Environmental Research and Consultancy Department

Noise Modelling for the Airports Commission: Methodology and Assumptions

October 2014

Executive Summary

The Environmental Research and Consultancy Department (ERCD) of the Civil Aviation Authority (CAA) has been commissioned by the Airports Commission to calculate forecast noise exposure contours for the three short-listed proposals to meet long-term capacity demand in the south east of the UK.

This document presents the methodology used, and assumptions made, in the calculation of the noise contours. The results are presented separately by the Airports Commission.

CHAPTER 1

Introduction

Background

1.1 The Environmental Research and Consultancy Department (ERCD) of the Civil Aviation Authority (CAA) has been commissioned by the Airports Commission to calculate forecast noise exposure contours for the three proposals to meet long-term capacity demand in the south east of the UK. The proposals are those that have been short-listed by the Airports Commission.

1.2 This document presents the methodology used, and assumptions made, in the calculation of the noise contours. These are addressed in Chapter 2, and given in terms of the various inputs to the modelling, i.e. routes, aircraft types, etc, and in each case are discussed in general terms before making any scenario-specific comments. The noise contour results are presented separately in documentation prepared by the Airports Commission.

1.3 In undertaking the work, account has been taken of the information presented in the Airports Commission Appraisal Framework on the modelling of aviation noise.

CHAPTER 2

Methodology

2.1 This section presents what has been calculated for each of the scenarios modelled.

Calculations

Noise metrics

2.2 Since 1990, the established index for relating the amount of aircraft noise exposure to community annoyance has been the Equivalent Continuous Sound Level metric, or Leq. In the UK this metric is applied to an average summer day (taking into account traffic between 16 June and 15 September inclusive) over 16 hours, between 07:00 and 23:00 local time. The background to the use of this metric is explained in DORA Report 9023[1].

2.3 The Airports Commission Appraisal Framework has introduced a number of additional noise metrics based on both average noise exposure and also on the number of noise events. Results have been calculated for the metrics listed below. The magnitude and extent of the aircraft noise around an airport is depicted on maps by plotting contours of constant metric values as described below.

- LAeq,16h metric calculated for average summer day movements over the 16-hour daytime period between 07:00 and 23:00. Noise exposure contours produced from 54 to 72 dB in 3 dB steps.
- LAeq,8h metric calculated for average summer night movements over the 8-hour night-time period between 23:00 and 07:00. Noise exposure contours produced from 48 to 72 dB, where relevant, in 3 dB steps.
- Lden metric calculated for the average annual daily movements over the 24-hour period, with weightings of 5 dB for evening (19:00 - 23:00) and 10 dB for night-time (23:00 - 07:00). Noise exposure contours produced from 55 to 75 dB in 5 dB steps.

[1] The Use of Leq as an Aircraft Noise Index, DORA Report 9023, Civil Aviation Authority, September 1990.

- N70 ‘number above’ metric, which describes the number of noise events (N) exceeding an outdoor maximum noise level of 70 dB LAmax, calculated for the average summer day movements over the 16-hour period between 07:00 and 23:00. Noise event contours produced of N greater than 20, 50, 100, 200 and 500 events where relevant.
- N60, similar to the N70 metric, but calculated for the average summer night movements over the 8-hour period between 23:00 and 07:00. Noise event contours produced of N greater than 25 and 50 events where relevant.
- Lnight metric calculated for the annual average daily movements over the 8-hour night period. Noise exposure contours produced from 50 to 70 dB in 5 dB steps. Although Lnight did not form part of the assessment framework, alongside Lden, it is one of the noise assessment metrics used by the European Commission under the Environmental Noise Directive.

Areas, Populations and Households

2.4 Estimates have been made of the numbers of people, households and the areas enclosed within the noise contours. The population data used for the current scenarios (scenarios are described in Chapter 3) are a 2013 update of the latest 2011 Census supplied by CACI Limited[2]. The population data used for the 2030, 2040 and 2050 scenarios are forecasts for these respective years also provided by CACI Limited.

2.5 The CACI population database contains data referenced at the postcode level. Population and household numbers associated with each postcode are assigned to a single co-ordinate located at the postcode’s centroid.

