	Minor Adverse
10	North Woolwich Road (East)	6,471	6,471	-	-	-
11	North Woolwich Road (West)	25,178	27,247	+2,069	+8.2%	Minor Adverse
12	Connaught Bridge (North)	25,392	22,574	-2,818	-11.1%	Minor Beneficial
13	Royal Albert Way (West)	26,843	23,339	-3,504	-13.1%	Minor Beneficial
14	Victoria Dock Road	14,820	15,506	+686	+4.6%	Negligible
15	Hartmann Road (East)	-	6,621	+6,621	100.0%	Substantial Adverse

9.85 Table 9.25 demonstrates that there is an increase in traffic on some links and a reduction in traffic on other links. This is because of the creation of an additional vehicle access point to the Airport from Woolwich Manor Way through to Hartmann Road (East). This results in a redistribution of Airport-related traffic and a reduction in traffic on some links in the With Development compared to the Without Development Case.

9.86 The greatest proportional reduction in traffic is forecast for Hartmann Road (West) with a -15.9% reduction and Minor Beneficial effect, and Connaught Road (east) with a -15.7% reduction and Minor Beneficial effect.

9.87 The greatest proportional increase in traffic flows are forecast for Hartmann Road (East) which records a 100% increase in traffic and scores a Substantial Adverse effect. It is proposed to provide a new vehicle link to the Airport from Hartmann Road (East), which is currently closed to traffic. This explains why there is a 100% increase in traffic, compared to the Without

Development case. This is followed by Woolwich Manor Way South, which scores a Moderate Adverse effect with a +42.4% increase and North Woolwich Road (West) which scored a +8.2% increase, amounting to a ***minor adverse*** effect.

9.88 Table 9.26 shows the results of the 120,000 Movement Sensitivity Test in 2023. Again, the Base Case traffic flows refer to the future 2023 Without Development scenario.

Table 9.26 – 2023 Annual Average Daily Traffic Flows (2023 Sensitivity Test)

	Link	Base Case	120,000 Movement Sensitivity Test	Change	% Change	Category
1	Royal Docks Road	28,629	30,632	2,003	+7.0%	Minor Adverse
2	Woolwich Manor Way (North)	10,094	10,094	0	-	-
3	Royal Albert Way (East)	24,078	20,574	-3,504	-14.6%	Minor Beneficial
4	Woolwich Manor Way South	12,055	17,561	5,506	+45.7%	Moderate Adverse
5	Pier Road	6,353	6,408	55	+0.9%	Negligible
6	Connaught Road (East)	7,507	6,340	-1,167	-15.5%	Minor Beneficial
7	Hartmann Road (West)	12,140	10,853	-1,287	-10.6%	Minor Beneficial
8	Connaught Road (West)	18,971	18,850	-121	-0.6%	Negligible
9	Connaught Bridge (South)	28,143	30,700	2,557	+9.1%	Minor Adverse
10	North Woolwich Road (East)	6,471	6,471	0	-	-
11	North Woolwich Road (West)	25,178	27,735	2,557	+10.2%	Minor Adverse
12	Connaught Bridge (North)	25,392	22,715	-2,677	-10.5%	Minor Beneficial
13	Royal Albert Way (West)	26,843	23,339	-3,504	-13.1%	Minor Beneficial
14	Victoria Dock Road	14,820	15,646	826	+5.6%	Negligible

	Link	Base Case	120,000 Movement Sensitivity Test	Change	% Change	Category
15	Hartmann Road (East)	-	7,022	7,022	+100.00%	Substantial Adverse

9.89 Table 9.26 shows that there is not a significant difference in traffic flows for the 120,000 Movement Sensitivity Test compared to the 2023 Principal Case traffic flows shown on Table 9.25, which demonstrates that there is an increase in traffic on some links and a reduction in traffic on other links due to the creation of an additional vehicle access point to the Airport from Woolwich Manor Way through to Hartmann Road (East). There is also no change in the significance category for any of the links for the 120,000 Movement Sensitivity Test compared to the 2023 Principal Case. Therefore there is no change in the level of significance of the environmental effects on the local highway network as a result of the 120,000 Movement Sensitivity Test.

Effect on Public Transport Network

DLR

9.90 The scope of the assessment on DLR services was agreed with TfL in advance of the CADP submission. It was agreed that the effect of the CADP would be examined on ôthe Airport Routeô of the DLR network, comprising of the section between Canning Town and Woolwich Arsenal via London City Airport.

9.91 Table 9.27 shows the annual average weekday Airport-related DLR passengers for the 2023 Principal Case, the 120,000 Movement Sensitivity Test. This includes staff and passengers.

Table 9.27 – Annual Average Weekday LCY DLR Passengers

	Without Development			With Development			Change		
	Arr.	Dep.	Total	Arr.	Dep.	Total	Arr.	Dep.	Total
2023 Principal Case	5,150	5,304	10,454	6,480	6,714	13,194	1,330	1,410	2,740
2023 Sensitivity Test	5,150	5,304	10,454	7,092	7,348	14,440	1,942	2,044	3,986

9.92 Table 8.27 shows that there is not a significant difference between the 2023 Principal Case and the 120,000 Movement Sensitivity Test, despite the uplift in approximately 350,000 mppa.

9.93 Within the July 2013 ES, the DLR AM peak hour assessment undertaken as part of the Transport Assessment was presented for the 2023 Principal Case. The results indicate that there was only a marginal change in crowding factors as a result of CADP. As such it was considered that there would be a negligible effect on crowding.

9.94 The impact of the CADP on DLR services has been discussed extensively with TfL/DLR since submission of the CADP planning applications. A supplementary assessment of the impact on the wider DLR network was prepared following these discussions. The revised impact assessment, the methodology for which was agreed with DLR at a meeting on 20th November 2013, was included in Appendix 6.1 of the March 2014 ESA (re-presented in Part D.1 of this CESA).

9.95 The revised assessment also concludes that the impact of the CADP proposals on the DLR, considering the network as a whole, is minimal and therefore it also has a negligible adverse effect.

9.96 As part of the 120,000 Movement Sensitivity Test, flight arrivals and departures have been rationalised to the changes in the fleet mix and the greater number of smaller aircraft. This resulted in an increase in passenger trips at certain points of the daily period, with a decrease during other periods.

9.97 For the AM peak hour (08:00-09:00), York Aviation's passenger profile shows a reduction of 22 passenger trips from the 2023 Principal Case to the 120,000 Movement Sensitivity Test due to a degree of peak spreading. Therefore, the results for the 2023 Principal Case show a worst case scenario.

9.98 As crowding on the DLR is not significantly exacerbated and CADP would generate an increase in the number of journeys by public transport, particularly by DLR, it is considered that it would have a minor beneficial effect on existing public transport conditions. This is because of the additional revenue that would be generated by the additional passengers.

9.99 In the context of the wider DLR operation there are benefits associated with CADP. The greater use of the DLR network across the day is a benefit. It means more efficient use of this highly sustainable public transport network, and consequent increased revenue. The increased revenue forms part of the virtuous circle of greater investment in the system, a more attractive system as a result, attracting greater use, and generating greater revenue.

9.100 This contributes to sustainability aims and taken overall with other effects has been judged to be of ***minor beneficial significance***.

9.101 In conclusion, the results indicate that DLR trips associated with the 120,000 Movement Sensitivity Test will only increase marginally compared to the 2023 Principal Case. The results also show that there will be a slight reduction in DLR trips during the AM peak hour resulting in no change to the crowding level assessment presented in the ES. This demonstrates that the 120,000 Movement Sensitivity Test does not change the level of significance of the environmental effects on the DLR.

Buses

9.102 The July 2013 Transport Assessment (TA) includes a quantitative assessment of bus passengers, as presented within Section 6, Tables 6.12-6.17. For the 2023 Principal Case, the assessment indicates that the CADP will attract just 20 additional bus passengers in the AM peak hour and 22 additional bus passengers in the PM peak hour.

9.103 For passengers, the mode split for bus use is just 0.3%. The minor change in passenger flows as a result of the 120,000 Movement Sensitivity Test will not result in any significant changes to the bus passenger numbers.

9.104 As there are in the order of 11 buses per hour calling at the Airport during peak periods, it is considered that this marginal increase in bus passengers will not have any impact upon the operation of these services. Furthermore, it is likely that this increase will be well within daily fluctuations that would occur in any event.

9.105 In conclusion, the impact of the 120,000 Movement Sensitivity Test on buses is not material. On the basis of the assessment undertaken within the Transport Assessment and application of professional judgement by Vectos, the environmental effect of CADP on bus services is considered to be ***negligible.***

Walking and Cycling

9.106 The Transport Assessment includes a quantitative assessment of pedestrians and cyclists, as presented within Section 6, Tables 6.12-6.17. For the 2023 Principal Case, the assessment indicates that the CADP will attract just 6 additional pedestrians and 3 additional cyclists during the AM and PM peak hour.

9.107 The minor change in passenger flows as a result of the 120,000 Movement Sensitivity Test will not result in any significant changes to the walking and cycling numbers compared to the 2023 Principal Case.

9.108 The Transport Assessment further considers the impact of CADP on walking, including a PERS audit which is included at Appendix K to the Transport Assessment and cycling within Section 8. Paragraphs 8.1 to 8.7 consider specifically the impact on walking and Paragraphs 8.8 and 8.9 consider the impact of the CADP on cycling. The Transport Assessment concludes, at paragraph 8.10, that:

- The proposals enhance the attractiveness of walking and cycling to the Airport, potentially increasing the demand for both modes, particularly for staff;
- The PERS audit has demonstrated that, for pedestrians, the Airport is well-connected to the surrounding area; and
- The proposals include additional cycle parking and facilitate an additional cycle route to / from Woolwich Manor Way.

9.109 Therefore, the effect of CADP on walking and cycling modes in the 120,000 Movement Sensitivity Test is considered to be ***minor beneficial.***

Summary

9.110 This section has assessed the impact of the 120,000 Movement Sensitivity Test on surface transport modes and access. The 120,000 Movement Sensitivity Test has been compared to the CADP 2023 Principal Case which was assessed in the original ES, ESA and ESSA. The assessment indicates only minor differences compared to what was originally presented and no change in the level of significance of the environmental effects.

iv. Socio-Economics- Assessment of Employment & GVA Effects (by York Aviation)

Introduction

9.111 The following assessments have been undertaken by York Aviation and relate to the potential changes to employment and Gross Value Added (GVA) income to the local and wider economy as a result of the uplift in passengers under the 120,000 Movement Sensitivity Test.

9.112 The assessment of likely significant effects of the 120,000 Movement Sensitivity Test is based on the same methodology as is set out in Chapter 7 of the ES: Socio-Economics.

The 2023 With and Without the CADP & with the 120,000 Movement Sensitivity Test

9.113 The employment estimates for 2023 with and without the proposed CADP and with the Sensitivity Test, are set out in Table 9.29 below. Employment figures are rounded to the nearest 10.

Table 9.29: Employment Impact at 2023

Employment Impact at 2023 without the CADP (FTEs)			
	Direct	**Indirect & Induced**	**Total**
2023	2,160	650	2,810
ES Employment Impact with the CADP at 2023 (FTEs)			
	Direct	**Indirect & Induced**	**Total**
Baseline (2012)	1,900	570	2,470
2019	2,570	770	3,340
2021	2,790	840	3,630
2023	2,860	860	3,720
Employment Impact with the 120,000 Movement Sensitivity Test at 2023 (FTEs)			
	Direct	**Indirect & Induced**	**Total**
2023	3,040	910	3,950
Source: York Aviation (figures may not sum exactly due to rounding)			

9.114 In the 2023 Principal Case reported in the ES the CADP supports an additional 700 direct onsite FTE jobs at 2023 when compared with no development, and an additional 910 FTE jobs overall at 2023. With the 120,000 Movement Sensitivity Test these figures rise to an additional 880 direct onsite FTE jobs at 2023 when compared with no development, and an additional 1,140 FTE jobs overall due to the higher number of passengers and aircraft movements.

9.115 The 120,000 Movement Sensitivity Test would therefore still result in a ***substantial beneficial*** effect.

9.116 The GVA estimates for the three reference years, both with and without the proposed CADP, are set out Table 9.30 below.

Table 9.30: GVA Impact at 2023

GVA Impact at 2023 without the CADP (£millions)			
	Direct	**Indirect & Induced**	**Total**
2023	£121.0	£36.3	£157.3
ES GVA Impact at 2023 with the CADP (£millions)			
	Direct	**Indirect & Induced**	**Total**
2023	£160.3	£48.1	£208.4
GVA Impact with the 120,000 Movement Sensitivity Test at 2023 (£millions)			
	Direct	**Indirect & Induced**	**Total**
2023	£170.5	£51.2	£221.7
Source: York Aviation (figures may not sum exactly due to rounding)			

9.117 In the 2023 Principal Case reported in the ES the CADP will support an additional £51.1m of GVA in the Study Area at 2023 compared with the impact without development. With the 120,000 Movement Sensitivity Test case, this figure rises to £64.4m additional GVA at 2023 when compared with no development, due to higher number of passengers and aircraft movements.

9.118 The 120,000 Movement Sensitivity Test case would therefore still result in a ***substantial beneficial effect***.

Impact of the Hotel

9.119 The figures shown above do not include the potential impact of the proposed construction of a Hotel on the Airport site (CADP2 application) The estimate in the ES that such a development could support up to 130 additional direct (onsite) jobs from the point when the hotel is opened and £5.8m of GVA, with around 70 indirect and induced jobs, would be unaffected by the 120,000 Movement Sensitivity Test case.

Employment Impact from Construction

9.120 The estimates of 344 FTE direct onsite construction jobs that will be supported over the life of the project, with a further 103 indirect and induced FTE jobs, making a total of 448 FTE jobs, equating to around £234m of direct GVA and £70m of indirect and induced GVA making a total of £304m, is unaffected by the 120,000 Movement Sensitivity Test.

Impact on Retail Businesses in North Woolwich

9.121 The effect of the 120,000 Movement Sensitivity Test on retail businesses in Woolwich would remain ***not significant/ negligible*** because no additional landside retail would be provided within the Terminal and the assumptions contained within ES Chapter 7 (paragraphs 7.123 to 7.125) would remain unaltered.

Wider Economic Benefits

9.122 Although it is not possible to quantify all of the wider economic benefits that would accrue from the proposed CADP, the Airport's ability to facilitate continued economic growth and inward investment in Newham and the wider East London economy would be enhanced in 2023 due to the higher number of passengers which would be able to use the Airport in the 120,000 Movement Sensitivity Test case and would therefore continue to constitute a ***substantial beneficial*** effect. As with the Principal Case, provision of the CADP infrastructure will enable the Airport to continue to support regeneration in East London.

Social Impacts

9.123 The 120,000 Movement Sensitivity Test case will result in no significant change to the social impacts identified in the ES because the uplift in passengers (of approximately 350,000 per annum by 2023) would have a ***negligible*** impact on the local or wider community.

Competition from Other Airports

9.124 The effects of competition from other airports have been factored into existing forecasts and in the 120,000 Movement Sensitivity Test and any additional effect can therefore be considered ***not significant/ negligible***.

Overall Conclusions

9.125 From this analysis it can be concluded that the likely socio-economic effects of the 120,000 Movement Sensitivity Test case would remain as ***substantial beneficial.***

Public Safety Zones (by Mark Eddowes)

9.126 Consideration has been given to the fleet mix within the 120,000 Movement Sensitivity Test scenario on Public Safety Zones (PSZ's) and the following has been provided by Mark Eddowes Aviation Limited.

9.127 The projected PSZ contours arising from the proposed CADP were detailed within the 'Third Party Risk Contours and Public Safety Zones for London City Master Plan with Forecast Movements for 2023', published by NATS on 14th December 2012. This document was attached to Appendix 7.3 of the July 2013 ES.

9.128 Although air travel is a low risk means of transport, the Civil Aviation Authority (CAA) identifies PSZs at each end of a runway in order to control the number of people on the ground in the vicinity of airports who could be at risk of death or injury in the event of an aircraft accident on take-off or landing. This is achieved by restricting new development within PSZs.

9.129 PSZs are areas of land at either end of an airport runway defined by an objective assessment of the risk to an individual on the ground within those areas from an aircraft accident over the course of a year.

9.130 The basic policy objective of the Department for Transport (set out in DfT Circular 01/2010 'Control of Development in Airport Public Safety Zones') is that there should be no increase in the number of people living working or congregating in PSZs and that, over time, the number should be reduced as circumstances allow. The Circular states that unimplemented planning permissions in PSZs do not need to be revoked or modified and most existing developments within PSZs can remain there, but some types of new development are not permitted.

9.131 The likelihood (frequency per annum) of an aircraft crash during take-off or landing operations at any given airport, derived on the basis of the historical crash frequency per aircraft movement and annual rate of movements at the airport in question.

9.132 The probability of impact at any given location relative to the runway end and extended centreline, derived on the basis of mathematical functions that correlate the observed distribution of crash locations. The severity of the consequence of an impact on the ground, again derived on the basis of historical accident data and taking account of the size of an aircraft operating at the airport in question, as characterised in terms of its maximum take-off weight authorised (MTWA).

9.133 The DfT PSZ model uses this approach to determine the risk to a hypothetical permanent resident at sites located in the vicinity of an airport runway and defines the PSZ for operations at individual airports by reference to the 1 in 100,000 annual fatality risk contour, taking account of the fleet mix and movement numbers for the airports concerned. The size of the PSZ is determined on the basis of the sum of the contributions to the total risk from all aircraft types within the fleet mix. The magnitude of the contribution to risk associated with each aircraft type is dependent upon the number of movements (N), the crash rate per movement (CR) and destroyed area (DA) for each type, in accordance with items 1 and 3 in paragraph 1. The crash location parameters under item 2 are essentially constants that apply to all fleet mixes. The relative risks associated with different fleet mixes can therefore be determined by reference to the risk factor which comprises these different parameters, N x CR x DA, given in units of hectares destroyed per annum.

9.134 For the CADP 2023 Principal Case fleet mix that has previously been identified, comprising 120,000 noise factored movements and 111,039 actual movements, a value for the risk factor of N x CR x DA = 0.0058045 hectares per annum is determined. The fleet mix and the parameters determining this risk factor are set out in full in Table 1 within Appendix 9.3.

9.135 For the identified 120,000 Movement Sensitivity Test fleet mix, a value for the risk factor of N x CR x DA = 0.0058022 hectares per annum is determined. The fleet mix and the parameters determining this risk factor are set out in full in Table 2 within Appendix 9.3. It can be seen that this value for the risk factor is marginally smaller than that for the CADP 2023 Principal Case fleet mix. It can therefore be concluded that the estimated individual risks associated with the two scenarios will be very similar indeed. It follows that there would be no material difference between the PSZs that would be determined for the 120,000 movements per annum sensitivity case and those previously identified for the CADP 2023 fleet mix .

9.136 In summary, the assessment of the 120,000 Movement Sensitivity Test shows that it is expected to result in no material difference to the PSZ assessed in the ES. As such, there would be no change to the estimated employment and GVA effects assessed in the ES.

v. Climate Change (by RPS)

9.137 The following assessments have been undertaken by RPS and relate to the potential changes to Greenhouse Gas (GHG) emissions associated with the changes to aircraft operations and passengers under the 120,000 Movement Sensitivity Test.

9.138 As detailed in the air quality section above, the increase in the number of aircraft movements from 111,000 to 120,000 per annum has the potential to increase emissions from aircraft operations. The GHG emissions associated with the aircraft operations and Auxiliary Power Unit (APU) use for the 120,000 Movement Sensitivity Test scenario have therefore been calculated, based on the methodology described in Chapter 17 of the ES. This has been compared with the emissions associated with the 111,000 aircraft movements that were assumed for the 2023 ‘With Development’ scenario, as presented in Chapter 17 of the ES. The results of this comparison are summarised in Table 9.31 below.

Table 9.31: Comparison of Total Estimated GHG Emissions

Emissions Source	Total Baseline Emissions (2011-2013)	Total Without Development Emissions (Future Year 2023)	Total With Development Emissions Principal Case (Future Year 2023)	Total With Development Emissions 120k Sensitivity Test (Future Year 2023)
Terminal energy, water and fuel consumption and waste (tCO2e)	7,097	2,853	7,329	7,329
Aircraft LTO emissions (tCO2e)	48,179	72,292	94,597	90,990
TOTAL (tCO2e)	52,276	75,144	101,926	98,319

9.139 As can be seen above, the aircraft emissions for the 120,000 Movement Sensitivity Test are lower than those calculated for the 2023 Principal Case. This is due to the differences in aircraft fleet mix between the two scenarios, with lower CO2 emissions associated with the Bombardier Q400 (which has increased movements under the 120,000 Movement Sensitivity Test scenario) compared with the Embraer E170 (which had comparatively more movements under the Principal Case). This effectively offsets any increase resulting from the higher number of aircraft movements. Emissions associated with the Terminal building energy and water consumption remain the same under both ‘with development’ scenarios, as the proposed development of new buildings for the CADP does not change.

9.140 As was presented in Chapter 17 for the 2023 Principal Case scenario, an emissions intensity ratio (per passenger using the Airport) has also been calculated for the 120,000 Movement Sensitivity Test scenario, breaking down the calculated GHG emissions to show total emissions on a per passenger basis. In order to aid comparison with the ES scenario, two tables are presented below, one which shows the results of the original intensity ratio for the ES scenario, the second which shows the results for the sensitivity scenario.

Table 9.32: Future Year (2023) GHG Emissions Per Passenger – 2023 Principal Case

Emissions Source	2012 Baseline	2023 Without development	2023 With Development (Principal Case)	Change from baseline (Principal Case)		Change from Without Development to With Development	
Terminal energy, water and fuel consumption (kgCO2e)	2.34	0.64	1.25	-1.09	-46.7%	0.60	94.0%
Aircraft LTO emissions (kgCO2e)	15.90	16.30	16.10	0.20	1.3%	-0.20	-1.2%
TOTAL (kgCO2e)	18.24	16.94	17.35	-0.89	-4.9%	0.41	2.4%
Passengers (no.)	3,030,000	4,435,000	5,874,000	2,844,000	93.9%	1,439,000	32.4%

Table 9.33: Future Year (2023) GHG Emissions Per Passenger – 120,000 Movement Sensitivity Test Scenario

Emissions Source	2012 Baseline	2023 Without Development	2023 With Development (Sensitivity Test)	Change from baseline (Sensitivity Test)		Change from Without Development to With Development (Sensitivity Test)	
Terminal energy, water and fuel consumption (kgCO2e)	2.34	0.64	1.17	-1.17	-49.9%	0.53	82.4%
Aircraft LTO emissions (kgCO2e)	15.90	16.30	14.56	-0.41	-8.4%	-1.74	-10.7%
TOTAL (kgCO2e)	18.24	16.94	15.73	-1.50	-13.8%	-1.21	-7.2%
Passengers (no.)	3,030,000	4,435,000	6,250,000	3,220,000	106.3%	1,815,000	40.9%

9.141 Tables 9.32 and 8.33 show that the 120,000 Movement Sensitivity Test actually reverses the conclusion of Chapter 17 of the ES, from a small 2.4% increase in GHG emissions per passenger in the with-development scenario compared to the without-development scenario, to instead a 7.2% decrease in total emissions under the 120,000 Movement Sensitivity Test scenario. This is again primarily due to the increased predicted movements of more modern larger aircraft under the sensitivity scenario, which are generally more fuel efficient than older smaller aircraft. It is also due to the slight improvement in emissions from terminal operations on a per passenger basis under the 120,000 Movement Sensitivity Test case compared with the Principal Case, as with the increase to 120,000 movements more passengers will be going through the terminal buildings, therefore the increase in emissions due to the higher energy consumption associated with the new CADP buildings is slightly offset compared to the ES ‘With Development’ results.

9.142 From the above analysis, it can therefore be concluded (within the assumptions of the assessment as described in Chapter 17 of the ES) that the contribution of aircraft GHG emissions with the 120,000 Movement Sensitivity Test would be lower than those predicted in Chapter 17 of the ES. The results in Chapter 17 of the ES therefore represent a ‘worst-case’ assessment and with this proviso, it can be concluded that there will be no unacceptable environmental effects and/or impacts with respect to climate change which are materially worse than those identified in the ES.

vi. Waste

9.143 The following assessments have been undertaken by RPS and relate to the potential changes to waste generation associated with the increase in passengers under the 120,000 Movement Sensitivity Test.

9.144 As part of the assessment within ES Chapter 15: Waste, the amount of waste generated per passenger was calculated. In light of the potential uplift in passengers under the 120,000 Movement Sensitivity Test, the total tonnes of waste have been calculated and compared with the 2023 With Development Principal Case calculation.

9.145 The same assumptions have been made in relation to grams of waste per passenger as the ES, which is a figure of 312 grams per passenger. This is based on the per passenger waste generation during 2012 where a total of 3.03 million passengers passed through the Airport.

9.146 Table 9.34 below includes the total tonnes of operational waste for the With and Without development scenarios for 2023 only. Additionally, the further passenger numbers associated with the 120,000 Movement Sensitivity Test has been applied to the Principal Assessment Year (2023 With Development).

Table 9.34- Waste Calculations for 2023 including 120,000 Movement Sensitivity Test

Scenario		Year	Passenger numbers (millions)	Tonnes of waste
Baseline		2012	3.03	946
With development	2023 Principal Case	2023	5.9	1,834
Without development		2023	4.44	1,385
With development	120k Movement Sensitivity Test	2023	6.25	1,965

9.147 When comparing the total tonnes of waste generated for the 2023 Principal Case there is a difference of 449 tonnes of waste between the With and Without Development scenarios assessed in the July 2013 ES. This difference was concluded as being negligible to minor adverse (para. 15.116-15.118 of the July 2013 ES).