2.6 Populations and households are calculated by summing populations and households associated with postcodes that are enclosed by the contour boundaries. The results have been presented cumulatively, rather than per contour band.

2.7 Any people or households located within the new expanded airport boundaries for the proposal scenarios have been excluded from the

[2] www.caci.co.uk

population and household estimates. The area estimates include land within the airport boundaries.

Noise Sensitive Buildings

2.8 Estimates have been made of the numbers of noise sensitive buildings (NSBs) situated within the contours, using the InterestMap™ [3] 'Points of Interest' (2013) database. For the purposes of this study, the noise sensitive buildings that have been considered are schools, hospitals and places of worship.

2.9 The estimates have been made on the same basis as for the estimates presented in the Gatwick and Heathrow annual noise contour reports, as produced by ERCD for DfT.

Newly Affected People

2.10 The numbers of people newly affected by the proposals have been calculated. Threshold levels of 57 dB LAeq,16h and 55 dB Lden have been used as criteria for being newly affected under these metrics respectively.

2.11 The numbers of people newly removed from these contours have also been calculated. These have been combined with the numbers of newly affected people to give the numbers of net newly affected people. Positive results indicate that a proposal adds more people to the threshold level contours than it removes; negative results indicate that a proposal removes more people from the threshold level contours than it adds.

2.12 The proposal scenarios have been compared with both the current and the future do-minimum scenarios.

Monetisation

2.13 Monetisation estimates have been made based on the methodological guidance in the Airports Commission Appraisal Framework. They use the noise contour and population estimate results and consider: Annoyance, Sleep Disturbance, Acute Myocardial Infarction (AMI) and Hypertension.

2.14 The basis for the Annoyance calculations is the WHO Burden of

[3] InterestMap™ is distributed by Landmark Information Group Ltd and derived from Ordnance Survey 'Points of Interest' data.

Disease from Environmental Noise[4], which sets out a methodology for estimating the monetary value associated with environmental noise exposure based on the number of people estimated as highly annoyed based on the 24-hour Lden metric. The methodology first estimates the number of people described as highly annoyed and uses a recommended Disability Weighting (DW) of 0.02 in order to estimate the number of Quality Adjusted Life Years (QALYs) lost due to daytime annoyance. Recommended sensitivity values of DW of 0.01 and 0.12 were also used.

2.15 The Airports Commission Appraisal Framework, however, required that the monetary value be based on daytime annoyance, in order to avoid any risk of doubling counts with night-time sleep disturbance. Thus, there was a need to adjust the WHO recommended dose response relationship so that annoyance was expressed in terms of average summer day LAeq,16h. Although the Burden of Disease methodology recommends that LAeq,16h = Lden - 2, this in fact varies from airport to airport depending on the proportion of noise in the day, evening and night periods, and the variation between summer average and annual average day. Analysis of average summer day LAeq,16h and average annual day Lden data for Heathrow and Gatwick airports showed that the difference is 1.6 for both airports.

2.16 The basis for the Sleep Disturbance, AMI and Hypertension calculations is ERCD report 1209 ‘Proposed methodology for estimating the cost of sleep disturbance from aircraft noise’[5].

2.17 The annual noise costs have been integrated over the 60-year period following the opening year. Specialist economic advice was provided by Airports Commission consultants on relevant elements of this part of the calculation. An opening year of 2025 has been used for the Gatwick Airport Second Runway (LGW 2R) scheme, and 2026 for the Heathrow Airport Northwest Runway (LHR NWR) and Heathrow Airport Extended Northern Runway (LHR ENR) schemes, as advised by the Airports Commission.

[4] WHO Regional Office for Europe (2011), Burden of Disease Estimation from Environmental Noise, 2011.

[5],Proposed Methodology for Estimating the Cost of Sleep Disturbance from Aircraft Noise, ERCD Report 1209, January 2013.