9.148 When applying the 120,000 Movement Sensitivity Test, 6.25 million passengers would pass through the Airport in 2023, producing 1,956 tonnes of operational waste. The difference between the Without Development scenario for 2023 and the 120,000 Movement Sensitivity Test is 580 tonnes. This is an increase of 131 tonnes of waste when compared with 2023 With Development Principal Case.

9.149 It is not considered that this increase is significant and the effect would remain ***negligible to minor adverse*** in line with the July 2013 ES.

9.150 It is important to note that the waste calculations do not do not take into consideration any potential reductions in waste generation as a result of waste management initiatives which will continue to be promoted by the Airport in accordance with the objectives set out in the Airport Sustainability Strategy (2012).

9.151 In addition, LBN falls into the East London Waste Authority (ESWA) where there are currently 23 household, commercial and industrial waste transfer stations with an estimated annual capacity of 2,439,625 tonnes. The Joint Waste Development Plan Document (JWDPD) predicts that the ELWA will be managing 1,573,000 tonnes of MSW and C&I waste by 2020. The additional waste generated by the increase in passengers at the Airport under the scenarios within Table 9.34 is therefore unlikely to significantly impact existing or proposed infrastructure.

PART C

10 PROPOSED NOISE QUOTA COUNT SYSTEM

a) Introduction

Historical Context

10.1 This section describes the future system of aircraft noise control proposed by the Airport, as part of the Aircraft Categorisation Review (ACR) contained in the Section 106 Agreement accompanying the 2009 Permission (ref 07/01510/VAR) which approved a 120,000 movement cap at the Airport. The noise quota count system will incentivise the use of quieter aircraft and it has been brought forward now after consultation with LBN to provide certainty about future noise controls at the Airport. This part of the CESA explains why it is an appropriate control and that it would be more effective and equitable than the existing Noise Factored Movement (NFM) system in operation today. It sets out the proposed details of the noise quota system and also demonstrates how an annual quota count budget will better protect the community and ensure noise impacts are limited to those predicted and described for the 2023 CAPD ÷With DevelopmentøPrincipal Case.

10.2 An aircraft categorisation regime has been in place throughout the life and growth of the Airport and the current noise factoring regime has been in place since 1991. Its primary purpose has been to ensure that the amenity of the nearby surrounding communities is well protected from noise pollution. Significant growth of the Airport has occurred in the interim however, and other communities beyond the immediate vicinity of the Airport boundary are now also affected by significant levels of aircraft noise.

10.3 A key feature of the existing aircraft categorisation regime has been the accurate and continuous monitoring of noise data using the Airportøs noise and track keeping (NTK) system which was recently updated in September last year. Government advice is however that any operating restrictions at an airport based on the noise performance of an aircraft should be based, not on measured data, but on noise certification levels determined in accordance with prescribed procedures under ICAO Annex 16.

10.4 The noise categorisation regime was developed and remains today based on departure noise only, determined from noise measured sideline of the aircraft on departure. This approach was taken at the time since the principal communities of concern in 1991 lay to the side of the Airport, specifically to the south in the Silvertown area. Britannia Village to the south west had not been built at that time; nor did the contour extend into any community areas to the east or west of the Airport.

10.5 As the levels of aircraft activity at the Airport have increased over the years and the area has been progressively developed, so the corresponding 57 dB noise contour now encompasses many more community areas than in 1991. The original noise control regime, which was devised to protect community areas to the south (i.e. those affected by sideline departure noise), takes no account of those communities to the east and west of the Airport which will be affected by noise from aircraft on arrival and flyover noise from departing aircraft, rather than sideline departure noise.

Consultation

10.6 The Airport has consulted with the London Borough of Newham (LBN) and its acoustic advisers in undertaking a review of the existing aircraft categorisation regime and developing the new regime which was submitted for approval to LBN on 10th October 2014 as required under the current Section 106 Agreement. Bickerdike Allen Partners (BAP) are retained by the Airport to assist on this matter in preparing and detailing the scheme and have to date held a series of consultations with LBN on this topic to resolve various technical matters arising from the review.

10.7 It has been agreed that the means of categorising aircraft at London City Airport should be altered to reflect a system similar to that used at the designated airports of Heathrow, Gatwick, and Stansted in order to control noise at night, namely a Quota Count (QC) classification system. The London City Airport Consultative Committee (LCACC) will be included in consultations prior to finalising the review of the existing aircraft categorisation regime.

b) <u>Principles of New Regime</u>

10.8 The new regime has been developed along the lines of the Night Noise Quota Count Classification System that was introduced in 1993 at Heathrow Airport. This noise dose based system is currently only used to control night noise, not day noise at an airport. London City Airport will be the first UK airport to operate such a system to control daytime noise in the UK.

10.9 The key advantage of using a scheme of this type at the Airport is that it is ‘tried and tested’ and has been used successfully to control noise at night around numerous other airports. It is based on a method of control using noise certification data, rather than actual noise monitoring data. This has the advantage that the airlines and airports are fully aware of what noise characteristics an aircraft will have before it operates, allowing it to be allocated a noise factor accordingly. The data is traceable and certificated (therefore non-contestable). Noise monitoring can then be used at an airport as a means of checking rather than as a means of principal control.

10.10 A description of the key elements of the proposed new aircraft categorisation regime is given below with details of how the system will operate in practice given in Appendix 10.1.

The Noise Quota Count System

10.11 As occurs now at LCY, each aircraft is given a noise factor or, in this case, a Quota Count (QC) rating (e.g. QC/0.5, QC/1, QC/2, etc.) according to how much noise it makes. Aircraft are classified separately for landing and takeoff. The data used are the noise certification data: aircraft are required to possess a noise certificate demonstrating their compliance with the appropriate ICAO noise certification standards.

10.12 The metric ‘EPNL’ (Effective Perceived Noise Level) is used for noise certification and it is measured in Effective Perceived Noise Decibels (EPNdB). Decibels are logarithmic units and a 3dB difference in noise level corresponds to a two-fold difference in noise energy. Accordingly, the QC bands increase by multiples of two, in step with the 3dB doubling of noise energy principle.

10.13 Aircraft are classified separately for landing and departure operations. For each operation, an aircraft is classified on the basis of their noise data (adjusted as appropriate) into one of the bands set out in Table 10.1 below:-

Table 10.1 – Aircraft Noise Classifications

Qualifying level, EPNdB	QC Classification
93 ï 95.9	2
90 ï 92.9	1
87 ï 89.9	0.5
84 ï 86.9	0.25
81 ï 83.9	0.125
78 = 80.9	0.063
75 ï 77.9	0.032
72 ï 74.9	0.016

(NB. This classification system is an extension of that operated by the designated airports in their Night Noise Quota Count System)

10.14 So in principle, an aircraft classified QC/1 is half as noisy as one classified QC/2 and twice as noisy as one classified QC/0.5.

10.15 The nature of the QC system is that it allows flights to be individually counted against a noise quota (in effect a noise budget) according to the QC rating (i.e. the noisiness) of the aircraft used. The noisier the aircraft used the higher its QC rating and the fewer that can be operated, thereby also providing a built-in incentive for airlines to use less noisy aircraft where practicable. Airlines are allowed to decide which aircraft to use according to their operational needs, but whether they use for example, 5xQC/2s or 10xQC/1s or 20xQC/0.5s or a combination of these, the sum of the noise energy permitted by the quota remains the same.

10.16 The system therefore works in a similar manner to the noise dose categories in use now at the Airport. The two key differences are that the system is based on certificated noise data, rather than monitored noise data, and also takes account of arrival and departure (sideline and flyover) noise, rather than just sideline departure noise.

Noise Certification Points

10.17 Certificated noise levels for a given aircraft are determined under carefully controlled conditions at three positions:-

- 450 metres sideline at noisiest point during an aircraft departure;
- 6500 metres from start of roll, directly beneath the departing aircraft; and
- 2000 metres from runway threshold, directly beneath the arriving aircraft

10.18 The arrival footprint is normally significantly smaller than the departure footprint of an aircraft, for a given noise dose level. To account for this, the method of deriving the rating value for a QC band on departure and arrival has been adjusted so that, in broad terms, an aircraft with say a QC 1 rating on departure will produce a similar noise footprint size to an aircraft with a QC 1 rating on arrival.

10.19 London City Airport, unlike other airports that deploy a noise quota count system, operates a steep approach glide slope (5.5 degrees as opposed to the more conventional 3 degrees glide slope). Studies have therefore been undertaken to establish adjustment factors to be applied to equalise departure and arrival noise footprints. It has been established that different adjustment factors are required to account for the differing noise characteristics exhibited by turbofan and turboprop aircraft when approaching at 5.5 degrees, as given in Appendix 10.1.

10.20 The scheme has also been modified from the night noise quota count system in use at the designated airports to account for the quieter aircraft types in use at London City Airport. For example, at the designated airports aircraft with a quota count of less than 0.25 are exempt from the budget; this means there is no limit on how many of these aircraft fly at night. At London City, under the new noise quota count system, no such exemptions will be permitted and all aircraft will be counted against the budget.

Control of Maximum Noise of Aircraft

10.21 The above quota count system will not in itself control the maximum noise level of an aircraft allowed to operate at London City Airport. This will be achieved by setting limits on the noisiness of an aircraft at the three noise certification points, thereby controlling sideline and flyover noise on departure as well as approach noise. In accordance with Government requirements, this control will be based on certificated noise data, rather than monitored noise data.

Monitoring of Aircraft Categorisation Regime

10.22 The new aircraft categorisation regime at London City Airport will be monitored using the airport's new and expanded noise monitoring and flight track keeping system. The intent here is to again deploy a similar procedure to that used at the designated airports for monitoring the night noise quota count. The procedure involves monitoring the noise of individual aircraft events in terms of EPNL (unit EPNdB). This is now possible given progress in the development of fast data acquisition systems.

10.23 The results of this monitoring work would then be used to rank order results, taking account of sideline noise and also approach and flyover noise. If significant anomalies are found in the rank ordering between these results and those used in the noise certification based quota count regime, adjustments will be made as necessary, increasing or decreasing individual quota counts accordingly. This is similar to the procedures in place now for raising or lowering the noise category of an aircraft type.

Quota Count Budget

10.24 The detailed elements of the regime and how it will operate are presented in Appendix 10.1. A key factor however, is that there will remain a limit similar to the existing noise factored movement (NFM) limit but, in this case, a quota count budget which runs in parallel with the existing aircraft movement limit at the airport.

10.25 The proposed quota count classification system, in tandem with current planning conditions, sets controls based on:

- Setting a limit on the overall number of aircraft movements (120,000 movements per annum);
- Placing restrictions on the noisiest aircraft types; and
- Setting noise quotas which cap the amount of noise energy which can be emitted on a weekly and annual basis.

10.26 These three methods of control provide the basis for further incentivising the use of quieter aircraft at London City Airport and the limits and caps set out in Appendix 10.1 have been established to achieve this objective, taking account of the existing planning constraints in place.

10.27 The annual noise quota count budget has been derived from a consideration of the 2023 With Development Principal Case fleet mix. This has been achieved by applying a QC classification to each aircraft type, accounting for departures and arrivals. An examination of the airport's fleet mix has been undertaken and noise certificates examined where available. On this basis, it has been established that this Principal Case mix relates to an annual quota count of approximately 23,000.

c) <u>Noise Factoring vs Quota Count Regime</u>

10.28 In broad terms, the quota count classification system has many similarities to the existing noise factoring system that has been in place at London City Airport since 1991. Both are based on noise dose and both classify aircraft into 3 dB bands. The key difference however relates to the fact that the noise factoring system no longer reflects accurately the noise exposure around the community. This is because it is based solely around sideline departure noise as measured at the four noise monitoring terminals located at or close to 2000 metres from start of roll and 300 metres sideline of each runway (NMT's 1 to 4 shown in Appendix 10.1, Schedule 2). In contrast, the noise quota count system includes consideration of not just sideline departure noise but also noise produced by aircraft on approach and by aircraft on flyovers on departure. The quota count system therefore accounts for effects further from the airport where the contours are dominated by flyover noise produced on departure (such as in Tower Hamlets) and approach noise (such as in Thamesmead).

10.29 To explore and demonstrate the differences between the two regimes, a series of Test Cases have been considered which serve to highlight how the quota count regime now offers a more equitable and reliable means of noise control than the noise factoring system it will replace.

10.30 The Airport currently operates with a noise factored movement (NFM) limit of 120,000 per annum alongside the limit of 120,000 actual movements. These limits, while providing constraints on how the Airport can operate, provide some tolerance over the degree of noise exposure that can arise given the variability of aircraft mix. Clearly, two departing aircraft that generate similar levels of noise sideline will score the same under the NFM regime. One might climb poorly and therefore produce greater levels of noise on flyover. Similarly, one might generate greater levels of noise on approach. Neither of these factors is accounted for under the existing NFM regime. In contrast, in the future under CADP, the QC classification system will rate aircraft according to their performance during the early departure phase (sideline noise) as well as the later phase (flyover) and also on approach. This will provide a tighter control over the noise environment, reducing this tolerance and ensuring that noise emissions are controlled to those relating to the 2023 With Development Principal Case fleet mix.

10.31 To demonstrate this point, four different Test Cases have been considered and dB LAeq16h average mode noise contours produced for each, together with associated noise quota counts. The four scenarios are as follows:-

- Test Case 1 – 2023 With Development Principal Case
- Test Case 2 – 120,000 Movement Sensitivity Test Mix

- Test Case 3 ï As Test Case 1 but C100 aircraft replaced with E190 aircraft
- Test Case 4 ï As Test Case 2 but C100 aircraft replaced with E190 aircraft

10.32 These cases have been selected to reflect both the key Principal Case mix presented and considered in the Environmental Statement (Test Case 1) as well as the 120,000 Movement Sensitivity Test case (Test Case 2) adopted to explore whether a mix of aircraft is feasible to achieve an annual throughput of 120,000 actual movements while still complying with the existing NFM limit and proposed QC budget. The final two cases (Test Case 3 and 4) have been selected to show how the introduction of E190 aircraft into the mix in place of the quieter C100 aircraft, while complying with the existing aircraft movement and NFM limits, can give rise to larger noise contours than the Principal Case considered here. The noise QC classification system is seen to provide a greater control over these aircraft mixes and reflect better the noise exposure that results from them.

10.33 The contours for each of the above Test Cases are presented in Appendix 10.2 as Figures 10.2.1 to 10.2.4. The calculated noise quota count for each of the Test Cases is presented in Table 10.2 below together with the corresponding area of the 57 dB $_{LAeq,16h}$ noise contour and also the corresponding noise factor total.

Table 10.2 – Comparison of Aircraft Mix Test Cases

Test Case	No. of Movements per annum	Noise Factored Movements	Quota Count	57 dB Contour Area (km2)
1. 2023 With Dev.	111,000	120,000	22,690(1)	9.1
2. 120k Sensitivity Mix	120,000	119,900	22,650(1)	8.8
3. As 1, C100 replaced by E190	111,000	120,000	24,940	10.2
4. As 2. C100 replaced by E190	120,000	119,900	25,190	10.1

(1) Quota count derived from range of values in absence of C100 formal noise certification data.

10.34 It can be seen from Figures 10.2.1 to 10.2.4 and also from Table 10.2 above that under the current aircraft categorisation regime, the four aircraft mixes considered all satisfy the current planning requirements at London City Airport. In the case of Test Cases 2 and 4, both mixes have identical numbers of aircraft movements and noise factored movements. Despite this, the size of the 57 dB contours differ markedly with the area for Test Case 4 (10.1 km2) being 15% larger than Test Case 2 (8.8 km2). The Test Case 4 contour area is also 11% larger than the Test Case 1 contour area (9.1 km2) which represents the 2023 With Development Principal Case.

10.35 In contrast to the above, under the new regime, as a quota count budget of 23,000 is proposed, Test Cases 3 and 4 would not be permitted to operate as the quota counts associated with each are significantly higher than the proposed limit.

10.36 The above examples illustrate that for the Airport to achieve a throughput of 120,000 aircraft movements annually, as currently permitted, this can only be achieved by introducing quieter aircraft into the fleet mix than presented in the 2023 CADP With Development Principal Case. This provides a clear incentive to introduce quieter aircraft into the Airport.

10.37 The quota count system will therefore provide a tighter constraint on the amount of noise emitted by operations at the Airport while also bringing the method of operating noise controls in line with

Government requirements to use independently derived and universally recognised noise certification data. Most aircraft carry a noise certificate that defines its noise characteristics and this noise certification information will be used to classify the aircraft within the QC system. Each year, the results of aircraft noise monitoring will be reviewed to establish whether the QC values used for each aircraft type are appropriate.

10.38 The QC classification system, as described above, will provide an efficient means of controlling noise emissions which follows the general principles adopted by the current aircraft categorisation regime. The system however offers a more robust means of controlling the noise environment at London City Airport and provides further incentives to use quieter aircraft at the Airport.

APPENDIX 9.1

Sensitivity Fleet Mix Air Noise Contours

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Legend

Sensitivity Mix

2023 With Dev

Drawing Title

LONDON CITY AIRPORT

$L_{Aeq,16h}$ airborne aircraft noise contours

54 - 72 in 3 dB steps

2023 Summer Average Mode With CADP 120k Movements Sensitivity Test Mix

Comparison with 2023 With Development Principal Case

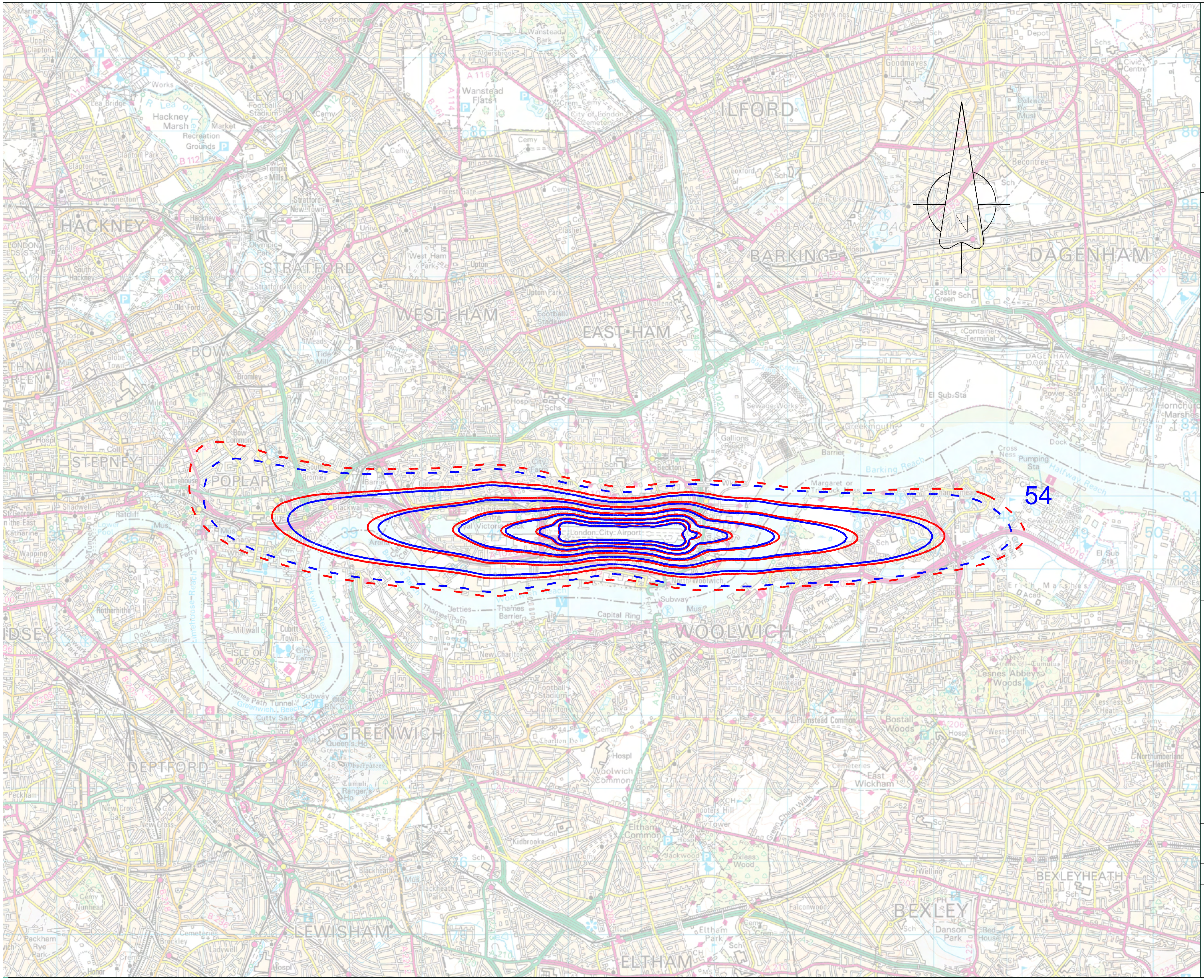
Scale at A3: 1:50,000

Date: October 2014

Drawing Number: B.9.1

APPENDIX 9.2

Sensitivity Mix Ground Noise Contour



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Legend

- Sensitivity Mix (red)
- 2023 Without Dev (blue)

Drawing Title

LONDON CITY AIRPORT

$L_{Aeq,16h}$ airborne aircraft noise contours

54 - 72 in 3 dB steps

2023 Summer Average Mode With CADP 120k Movements Sensitivity Test Mix

Comparison with 2023 Without Development Base Case

Scale at A3: 1:50,000

Date: October 2014

Drawing Number: B.9.2

APPENDIX 9.3

120k sensitivity test - PSZs

120k Sensitivity Test: PSZs

1. Risks from aircraft crash to sites on the ground in the vicinity of an airport can be estimated by use of an empirical model based on historical accident data that takes account of three key factors as follows:

   1 The likelihood (frequency per annum) of an aircraft crash during take-off or landing operations at any given airport, derived on the basis of the historical crash frequency per movement and annual rate of movements at the airport in question.

   2 The probability of impact at any given location relative to the runway end and extended centreline, derived on the basis of mathematical functions that correlate the observed distribution of crash locations.

   3 The severity of the consequence of an impact on the ground, again derived on the basis of historical accident data and taking account of the size of an aircraft operating at the airport in question, as characterised in terms of its maximum take-off weight authorised (MTWA).

2. The DfT PSZ model uses this approach to determine the risk to a hypothetical permanent resident at sites located in the vicinity of an airport runway and defines the PSZ for operations at individual airports by reference to the 1 in 100,000 annual fatality risk contour, taking account of the fleet mix and movement numbers for the airports concerned. The size of the PSZ is determined on the basis of the sum of the contributions to the total risk from all aircraft types within the fleet mix. The magnitude of the contribution to risk associated with each aircraft type is dependent upon the number of movements (N), the crash rate per movement (CR) and destroyed area (DA) for each type, in accordance with items 1 and 3 in paragraph 1. The crash location parameters under item 2 are essentially constants that apply to all fleet mixes. The relative risks associated with different fleet mixes can therefore be determined by reference to the risk factor which comprises these different parameters, N x CR x DA, given in units of hectares destroyed per annum.

3. For the CADP 2023 fleet mix that has previously been identified, comprising 120,000 noise factored movements and 111,040 actual movements, a value for the risk factor of N x CR x DA = 0.0058045 hectares per annum is determined. The fleet mix and the parameters determining this risk factor are set out in full in Table 1.

4. For the identified 120,000 movements per annum fleet mix, a value for the risk factor of N x CR x DA = 0.0058022 hectares per annum is determined. The fleet mix and the parameters determining this risk factor are set out in full in Table 2. It can be seen that this value for the risk factor is marginally smaller than that for the CADP 2023 fleet mix. It can therefore be concluded that the estimated individual risks associated with the two scenarios will be very similar indeed. It follows that there would be no material difference between the PSZs that would be determined for the 120,000 movements per annum sensitivity case and those previously identified for the CADP 2023 fleet mix

Table 1: 2023 Forecast and Risk Factors

Type of Operation	2023 CADP Movements (N)	Crash rate (CR) per million movements[1]	Crash rate per annum	Destroyed Area (DA)[2]	Relative Risk Factor N x CR x DA
Passenger	1,220	0.082	0.00010	0.412	0.0000413
Passenger	4,990	0.254	0.00127	0.223	0.0002828
Passenger	26,613	0.254	0.00676	0.277	0.0018693
Passenger	14,416	0.082	0.00118	0.385	0.0004557
Passenger	6,653	0.082	0.00055	0.310	0.0001690
Passenger	53,227	0.082	0.00436	0.358	0.0015604
Exec jet	357	2.23	0.00080	0.143	0.0001140
Exec jet	794	2.23	0.00177	0.139	0.0002460
Exec jet	1,202	2.23	0.00268	0.139	0.0003724
Exec jet	45	2.23	0.00010	0.244	0.0000245
Exec jet	300	2.23	0.00067	0.287	0.0001923
Exec jet	1,004	2.23	0.00224	0.178	0.0003988
Exec jet	219	2.23	0.00049	0.159	0.0000779
	111,040		0.02296	0.253	0.0058045

Note 1: The values given are those identified from previously published PSZ assessments employing the DfT model. Due to periodic updating of the crash rate statistics, there may have been some recent revisions to some of the crash rates used in the DfT model but these can be expected not to make any material difference to the risk estimates.

Note 2: The estimates for the destroyed area have been made using what is understood to be the most recently published version of the DfT model. Due to periodic updating of the crash statistics, there may have been some recent revisions to some of the consequence model used in the DfT model but these can be expected not to make any material difference to the risk estimates.