Noise modelling

2.18 This section describes the noise model used to undertake the calculations.

The ANCON noise model

2.19 The noise contours were calculated using the UK Civil Aircraft Noise Contour model ANCON (version 2.3). The ANCON model is developed and maintained by ERCD on behalf of the Department for Transport (DfT) and is used for the production of historic and forecast contours for Heathrow, Gatwick and Stansted airports, and a number of regional airports in the UK. A technical description of ANCON is provided in R&D Report 9842[6].

2.20 ANCON is fully compliant with the latest European guidance on noise modelling, ECAC.CEAC Doc 29 (3rd edition), published in December 2005[7]. This guidance document represents internationally agreed best practice as implemented in modern aircraft noise models.

Noise calculations

2.21 Aviation noise is calculated for take-off and landing operations, accounting for engine and airframe noise. The contours show ‘air noise’, which comprises the noise from aircraft whilst flying in the air and when on the runway during the take-off and landing roll. Noise from ground-based activities such as aircraft taxiing and engine testing (‘ground noise’) is not considered here.

Scenarios

2.22 The Airports Commission specified a number of scenarios for which noise modelling results were required. The full list of scenarios is presented in Appendix B.

2.23 Each scenario has a unique identifier to explicitly identify the data relating to each scenario.

2.24 The scenarios are summarised as follows:

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[6] Ollerhead J B, Rhodes D P, Viinikainen M S, Monkman D J, Woodley A C, The UK Civil Aircraft Noise Contour Model ANCON: Improvements in Version 2. R&D Report 9842, July 1999

[7] European Civil Aviation Conference. Report on Standard Method of Computing Noise Contours around Civil Airports ECAC.CEAC Doc 29, 3rd edition, Volumes 1 & 2, December 2005

Current scenarios

2.25 Noise calculations for Heathrow and Gatwick airport using the latest set of data available for both airports. This includes:

- LAeq,16h and LAeq,8h metrics for 2013, taken from the annual noise contour reports (ERCD Reports 1401[8] and 1402[9]). The N70 and N60 noise contours were computed using the same underlying data;
- Lden and Lnight metrics for 2011 are those produced for the Round 2 noise mapping for the Environmental Noise Directive (ERCD reports 1204[10] and 1205[11]).

Do-minimum scenarios

2.26 Noise calculations for Heathrow and Gatwick airport using the most recent (2013) noise model data, with forecast traffic for 2030, 2040 and 2050.

Do-something scenarios

2.27 Noise calculations for the proposed schemes:

- Gatwick LGW 2R (Gatwick Airport Second Runway) for which a single proposal was modelled (i.e. with no sensitivity testing);
- Heathrow LHR NWR (Heathrow Airport Northwest Runway), for which three options were provided plus sensitivity testing:
  - Minimise total affected people (T)
  - Minimise newly affected people (N)
  - Provision of Respite (R)
  - Sensitivity testing was carried out for the Minimise total affected people (T) option for approaches on a 3.5 degree glide-slope, and for the scheme promoter's fleet mix.

[8] Noise Exposure Contours for Heathrow Airport 2013, ERCD report 1401, October 2014

[9] Noise Exposure Contours for Gatwick Airport 2013, ERCD report 1402, October 2014

[10] Strategic Noise Maps for Heathrow Airport 2011, ERCD report 1204, June 2013

[11] Strategic Noise Maps for Gatwick Airport 2011, ERCD report 1205, June 2013

- Heathrow LHR ENR (Heathrow Airport Extended Northern Runway), for which one option was modelled with a sensitivity test on an alternative operating mode.

National assessment scenarios

2.28 Noise calculations were undertaken for Gatwick do-minimum with Heathrow LHR NWR taken forward, and separately with Heathrow LHR ENR taken forward. Equivalent calculations were not carried out for Heathrow do-minimum with Gatwick LGW 2R taken forward, because a pre-screening exercise showed there was not likely to be a significant difference between this and the Heathrow do-minimum scenario.

Carbon-traded scenarios

2.29 Further noise calculations for the proposed schemes with traffic forecasts provided assuming carbon trading was undertaken.

CHAPTER 3
Input Data

3.1 In order to determine the aircraft noise exposure levels around an airport, information is required on the types of aircraft operating, the number of movements by each aircraft type, their noise characteristics and their position in three dimensions with respect to ground locations in the vicinity of the airport. The following sections describe the various input data requirements.