Aircraft Type	Type of Engine
Airbus A318	Jet
ATR-42	Turboprop
Bombardier Q400	Turboprop
Canadair C100	Jet
Embraer E170	Jet
Embraer E190	Jet
Beechjet 400A	Jet
Cessna 550 Citation Bravo	Jet
Cessna 560XL Citation XL	Jet
Embraer Legacy	Jet
Dassault Falcon 7X	Jet
Raytheon Hawker 800XP	Jet
Learjet 45	Jet
Total	

Table 2: 120,000 Sensitivity Case Fleet Mix and Risk Factors

Type of Operation	Movement Numbers (N)	Crash rate (CR) per million movements	Crash rate per annum	Destroyed Area (DA)[2]	Relative Risk Factor N x CR x DA
Passenger	1,220	0.082	0.00010	0.412	0.0000413
Passenger	4,990	0.254	0.00127	0.223	0.0002828
Passenger	44,688	0.254	0.01135	0.277	0.0031390
Passenger	16,230	0.082	0.00133	0.385	0.0005130
Passenger	6,653	0.082	0.00055	0.310	0.0001690
Passenger	45,315	0.082	0.00372	0.358	0.0013284
Exec jet	82	2.23	0.00018	0.143	0.0000262
Exec jet	183	2.23	0.00041	0.139	0.0000567
Exec jet	277	2.23	0.00062	0.139	0.0000858
Exec jet	10	2.23	0.00002	0.244	0.0000054
Exec jet	69	2.23	0.00015	0.287	0.0000442
Exec jet	232	2.23	0.00052	0.178	0.0000922
Exec jet	51	2.23	0.00011	0.159	0.0000181
	120,000		0.002033	0.285	0.0058022

Note 1: The values given are those identified from previously published PSZ assessments employing the DfT model. Due to periodic updating of the crash rate statistics, there may have been some recent revisions to some of the crash rates used in the DfT model but these can be expected not to make any material difference to the risk estimates.
Note 2: The estimates for the destroyed area have been made using w hat is understood

Aircraft Type	Type of Engine
Airbus A318	Jet
ATR-42	Turboprop
Bombardier Q400	Turboprop
Canadair C100	Jet
Embraer E170	Jet
Embraer E190	Jet
Beechjet 400A	Jet
Cessna 550 Citation Bravo	Jet
Cessna 560XL Citation XL	Jet
Embraer Legacy	Jet
Dassault Falcon 7X	Jet
Raytheon Hawker 800XP	Jet
Learjet 45	Jet
Total	

APPENDIX 10.1

Quota Count Classification Systems

<u>APPENDIX 10.1 Quota Count Classification Systems</u>

Quota Count Classifications

1.1 The QC classification system is based on official noise certification data derived from measurements made on actual aircraft which have been conducted in accordance with the International Civil Aviation Organisation (ICAO) certification process, with adjustments to account for specific procedures at LCY.

1.2 Aircraft are classified separately for landing and departure operations. For each operation, an aircraft is classified on the basis of their noise data (adjusted as appropriate) into one of the bands set out in Table 9.1 below:-

Table 9.1 – Aircraft Noise Classifications

Qualifying level, EPNdB	QC Classification
93 ï 95.9	2
90 ï 92.9	1
87 ï 89.9	0.5
84 ï 86.9	0.25
81 ï 83.9	0.125
78 = 80.9	0.063
75 ï 77.9	0.032
72 ï 74.9	0.016

(NB. This classification system is an extension of that operated by the designated airports in their Night Noise Quota Count System)

Noise Certification Levels

1.3 Under regulations laid out by the European Commission, most aircraft of the types used at London City Airport carry a certificate that sets out the noise certification levels for the aircraft and states the weight at which the aircraft was certified.

1.4 Noise certification data for a given aircraft type can exist at a variety of different take-off weights. In addition, some aircraft of a given type are fitted with modified (quieter) engines and are certified accordingly. As a result of this, the selection of certified noise certification levels for an individual aircraft shall be based on:-

- **the values set out on the certified noise certificate for the individual aircraft; OR, if this is not available,**
- **the average of those values set out in the EASA database for the specific aircraft type.**

1.5 Schedule 1a sets out noise certification levels obtained from noise certificates applicable to individual aircraft types in use at London City Airport for which data is publically available from the Civil Aviation Authority. Schedule 1b provides noise certification levels derived from the average of those values set out in the EASA[1] database.

[1] European Aviation Space Agency

a) Maximum Permissible Noise Levels Of Aircraft

1.6 Under the ACR, no aircraft will be permitted to operate at the Airport unless it complies with the noise requirements of Chapter 4 and each of the three noise certification levels attributable to that aircraft, as described above, are equal to or less than the following:

- Take-off: 89.0 EPNdB
- Sideline: 94.0 EPNdB
- Approach: 98.0 EPNdB

b) Applicability of Quota Count Regime

Quota Count Period

1.7 The quota count period applies throughout the operational hours of the airport as specified in the airport's entry given in the UK AIP. Any eligible aircraft that operates outside these hours, as a result of operational delays, would be included in the quota count period of assessment.

1.8 For the purposes of an annual assessment of the total quota count, the calendar year shall apply.

Quota Count Budget

1.9 The total quota count shall not exceed the following:-

- 23,000 per calendar year;
- 776 in any one week.

1.10 The quota count shall be calculated by multiplying the number of take-offs and landings by the relevant departure and arrival quota counts respectively, as determined by the QC classification system described above (taking account of any adjustments arising from a consideration of noise monitoring results - see below) for an aircraft and adding together the totals for each aircraft type using the airport.

Aircraft Eligibility

1.11 All aircraft operating at the Airport shall be included in the quota count, other than those engaged in training and aircraft testing.

c) Noise Monitoring

Aircraft Noise Measurement

1.12 Throughout each year of operation of the quota count system, noise monitoring shall be undertaken at the locations specified in Schedule 2 to record at each noise monitor the effective perceived noise level (EPNL) during aircraft departures and landings.

1.13 The data shall be reviewed on an annual basis to establish for each aircraft type, separately for each airline, the following information:-

- The average annual SIDELINE departure noise level (in EPNdB), from NMT’s 1,2 3 and 4;
- The average annual FLYOVER departure noise level (in EPNdB), from NMT’s 5 and 6; and
- The average annual APPROACH noise level (in EPNdB), from NMT’s 5 and 6.

Rank Ordering

1.14 The results of aircraft noise monitoring will be reviewed each year to establish whether the quota count values used for each aircraft type are appropriate.

1.15 The following year’s total quota count will be determined based on scheduled information and established noise quota counts, taking account of any adjustments arising from a consideration of noise monitoring results. The result of this assessment shall be compared against the Airport’s permitted noise quota count budget (as specified above).

d) <u>Incentives</u>

1.16 The Airport will operate a series of incentives aimed at ensuring aircraft operate as quietly as possible without compromising normal operational and safety considerations. These will supplement those incentives that form part of the Noise Monitoring and Mitigation Strategy

e) <u>Reporting</u>

Quarterly Report

1.17 A quarterly operational statistics report shall be produced each quarter that sets out the daily and weekly quota counts attributable to the actual aircraft movements at the airport. The weekly values will be compared with the permitted limit to identify if and when any limits are approached.

Annual Report

1.18 In June each year following the completion of the calendar year, a report shall be produced as part of the airport’s Annual Performance Report that records the results of the assessments undertaken as part of the quota count regime, including but not limited to:-

- The quota counts used for each aircraft type during the calendar year in question;
- The total annual quota count arising from aircraft operations during the calendar year;
- The results of noise monitoring undertaken during the calendar year, expressed for each aircraft as averages in relation to sideline, flyover and approach noise levels as determined in accordance with the approach outlined above;
- Details of any adjustments that have been made to the quota counts of specific aircraft;
- The quota counts to be used for the forthcoming calendar year; and
- The expected total annual quota count for the forthcoming year.

Schedule 1a - UK registered aircraft at LCY - EASA certificate information from CAA Website

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Registration	Name	Type	Lateral	Flyover EPNdB	Approach	Engine Type	Engine Class	Max TOW (kg)
GEUNA	A318	Airbus A318-112	91.9	83.0	93.9	CFM56-5B9/3	Turbofan	68000
GEUNB	A318	Airbus A318-112	91.9	83.0	93.9	CFM56-5B9/3	Turbofan	68000
GDRFC	AT42	ATR 42-320	83.9	83.0	96.7	PW121	Turboprop	16900
GISLG	AT42	ATR 42-320	83.9	83.0	96.7	PW121	Turboprop	16900
GZEBS	AT42	ATR 42-320	83.9	83.0	96.7	PW121	Turboprop	16900
GISLF	AT42	ATR 42-500	80.7	76.6	92.3	PW127E	Turboprop	18600
GBZAU	RJ1H	Avro 146-RJ100	88.1	85.3	97.6	LF507-1F	Turbofan	44999
GBZAV	RJ1H	Avro 146-RJ100	88.1	85.3	97.6	LF507-1F	Turbofan	44999
GBZAY	RJ1H	Avro 146-RJ100	88.1	85.3	97.6	LF507-1F	Turbofan	44999
GBZAZ	RJ1H	Avro 146-RJ100	88.1	85.3	97.6	LF507-1F	Turbofan	44999
GCFAA	RJ1H	Avro 146-RJ100	88.1	85.3	97.6	LF507-1F	Turbofan	44999
GLENM	RJ85	Avro 146-RJ85	88.4	84.3	97.3	LF507-1F	Turbofan	43998
GCEIC	RJ85	Avro 146-RJ85	88.6	83.0	97.3	LF507-1F	Turbofan	42184
GLCYB	RJ85	Avro 146-RJ85	88.6	83.0	97.3	LF507-1F	Turbofan	42184
GLCYC	RJ85	Avro 146-RJ85	88.6	83.0	97.3	LF507-1F	Turbofan	42184
GZAPK	B462	BAE. 146-200	87.3	85.2	95.8	ALF502R-5	Turbofan	42184
GZAPN	B462	BAE. 146-200	87.3	85.2	95.8	ALF502R-5	Turbofan	42184
GZAPO	B462	BAE. 146-200	87.3	85.2	95.8	ALF502R-5	Turbofan	42184
GRAJJ	B462	BAE. 146-200	87.4	84.8	95.8	ALF502R-5	Turbofan	39995
GCEGR	BE20	Beech 200	n/a	73.8 dB(A)	n/a	PT6A-41	Turboprop	5670
GOCEG	BE20	Beech 200	n/a	73.9 dB(A)	n/a	PT6A-42	Turboprop	5670
GBYCP	BE20	Beech 200	n/a	79.2 dB(A)	n/a	PT6A-42	Turboprop	5670
GCEGP	BE20	Beech 200	n/a	79.2 dB(A)	n/a	PT6A-41	Turboprop	5670
GFRYI	BE20	Beech 200	n/a	79.2 dB(A)	n/a	PT6A-41	Turboprop	5670
GBGRE	BE20	Beech 200	n/a	79.3 dB(A)	n/a	PT6A-61	Turboprop	5670
GBVMA	BE20	Beech 200	n/a	81.2 dB(A)	n/a	PT6A-61	Turboprop	5670
GLIVY	BE20	Beech 200	n/a	88.0 dB(A)	n/a	PT6A-61	Turboprop	5670
GCFYT	BE58	Beech 58	n/a	88.2 dB(A)	n/a	IO-550-C	Piston	2494
GCOBH	BE20	Beech B200	n/a	73.8 dB(A)	n/a	PT6A-42	Turboprop	5670
GFPLE	BE20	Beech B200	n/a	73.8 dB(A)	n/a	PT6A-42	Turboprop	5670
GJOAL	BE20	Beech B200	n/a	73.8 dB(A)	n/a	PT6A-42	Turboprop	5670
GMEGN	BE20	Beech B200	n/a	79.2 dB(A)	n/a	PT6A-42	Turboprop	5670
GBZNE	B350	Beech B300	n/a	76.5	n/a	PT6A-60A	Turboprop	6804

				dB(A)				
GKLNB	B350	Beech B300	n/a	76.5 dB(A)	n/a	PT6A-60A	Turboprop	6804
GPOWB	B350	Beech B300	n/a	76.5 dB(A)	n/a	PT6A-60A	Turboprop	6804
GCGJA	CL60	Canadair CL600-2B16	86.2	81.2	90.3	CF34-3B	Turbofan	21863
GNCCC	CL60	Canadair CL600-2B16	86.2	81.2	90.3	CF34-3B	Turbofan	21863
GURRU	CL60	Canadair CL600-2B16	86.2	81.2	90.3	CF34-3B	Turbofan	21863
GFCAL	C441	Cessna 441	n/a	74.0 dB(A)	n/a	TPE331-8-403S	Turboprop	4468
GFBKA	C510	Cessna 510	85.0	73.9	86.0	PW615F-A	Turbofan	3921
GFBKB	C510	Cessna 510	85.0	73.9	86.0	PW615F-A	Turbofan	3921
GFBKC	C510	Cessna 510	85.0	73.9	86.0	PW615F-A	Turbofan	3921
GFBKD	C510	Cessna 510	85.0	73.9	86.0	PW615F-A	Turbofan	3921
GFBLI	C510	Cessna 510	85.0	73.9	86.0	PW615F-A	Turbofan	3921
GFBLK	C510	Cessna 510	85.0	73.9	86.0	PW615F-A	Turbofan	3921
GFBNK	C510	Cessna 510	85.0	73.9	86.0	PW615F-A	Turbofan	3921
GFLBK	C510	Cessna 510	85.0	73.9	86.0	PW615F-A	Turbofan	3921
GKLNW	C510	Cessna 510	85.0	73.9	86.0	PW615F-A	Turbofan	3921
GLEAC	C510	Cessna 510	85.0	73.9	86.0	PW615F-A	Turbofan	3921
GLEAI	C510	Cessna 510	85.0	73.9	86.0	PW615F-A	Turbofan	3921
GLFPT	C510	Cessna 510	85.0	73.9	86.0	PW615F-A	Turbofan	3921
GMICE	C510	Cessna 510	85.0	73.9	86.0	PW615F-A	Turbofan	3921
GNGEL	C510	Cessna 510	85.0	73.9	86.0	PW615F-A	Turbofan	3921
GOAMB	C510	Cessna 510	85.0	73.9	86.0	PW615F-A	Turbofan	3921
GSSLM	C510	Cessna 510	85.0	73.9	86.0	PW615F-A	Turbofan	3921
GXAVB	C510	Cessna 510	85.0	73.9	86.0	PW615F-A	Turbofan	3921
GLEAA	C510	Cessna 510	-	-	-	PW615F-A	Turbofan	3921
GLEAB	C510	Cessna 510	-	-	-	PW615F-A	Turbofan	3921
GCITJ	C525	Cessna 525	83.6	73.4	89.5	FJ44-1A	Turbofan	4717
GEDCJ	C525	Cessna 525	83.6	73.4	89.5	FJ44-1A	Turbofan	4717
GLUBB	C525	Cessna 525	83.6	73.4	89.5	FJ44-1A	Turbofan	4717
GOSOH	C525	Cessna 525	83.6	73.4	89.5	FJ44-1A	Turbofan	4717
GPWNS	C525	Cessna 525	83.6	73.4	89.5	FJ44-1A	Turbofan	4717
GSEAJ	C525	Cessna 525	83.6	73.4	89.5	FJ44-1A	Turbofan	4717
GSFCJ	C525	Cessna 525	83.6	73.4	89.5	FJ44-1A	Turbofan	4717
GEDCK	C525	Cessna 525	83.6	73.4	89.7	FJ44-1A	Turbofan	4808
GHEBJ	C525	Cessna 525	83.6	73.6	89.7	FJ44-1A	Turbofan	4808
GTSJF	C25B	Cessna 525A	88.7	74.0	88.6	FJ44-3A	Turbofan	6291
GCGUZ	C25A	Cessna 525A	86.1	75.5	89.7	FJ44-3A-24	Turbofan	5670
GCROO	C25A	Cessna 525A	86.1	75.5	89.7	FJ44-3A-24	Turbofan	5670
GDAGS	C25A	Cessna 525A	86.1	75.5	89.7	FJ44-3A-24	Turbofan	5670
GODAG	C25A	Cessna 525A	86.1	75.5	89.7	FJ44-3A-24	Turbofan	5670
GTWOP	C25A	Cessna 525A	86.1	75.5	89.7	FJ44-3A-24	Turbofan	5670
GPEER	C25A	Cessna 525A	86.1	75.5	89.7	FJ44-3A-24	Turbofan	5670
GEDCL	C25A	Cessna 525A	88.8	74.5	91.4	FJ44-2C	Turbofan	5613
GEDCM	C25A	Cessna 525A	88.8	74.5	91.4	FJ44-2C	Turbofan	5613
GMROO	C25A	Cessna 525A	88.8	74.5	91.4	FJ44-2C	Turbofan	5613

GOCJZ	C25A	Cessna 525A	88.8	74.5	91.4	FJ44-2C	Turbofan	5613
GTBEA	C25A	Cessna 525A	88.8	74.5	91.4	FJ44-2C	Turbofan	5613
GSONE	C25A	Cessna 525A	-	-	-	FJ44-2C	Turbofan	5613
GYEDC	C25B	Cessna 525B	88.7	74.0	88.6	FJ44-3A	Turbofan	6291
GFJET	C550	Cessna 550	86.7	80.1	90.2	JT15D-4	Turbofan	6033
GJBIZ	C550	Cessna 550	86.7	80.1	90.2	PW530A	Turbofan	6713
GSPUR	C550	Cessna 550	86.4	71.6	90.8	JT15D-4	Turbofan	6395
GEHGW	C550	Cessna 550	85.2	73.7	91.2	PW530A	Turbofan	6713
GFCDB	C550	Cessna 550	85.2	73.7	91.2	PW530A	Turbofan	6713
GFIRM	C550	Cessna 550	85.2	73.7	91.2	PW530A	Turbofan	6713
GIKOS	C550	Cessna 550	85.2	73.7	91.2	PW530A	Turbofan	6713
GJBLZ	C550	Cessna 550	85.2	73.7	91.2	PW530A	Turbofan	6713
GMHIS	C550	Cessna 550	85.2	73.7	91.2	PW530A	Turbofan	6713
GOMRH	C550	Cessna 550	85.2	73.7	91.2	PW530A	Turbofan	6713
GYPRS	C550	Cessna 550	85.2	73.7	91.2	PW530A	Turbofan	6713
GCGEI	C550	Cessna 550	-	-	-	PW530A	Turbofan	6713
GKDMA	C560	Cessna 560	89.8	70.0	90.5	PW535A	Turbofan	7543
GCXLS	C56X	Cessna 560XL	86.3	72.7	92.8	PW545B	Turbofan	9163
GECAI	C56X	Cessna 560XL	86.3	72.7	92.8	PW545B	Turbofan	9163
GKPEI	C56X	Cessna 560XL	86.3	72.7	92.8	PW545B	Turbofan	9163
GLEAX	C56X	Cessna 560XL	86.3	72.7	92.8	PW545B	Turbofan	9163
GOMEA	C56X	Cessna 560XL	86.3	72.7	92.8	PW545B	Turbofan	9163
GOROO	C56X	Cessna 560XL	86.3	72.7	92.8	PW545B	Turbofan	9163
GRSXL	C56X	Cessna 560XL	86.3	72.7	92.8	PW545B	Turbofan	9163
GXBEL	C56X	Cessna 560XL	86.3	72.7	92.8	PW545B	Turbofan	9163
GOXLS	C56X	Cessna 560XL	86.8	72.1	92.8	PW545B	Turbofan	9163
GCHUI	C56X	Cessna 560XL	86.8	72.2	92.8	PW545C	Turbofan	9163
GEPGI	C56X	Cessna 560XL	86.8	72.2	92.8	PW545C	Turbofan	9163
GCBRG	C56X	Cessna 560XL	85.3	72.4	93.1	PW545A	Turbofan	9072
GCGMF	C56X	Cessna 560XL	85.3	72.4	93.1	PW545A	Turbofan	9072
GCIEL	C56X	Cessna 560XL	85.3	72.4	93.1	PW545A	Turbofan	9072
GELOA	C56X	Cessna 560XL	85.3	72.4	93.1	PW545A	Turbofan	9072
GIPAX	C56X	Cessna 560XL	85.3	72.4	93.1	PW545A	Turbofan	9072
GLDFM	C56X	Cessna 560XL	85.3	72.4	93.1	PW545A	Turbofan	9072
GPEPE	C56X	Cessna 560XL	85.3	72.4	93.1	PW545A	Turbofan	9072
GSIRS	C56X	Cessna 560XL	85.3	72.4	93.1	PW545A	Turbofan	9072
GWINA	C56X	Cessna 560XL	85.3	72.4	93.1	PW545A	Turbofan	9072
GXLGB	C56X	Cessna 560XL	85.3	72.4	93.1	PW545A	Turbofan	9072
GOSVM	C56X	Cessna 560XL	-	-	-	PW545B	Turbofan	9163
GCPRR	C680	Cessna 680	87.5	71.8	91.3	PW306C	Turbofan	13744
GSVSB	C680	Cessna 680	87.5	71.8	91.3	PW306C	Turbofan	13744
GCJCC	C680	Cessna 680	-	-	-	PW306C	Turbofan	13744
GWOWA	DH8C	DHC-8-311	86.9	80.0	94.9	PW123	Turboprop	19504
GWOWB	DH8C	DHC-8-311	86.9	80.0	94.9	PW123	Turboprop	19504
GWOWC	DH8C	DHC-8-311	86.9	80.0	94.9	PW123	Turboprop	19504
GWOWD	DH8C	DHC-8-311	86.9	80.0	94.9	PW123	Turboprop	19504
GWOWE	DH8C	DHC-8-311	86.9	80.0	94.9	PW123	Turboprop	19504
GJECG	DH8D	DHC-8-402	84.0	78.3	94.8	PW150A	Turboprop	29257
GBWIR	D328	Dornier 328-100	83.8	82.1	94.8	PW119B	Turboprop	13990

GBWWT	D328	Dornier 328-100	83.8	82.1	94.8	PW119B	Turboprop	13990
GBYHG	D328	Dornier 328-100	83.8	82.1	94.8	PW119B	Turboprop	13990
GBYMK	D328	Dornier 328-100	83.8	82.1	94.8	PW119B	Turboprop	13990
GBZOG	D328	Dornier 328-100	83.8	82.1	94.8	PW119B	Turboprop	13990
GCCGS	D328	Dornier 328-100	83.8	82.1	94.8	PW119B	Turboprop	13990
GWCCI	E135	EMB-135BJ	85.3	80.6	91.3	AE 3007A1 P	Turbofan	22500
GCMAF	E135	EMB-135BJ	86.8	79.7	91.3	AE 3007A1E	Turbofan	22500
GHUBY	E135	EMB-135BJ	86.8	79.7	91.3	AE 3007A1E	Turbofan	22500
GIRSH	E135	EMB-135BJ	86.8	79.7	91.3	AE 3007A1E	Turbofan	22500
GLALE	E135	EMB-135BJ	86.8	79.7	91.3	AE 3007A1E	Turbofan	22500
GLEGC	E135	EMB-135BJ	86.8	79.7	91.3	AE 3007A1E	Turbofan	22500
GPEPI	E135	EMB-135BJ	86.8	79.7	91.3	AE 3007A1E	Turbofan	22500
GRHMS	E135	EMB-135BJ	86.8	79.7	91.3	AE 3007A1E	Turbofan	22500
GRRAZ	E135	EMB-135BJ	86.8	79.7	91.3	AE 3007A1E	Turbofan	22500
GRUBE	E135	EMB-135BJ	86.8	79.7	91.3	AE 3007A1E	Turbofan	22500
GTHFC	E135	EMB-135BJ	86.8	79.7	91.3	AE 3007A1E	Turbofan	22500
GRBNS	E135	EMB-135BJ	86.9	78.0	91.7	AE3007A2	Turbofan	24300
GCMAS	E135	EMB-135BJ	-	-	-	AE3007A2	Turbofan	24300
GLCYD	E170	ERJ 170-100 STD	93.0	81.5	94.9	CF34-8E5A1	Turbofan	35990
GLCYE	E170	ERJ 170-100 STD	93.0	81.5	94.9	CF34-8E5A1	Turbofan	35990
GLCYF	E170	ERJ 170-100 STD	93.0	81.5	94.9	CF34-8E5A1	Turbofan	35990
GLCYG	E170	ERJ 170-100 STD	93.0	81.5	94.9	CF34-8E5A1	Turbofan	35990
GLCYH	E170	ERJ 170-100 STD	93.0	81.5	94.9	CF34-8E5A1	Turbofan	35990
GLCYI	E170	ERJ 170-100 STD	93.0	81.5	94.9	CF34-8E5A1	Turbofan	35990
GLCYJ	E190	ERJ 190-100 SR	93.0	81.4	92.5	CF34-10E5A1	Turbofan	45990
GLCYK	E190	ERJ 190-100 SR	93.0	81.4	92.5	CF34-10E5A1	Turbofan	45990
GLCYL	E190	ERJ 190-100 SR	93.0	81.4	92.5	CF34-10E5A1	Turbofan	45990
GLCYM	E190	ERJ 190-100 SR	93.0	81.4	92.5	CF34-10E5A1	Turbofan	45990
GLCYN	E190	ERJ 190-100 SR	93.0	81.4	92.5	CF34-10E5A1	Turbofan	45990
GLCYO	E190	ERJ 190-100 SR	93.0	81.4	92.5	CF34-10E5A1	Turbofan	45990
GLCYP	E190	ERJ 190-100 SR	93.0	81.4	92.5	CF34-10E5A1	Turbofan	45990
GLCYR	E190	ERJ 190-100 SR	93.0	81.4	92.5	CF34-10E5A1	Turbofan	45990
GLCYS	E190	ERJ 190-100 SR	93.0	81.4	92.5	CF34-10E5A1	Turbofan	45990
GLCYT	E190	ERJ 190-100 SR	93.0	81.4	92.5	CF34-10E5A1	Turbofan	45990
GLCYU	E190	ERJ 190-100 SR	93.0	81.4	92.5	CF34-10E5A1	Turbofan	45990
GKPTN	FA50	Falcon 50	92.7	83.0	95.2	TFE31-40-1C	Turbofan	18500
GIONX	FA7X	Falcon 7X	90.1	82.3	92.6	PW307A	Turbofan	31751
GPVHT	FA7X	Falcon 7X	90.4	83.7	92.6	PW307A	Turbofan	31298
GJMMX	F900	Falcon 900EX	90.5	79.8	92.3	TFE731-60	Turbofan	22226
GLCYA	F900	Falcon 900EX	90.5	79.8	92.3	TFE731-60	Turbofan	22226
GRMMA	F900	Falcon 900EX	90.5	79.8	92.3	TFE731-60	Turbofan	22226
GSABI	F900	Falcon 900EX	90.5	79.8	92.3	TFE731-60-1C	Turbofan	22226
GYCKF	F900	Falcon 900EX	90.5	79.8	92.3	TFE731-60	Turbofan	22226
GCDLT	H25B	Hawker 800XP	87.1	79.3	93.3	TFE731-5BR	Turbofan	12701
GJMAX	H25B	Hawker 800XP	87.1	79.3	93.3	TFE731-5BR	Turbofan	12701
GDLTC	H25B	Hawker 900XP	86.6	76.7	94.9	TFE731-50R	Turbofan	12700
GKLNE	H25B	Hawker 900XP	86.6	76.7	94.9	TFE731-50R	Turbofan	12700
GODUR	H25B	Hawker 900XP	86.6	76.7	94.9	TFE731-50R	Turbofan	12700
GORYX	H25B	Hawker 900XP	86.6	76.7	94.9	TFE731-50R	Turbofan	12700