Aircraft models

Existing aircraft

3.2 The ANCON noise model uses a series of aircraft datasets to represent the real aircraft types that are included in a scenario. These are referred to as ANCON types.

3.3 For existing aircraft types, radar data and noise measurements are collected from around Heathrow and Gatwick Airports. The radar data is used to generate aircraft performance information, which along with the noise source database, allows the noise emissions associated with aircraft operations to be estimated. The noise measurements allow for validation of the aircraft noise source and propagation characteristics.

3.4 An illustration of the techniques used in processing radar and noise monitoring data, including an illustration of noise monitoring locations used by ERCD is provided in ERCD Report 0406[12]. The most recent noise monitoring positions used are reported in CAP 1149.[13]

3.5 The ANCON types are based on these data, which is reviewed and updated annually as part of the generation of average summer day noise contours. Collecting local data and reviewing it on a regular basis ensures that the ANCON databases reflect local practices and

[12] Techniques used by ERCD for the Measurement and Analysis of Aircraft Noise and Radar Data, ERCD Report 0406, January 2005. ISBN 1-904862-13-6

[13] Noise Monitor Positions at Heathrow, Gatwick and Stansted Airports, CAP 1149, March 2014, Civil Aviation Authority.

procedures, such as the requirements stipulated in the Aeronautical Information Publication (AIP).

3.6 For this analysis for the Airports Commission, information relating to existing aircraft types was based on radar data and noise measurements for 2013.

Imminent and future aircraft

3.7 Paragraphs 5.6 to 5.12 of the Airports Commission Discussion Paper 5: Aviation Noise summarises how over the last fifty years new aircraft have become progressively quieter, and how this trend is expected to continue out to 2020. It also reported on how beyond 2020, the International Civil Aviation Organization (ICAO) anticipates that the rate of noise reduction might reduce somewhat but still continue on a downward path.

3.8 To reflect this in the noise modelling, the same approach has been used as in previous assessments and described in ERCD Report 0307[14]. For each imminent and future aircraft type, an explicit ‘surrogate’ has been chosen from the ANCON type models for 2013, a similar aircraft type whose certificated noise levels are known.

3.9 The ANCON type for a given imminent or future aircraft type is derived by taking the noise model data for the surrogate aircraft, and adjusting it based on the differences between the future type’s predicted certification data (based on available manufacturers’ data and current industry knowledge) and the surrogate aircraft’s known data.

3.10 Further information on the process and rationale is summarised in Appendix C.

Vertical profiles

3.11 Departing aircraft are modelled using the average departure profiles calculated during the 2013 review (see 3.6 and 3.8). Consequently, each ANCON type is modelled with its own profile based on recent operations.

3.12 For clarity, no specific departure angle is assumed for noise

[14] Updated Methodology and Supplementary Information Relating to Future Aircraft Noise Exposure Estimates for UK Airports, ERCD Report 0307, December 2003. ISBN 1-904763-34-0

modelling. Aircraft do not depart at a fixed climb angle, as their rate of climb is dependent on an aircraft's fundamental performance characteristics, its take-off weight, local meteorological conditions and any procedural constraints.

3.13 Arriving aircraft are assumed to follow standard ILS approaches in all scenarios. Approaches are modelled based on the average profiles calculated during the 2013 review. These incorporate a 3 degree glide path from around 3,000 ft altitude to ground level (from approximately 17.5 km distance to the runway threshold). Before this point, any level flight segments flown prior to joining the ILS are incorporated in the average arrival profile.

3.14 The standard profiles have been adjusted to represent the 3.2 degree glide path that is assumed for all future scenarios. This decision was made on the basis that systematic non-site-specific developments should be applied to all scenarios so that the assessment can be made on a comparable basis. 3.2 degrees was chosen as this represents the best approximation to all the proposals.

3.15 A sensitivity test has been undertaken for the Heathrow LHR NWR scheme (minimise total people affected) in 2050 with the glide path angle adjusted to 3.5 degrees (scenario ID: H50-3R-T-35).