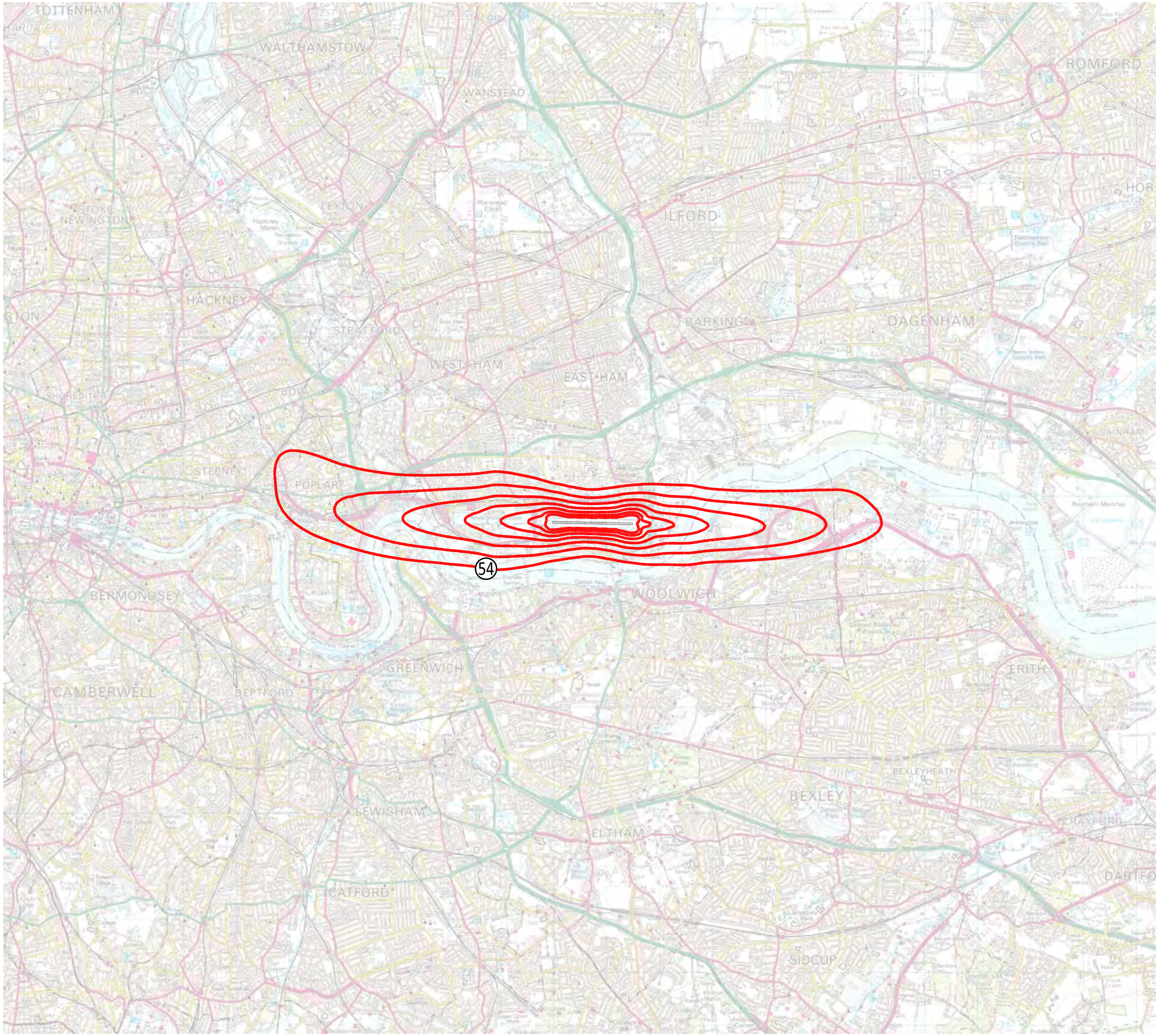
GOTAZ	H25B	Hawker 900XP	86.6	76.7	94.9	TFE731-50R	Turbofan	12700
GOZAT	H25B	Hawker 900XP	86.6	76.7	94.9	TFE731-50R	Turbofan	12700
GHPPY	LJ40	Learjet 45	85.1	75.5	93.4	TFE731-20BR-1B	Turbofan	9525
GMEET	LJ40	Learjet 45	85.1	75.5	93.4	TFE731-20BR-1B	Turbofan	9525
GIZAP	LJ45	Learjet 45	85.1	75.5	93.4	TFE731-20AR-1B	Turbofan	9752
GIZIP	LJ45	Learjet 45	85.1	75.5	93.4	TFE731-20AR-1B	Turbofan	9752
GOLDK	LJ45	Learjet 45	85.1	75.5	93.4	TFE731-20AR-1B	Turbofan	9752
GOLDT	LJ45	Learjet 45	85.1	75.5	93.4	TFE731-20AR-1B	Turbofan	9752
GPFCT	LJ45	Learjet 45	85.1	75.5	93.4	TFE731-20AR-1B	Turbofan	9752
GSNZY	LJ45	Learjet 45	85.1	75.5	93.4	TFE731-20AR-1B	Turbofan	9752
GSOVB	LJ45	Learjet 45	85.1	75.5	93.4	TFE731-20AR-1B	Turbofan	9752
GZXZX	LJ45	Learjet 45	85.1	75.5	93.4	TFE731-20AR-1B	Turbofan	9752
GFCSL	PA31	Piper PA-31-350	n/a	88.0 dB(A)	n/a	TIO-540-J2BD	Piston	3342
GFNAV	PA31	Piper PA-31-350	n/a	88.0 dB(A)	n/a	TIO-540-J2BD	Piston	3342
GCDEA	SB20	Saab 2000	86.9	79.1	87.9	AE 2100A	Turboprop	22999
GCDEB	SB20	Saab 2000	86.9	79.1	87.9	AE 2100A	Turboprop	22999
GCDKA	SB20	Saab 2000	86.9	79.1	87.9	AE 2100A	Turboprop	22999
GCDKB	SB20	Saab 2000	86.9	79.1	87.9	AE 2100A	Turboprop	22999
GCERY	SB20	Saab 2000	86.9	79.1	87.9	AE 2100A	Turboprop	22999
GCERZ	SB20	Saab 2000	86.9	79.1	87.9	AE 2100A	Turboprop	22999
GCIEC	SB20	Saab 2000	86.9	79.1	87.9	AE 2100A	Turboprop	22999

Schedule 1b - Data from EASA Noise Certification Database							
London City Airport: Aircraft types	EASA Maximum Take Off Weight Range No. variations	Minimum	Average kg	Maximum	EASA (closest to avg MTOW) Lateral	Flyover EPNdB	Approach
Airbus A318	201	56,000	62,453	68,000	90.8	81.8	93.8
ATR 42	33	15,750	17,756	20,000	80.9	77.2	93.1
ATR 72	42	19,500	21,830	23,500	84.7	90.9	92.5
BAe 146-100	5	34,473	36,333	38,102	87.6	82.3	95.2
BAe 146-200	5	39,995	40,948	42,184	87.3	84.9	95.6
BAe 146-300	9	42,999	44,013	46,039	87.8	84.9	97.3
Canadair CL60	16	17,236	20,188	21,863	85.7	79.8	89.4
Cessna Citation C25A	2	5,613	5,642	5,670	86.1	75.5	89.7
Cessna Citation C25B	2	5,670	5,981	6,291	89.7	74.0	88.6
Cessna Citation C25C	2	7,688	7,724	7,760	92.8	75.4	89.5
Cessna Citation C510	1		3,921		85.0	73.9	86.0
Cessna Citation C525	4	4,717	4,808	4,853	83.6	73.6	89.7
Cessna Citation C550	7	6,033	6,312	6,713	87.5	71.2	87.7
Cessna Citation C560	5	7,212	7,435	7,634	95.9	82.9	85.7
Cessna Citation C56X	4	9,072	9,140	9,163	86.8	72.1	92.8
Cessna Citation C680	3	13,608	13,770	13,959	87.5	71.8	91.3
Dassault Falcon 10	3	8,500	8,670	8,755	86.2	82.2	95.2
Dassault Falcon 2000EX	41	16,238	18,893	19,414	91.7	79.8	91.0
Dassault Falcon 50	8	17,600	18,275	18,500	92.7	83.0	95.2
Dassault Falcon 900	13	20,639	21,518	22,226	90.5	79.8	92.3
Dassault Falcon 7X	3	31,298	31,449	31,751	90.1	81.9	92.6
Dornier 328	4	13,640	13,903	13,990	83.8	82.1	94.8
Dornier 328 Jet	2	15,200	15,430	15,660	89.8	76.5	92.1
Dash 8-400	46	27,987	28,919	29,574	84.0	78.0	94.8
Embraer 135	8	18,990	21,183	24,300	85.3	80.6	91.3
Embraer 170	56	34,000	36,744	38,600	93.0	81.5	93.6
Embraer 190	78	43,740	49,231	54,500	91.4	84.7	92.5
Fokker 50	10	19,950	20,646	20,820	85.0	81.0	96.6
Gulfstream G150	1		11,839		91.2	80.7	91.9
Learjet 40	-	-	-	-	-	-	-
Learjet 45	12	9,163	9,508	9,752	85.1	75.5	93.4
Piaggio 180	8	5,239	5,364	5,489	87.4		
Piper Navajo 31	1		3,538		85.4		
Raytheon Beechcraft 350	-	-	-	-	-	-	-
Raytheon Beechcraft 200	156	5,670	5,825	6,087	77.7		
Raytheon Beechjet 400	9	7,158	7,317	7,394	93.7	89.0	91.7
Raytheon Beechcraft 58	43	2,263	2,612	2,812	76.1		
Raytheon Hawker 800XP	8	12,186	12,534	12,700	86.6	76.7	94.9
RJ-85	8	36,287	40,864	43,998	88.7	81.9	96.9
RJ-100	8	42,900	44,355	46,039	88.2	84.7	97.6
Saab 2000	2	22,800	22,900	22,999	86.9	79.1	87.9

Schedule 2 – Noise Monitoring Locations

APPENDIX 10.2

ACR Stress Test Figures



LEGEND:

CADP ES Mix (111k) Noise Contours, 54 to 72 dB $L_{Aeq,16h}$ in 3 dB steps

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London City Airport
ACR Stress Test

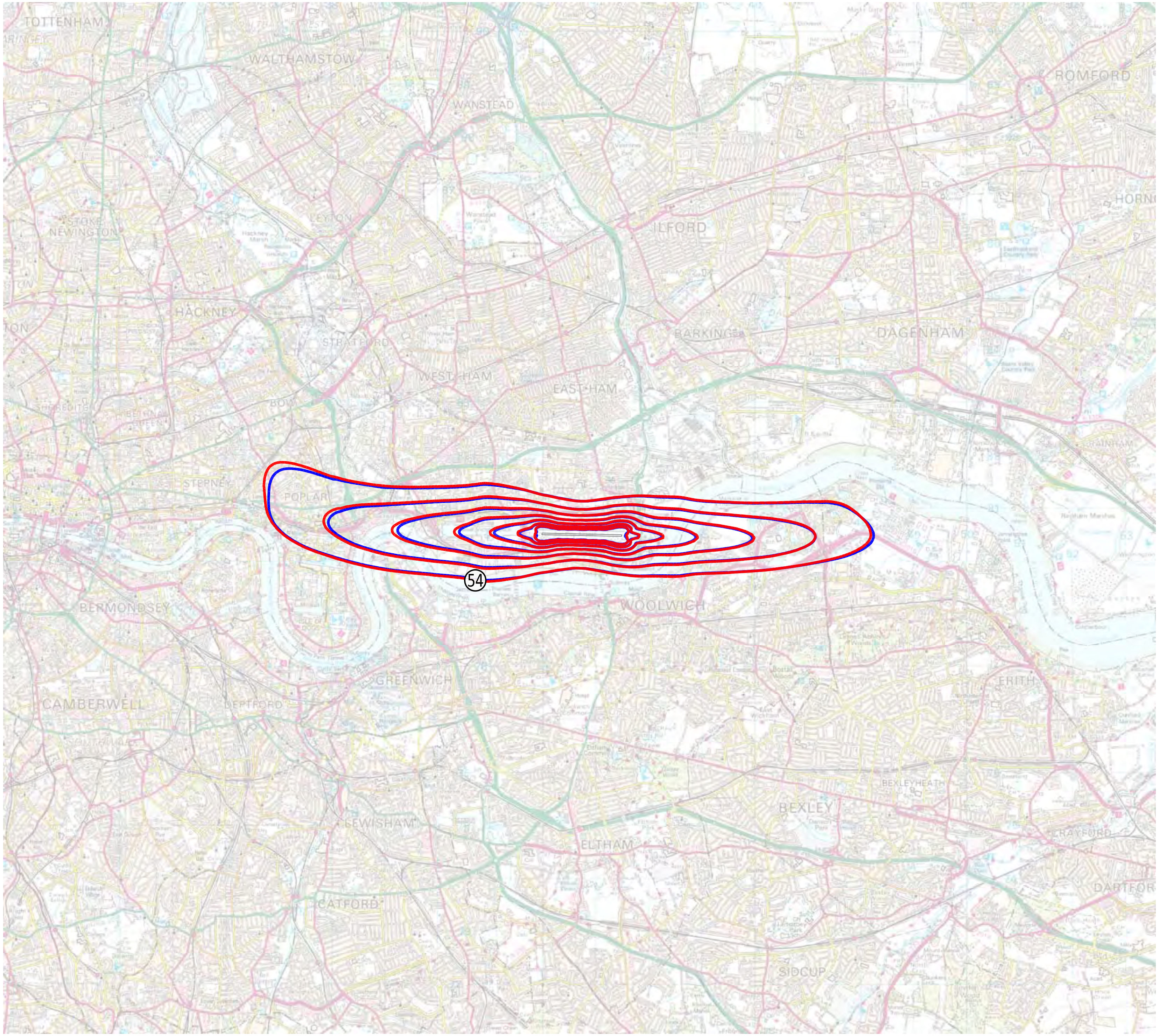
Airborne Aircraft Noise Contours
2023 With Development Principal Case

DRAWN: DR | CHECKED: PH

DATE: 30/10/2014 | SCALE: 1:100000@A4

FIGURE No:

Figure 10.2.1 C.10.1



LEGEND:

CADP ES Mix (111k) Noise Contours, 54 to 72 dB $L_{Aeq,16h}$ in 3 dB steps

120k Sensitivity Mix Noise Contours, 54 to 72 dB $L_{Aeq,16h}$ in 3 dB steps

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London City Airport
ACR Stress Test

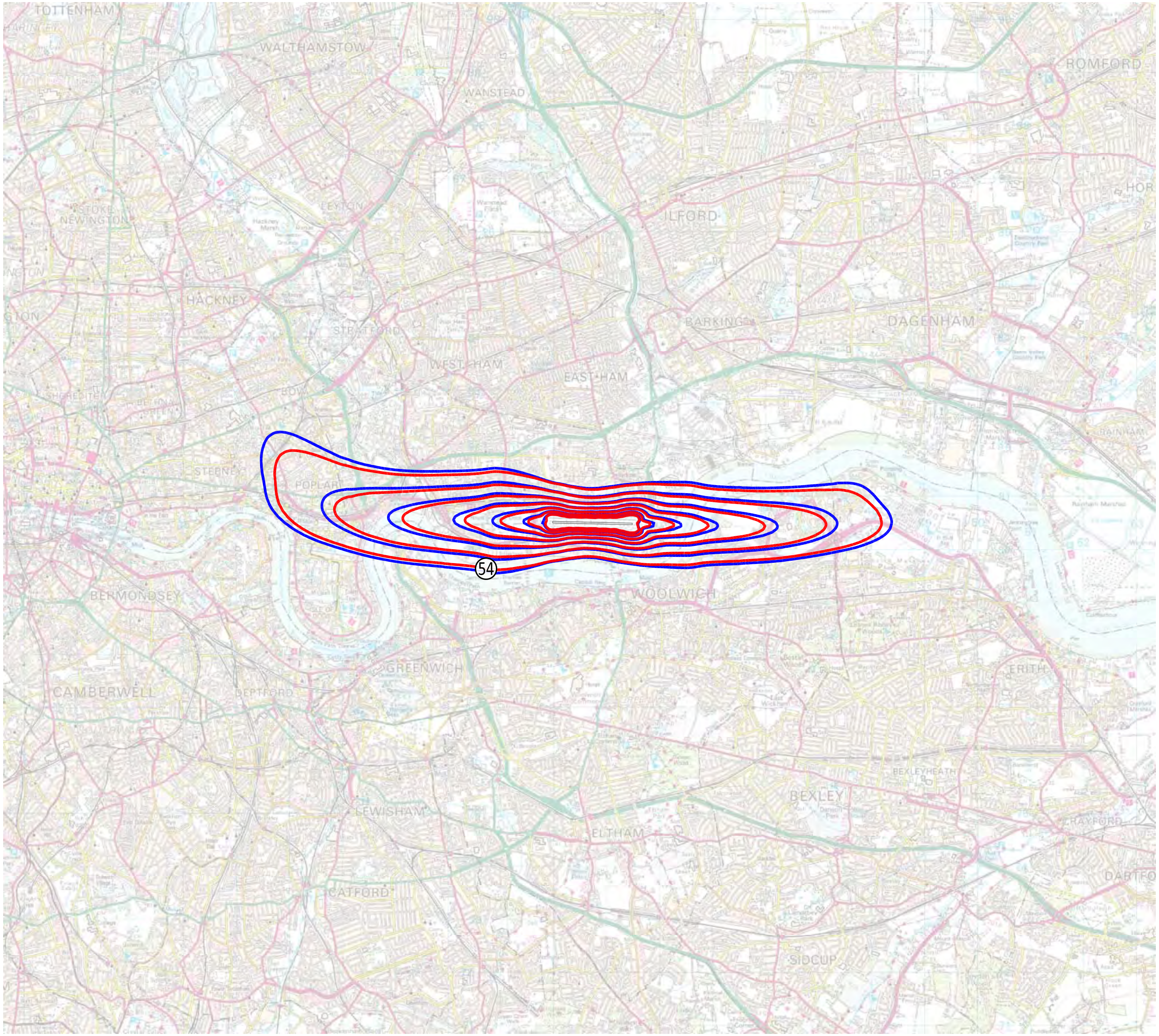
Airborne Aircraft Noise Contours
2023 With Development Principal Case
Vs 120k Sensitivity Mix

DRAWN: DR CHECKED: PH

DATE: 30/10/2014 SCALE: 1:100000@A4

FIGURE No:

Figure 10.2.2 C.10.2



LEGEND:

CADP ES Mix (111k) Noise Contours, 54 to 72 dB $L_{Aeq,16h}$ in 3 dB steps

111k ES Mix C100 replaced by E190 Noise Contours, 54 to 72 dB $L_{Aeq,16h}$ in 3 dB steps

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ACR Stress Test

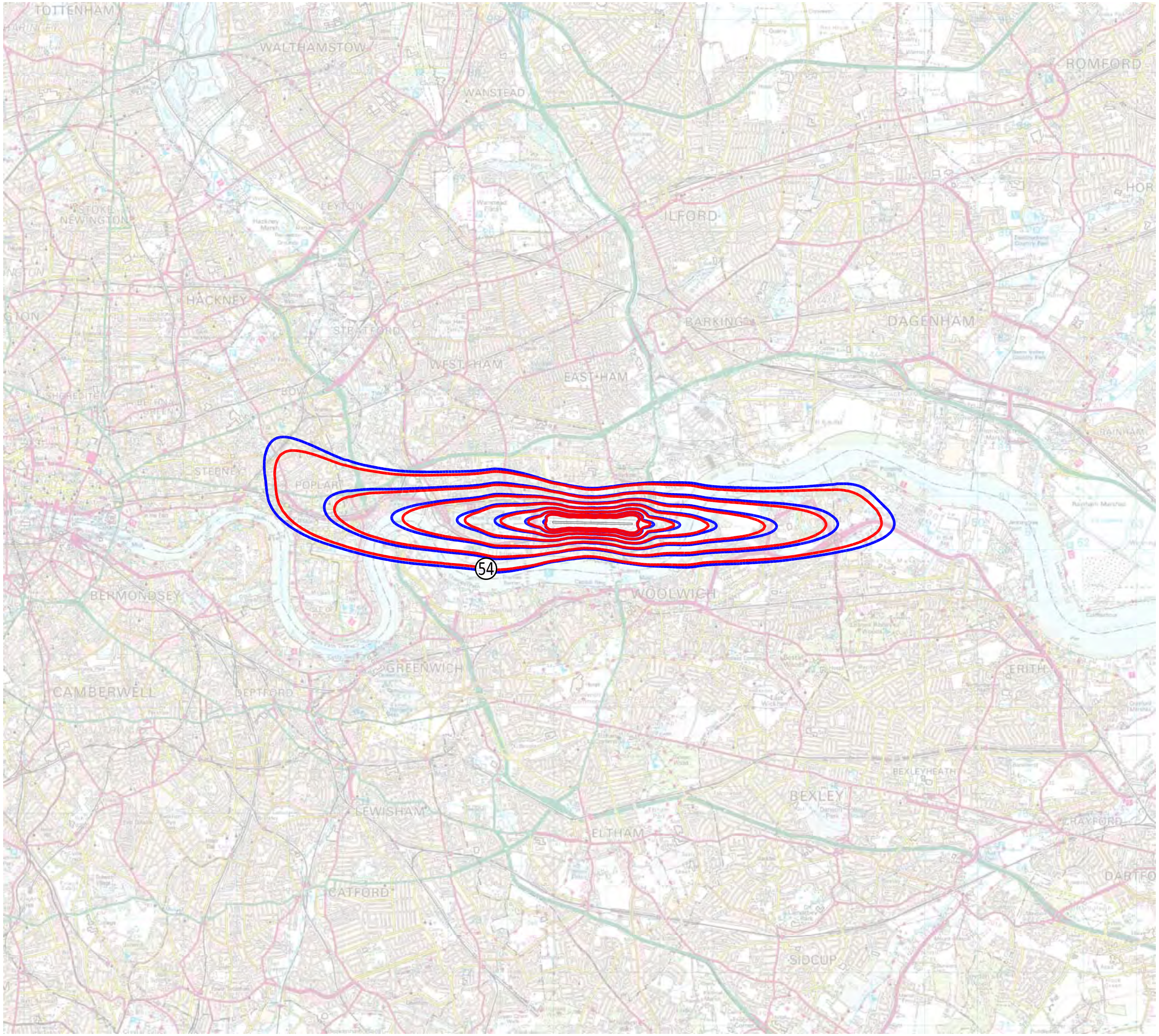
Airborne Aircraft Noise Contours
2023 With Development Principal Case
Vs 111k ES Mix C100 replaced by E190

DRAWN: DR CHECKED: PH

DATE: 30/10/2014 SCALE: 1:100000@A4

FIGURE No:

Figure 10.2.3 C.10.3



LEGEND:

CADP ES Mix (111k) Noise Contours, 54 to 72 dB $L_{Aeq,16h}$ in 3 dB steps

120k Sensitivity Mix C100 replaced by E190 Noise Contours, 54 to 72 dB $L_{Aeq,16h}$ in 3 dB steps

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2023 With Development Principal Case
Vs 120k Sensitivity Mix C100 replaced by E190

DRAWN: DR CHECKED: PH

DATE: 30/10/2014 SCALE: 1:100000@A4

FIGURE No:

Figure 10.2.4 C.10.4