3.16 The application of reverse thrust following touchdown was modelled for all ANCON types where applicable.

Runways

3.17 Information on runway ends and any displaced thresholds were provided by scheme proposers. Specific details are as follows:

Current and do-minimum scenarios

3.18 The existing runways and thresholds at Heathrow and Gatwick airports were used for these scenarios.

Gatwick LGW 2R

3.19 For the proposal scenarios, the runway thresholds provided by the scheme promoter were used for the existing and second runway.

Heathrow LHR NWR

3.20 Details for the existing and third runway, as required for noise modelling purposes, have been provided by the scheme promoter.

Heathrow LHR ENR

3.21 The coordinates of the existing south runway have been used.

3.22 The runway coordinates for the northern runway ends were provided by the scheme promoter, and have been used in the noise modelling.

3.23 Because the northern runway extension shortens the existing northern runway, LeighFisher (consultants to the Airports Commission) identified that 3 to 10% of ICAO Code E and Code F aircraft departures would be required to use only the south runway. However, the Airports Commission concluded that it was not necessary to reflect this level of complexity in the noise modelling for reasons of proportionality.

3.24 It was assumed that landing runway thresholds were not displaced for any runway.

Routes

3.25 All proposals assume departing aircraft follow standard instrument departures (SIDs). ERCD provided Jacobs with information on historical SID usage by aircraft type for Heathrow and Gatwick in 2013. It is understood that Jacobs used this information as a basis to allocate aircraft to SIDs for the proposal scenarios, which LeighFisher used to develop traffic forecasts for each scenario. These traffic forecasts were provided as inputs to the noise modelling, and included the allocation of operations to SIDs.

3.26 Departure routes for do-minimum and do-something scenarios assume use of Performance-Based Navigation (PBN). Therefore, departure flight path dispersion settings were adjusted, based on an analysis of radar data from Heathrow and Gatwick of aircraft undertaking PBN departure operations.

3.27 Arrival operations have been allocated equally to arrival routes on a pro-rata basis. Arrival routes for the do-minimum and do-something scenarios use representative arrival dispersion settings for Heathrow and Gatwick respectively.

3.28 It is understood that NATS have reviewed and approved the proposed route designs on behalf of the Airports Commission, and that they are compatible with anticipated future airspace and navigational technology.

3.29 Departure and arrival routes have been provided to the Airports Commission in graphical and CAD formats. Details specific to the scenarios and schemes are given below.

Do-minimum scenarios

3.30 The mean tracks calculated for operations during summer 2013 have been used as the routes for the Gatwick base case scenarios. The routes used in 2013 analysis work concerning the ending of the Cranford Agreement were used for the Heathrow base case scenarios. Dispersion has also been calculated for the 2013 summer period and applied to the modelled routes.

Gatwick LGW 2R

3.31 The Airports Commission, NATS agreed that the scheme promoter's proposed departure routes represented the best available estimate for a two parallel-runway airport. It is understood that all proposed departure routes will integrate into existing and future LAMP strategies (see 3.28).

3.32 Arrival routes were developed comprising a separate base leg from the south for each runway and direction, and were agreed with the Airports Commission and NATS.

Heathrow LHR NWR

3.33 The scheme promoter proposed three different airspace designs, each with varying departure and arrival routes, depending on what noise outcome was desired. It was concluded that these represented the best available data and are summarised as follows:

- minimise the total number of people affected by noise
- minimise the number of people newly affected by noise
- provision of respite

3.34 It is understood that Point Merge will not be taken forward at Heathrow due to the limitations on the use of vectoring. Some of the routes for this scheme incorporate off-set approaches.

Heathrow LHR ENR

3.35 Departure routes are based on the indicative mixed mode departure routes used in the 2007 analysis for the Project for the Sustainable

Development of Heathrow (PSDH)[15]. The westerly departure routes from the north runway are displaced to incorporate the extended runway.

3.36 Five different operating modes are presented by the scheme promoter in section 3.3.3 of their scheme proposal[16]. Departure routes have been developed for the 'Peak Flow' operating mode, and also for a sensitivity test on using the five operating modes as presented in the scheme proposals. This is denoted the ‘respite’ scenario, and additional southbound departure routes from the northern runways have been agreed with NATS where required to reflect the forecast.

3.37 Arrival routes are those used in the PSDH analysis and comprise three ‘herring-bone’ base leg joins to the final approach. Approach streams to the northern runways are from the north, and approach streams to the southern runway are from the south. The curved, angled and off-set approach principles that were presented by the scheme promoter have not been modelled as these were not sufficiently well-defined.

Traffic

3.38 LeighFisher provided average summer and average annual aircraft movement numbers by aircraft type, time period (day, evening and night, as needed for the noise metrics), and SID for each scenario.

3.39 Because future ANCON types are represented by adjustments to existing types, they are also linked to a manufacturer. In contrast the forecasts are more generic, with imminent and future aircraft types listed as generic types by seat capacity, rather than a specific aircraft type. In such cases, the forecast was allocated to ANCON types on the basis of equal market share, i.e. movements were allocated equally amongst all manufacturers providing one or more suitable aircraft, then the movements for each manufacturer were divided equally amongst their respective aircraft. Further information on this approach is given in Appendix A of ERCD Report 0307 mentioned previously.

[15] Revised Future Aircraft Noise Exposure Estimates for Heathrow Airport, ERCD 0705, November 2007

[16] HH/RIL Updated Scheme Design document, dated May 2014

3.40 The forecasts are assumed to be compatible with the proposers' anticipated maximum hourly throughput.

3.41 In order to support these numbers of operations, A-CDM is assumed to be active for these scenarios.

3.42 Appendix D provides a breakdown of the traffic forecasts for average summer 16-hour day and 8-hour night for the scenarios modelled.

3.43 Sensitivity testing has been undertaken for the Heathrow LHR NWR scheme for the minimise total people affected scenario, using the fleet mix used in the Heathrow Airport Ltd submission (scenario ID: H-3R-T-F). The traffic forecast for this was provided by LeighFisher for 2030 and 2040 (the years assessed by Heathrow Airport Ltd), and the noise modelling results calculated on the same basis as for the other scenarios.

Operating modes

Westerly/Easterly runway modal split

3.44 The future scenarios are modelled using a common set of westerly/easterly runway modal splits for each airport respectively. For the summer LAeq,16h and N70 metrics, these are based on the average of the modal splits for the previous 20 years. For the other metrics, they are based on the average of the modal splits for the previous 5 years for Heathrow, and 10 years for Gatwick, as shown here:

Time period (metric)	Modal split (% westerly),	
	Gatwick	Heathrow
Summer day (LAeq,16h, N70)	74	77
Summer night (LAeq,8h, N60)	78	83
Annual 12-hour day (Lden component)	67	70
Annual 4-hour evening (Lden component)	68	70
Annual 8-hour night (Lden component and Lnight)	68	72

3.45 The Heathrow do-minimum scenario (H-2R), and Heathrow LHR ENR (H-HH-X) and Heathrow LHR NWR (H-3R-T, H-3R-N and H-3R-R) proposal scenarios reflect the average modals splits for Heathrow. The Gatwick do-minimum (G-1R) and LGW 2R (G-2R-X) scenarios reflect the average modal splits for Gatwick.

Gatwick LGW 2R

3.46 The layout of the Gatwick proposal indicates that there will be higher demand for landing on the northern runway. However, in the absence of quantitative information on this aspect, landing traffic has been apportioned equally across both runways where possible.

3.47 Compass departures are proposed by the scheme promoter and the forecast allocates operations to the available SIDs. Balancing SIDs have been used to apportion departing traffic equally across both runways where possible. The Airports Commission has informed us that the SIDs will enable one-minute departure splits if required.

Heathrow LHR NWR

3.48 Each of the three options listed in 3.33 is treated as a separate analysis scenario, i.e. for H-3R-T, H-3R-N and H-3R-R there is no combining of route options in any model runs.

3.49 However, within each of these options, four runway operating modes are proposed by the scheme promoter, who advised that these modes will be used equally (the mode will change once per day on a four-day cycle). Since the modelling is concerned with long-term averages, each mode is assumed to operate for 25% of the time.

3.50 The four modes comprise the new and south runways being used for different combinations of departures, landings or mixed-mode operation (both departures and landings), and the existing north runway for departures or landings.

3.51 Compass departures are proposed by the scheme promoter and the forecast allocates operations to the available SIDs. Balancing SIDs have been used to apportion departing traffic equally between both the departures and mixed mode runways where possible within each operating mode.

Heathrow LHR ENR

3.52 As mentioned in 3.36, the Heathrow LHR ENR scheme proposes five operating modes that are to occur during specific time periods each day. The Airports Commission has stated that by 2037, runway demand will exceed supply at Heathrow with three runways. In this case, it will only be possible to use the Peak Flow mode. Therefore, as advised by the Airports Commission, the do-something scenarios for the Heathrow LHR ENR (H-HH-X) scheme have been modelled using the 'Peak Flow' operating mode throughout.

3.53 The analysis for 2030 includes a sensitivity test on the use of the five operating modes, denoted as the ‘respite’ scenario (scenario ID: H30-HH-R). LeighFisher has provided information to apportion the forecast traffic for 2030 amongst the modes. This is necessary for cases where more than one operating mode occurs during a given time period.

3.54 Compass departures have been proposed by the scheme promoter, and the forecast allocates operations to the available SIDs. Balancing SIDs have been used to equalise the traffic between the north and south runways where possible.

Compatibilities

3.55 The modelling assumed the following technological concepts being in place by the respective assessment years.

- Performance Based Navigation
- Steeper ILS approaches

3.56 It should be noted that some scenarios for LHR NWR also included off-set approaches

APPENDIX A

Glossary

A-CDM	Airport Collaborative Decision Making
ANCON	The UK Civil Aircraft Noise Contour model, developed and maintained by ERCD.
dB	Decibel units describing sound level or changes of sound level.
dBA	Units of sound level on the A-weighted scale, which incorporates a frequency weighting approximating the characteristics of human hearing.
CAD	Computer Aided Design
DfT	Department for Transport (UK Government)
ECAC	European Civil Aviation Conference
ERCD	Environmental Research and Consultancy Department of the Civil Aviation Authority.
ILS	Instrument Landing System; a ground-based system that provides precision guidance to an aircraft approaching and landing on a runway.
LAeq,16h	Equivalent sound level of aircraft noise in dBA, often called 'equivalent continuous sound level'. For conventional historical contours this is based on the daily average movements that take place within the 16-hour period (0700-2300 local time) over the 92-day summer period from 16 June to 15 September inclusive.
LAeq,8h	Equivalent sound level of aircraft noise in dBA often called 'equivalent continuous sound level'. This is based on the daily average movements that take place within the 8-hour period (2300-0700 local time) over the 92-day summer period from 16 June to 15 September inclusive.
Lden	Equivalent sound level of aircraft noise in dBA for the average 24-hour annual period with 5 dB weightings for Levening and 10 dB weightings for Lnight.
Lnight	Equivalent sound level of aircraft noise in dBA for the average 8-hour annual night period (2300-0700 local time).
LAMP	London Airspace Modernisation Programme
N70 & N60	'Number above' contours describe the number of noise events (N) exceeding an outdoor maximum noise level of 70 dBA Lmax for N70 (based on an average summer's 16-hour day), and 60 dBA Lmax for N60 (based on an average summer's 8-hour night).
PBN	Performance-based navigation

Point Merge	Point Merge is a system by which aircraft, in a queue to land, fly an extended flight path around an arc instead of holding in circular stacks.
SID	Standard Instrument Departure

APPENDIX B

Scenarios

Scenario		Assessment year			
		2011/13	2030	2040	2050
Current scenarios					
Gatwick		G11-1R / G13-1R	G30-1R	G40-1R	G50-1R
Heathrow		H11-2R / H13-2R	H30-2R	H40-2R	H50-2R
Do-minimum scenarios					
Gatwick		-	G30-1R	G40-1R	G50-1R
Heathrow		-	H30-2R	H40-2R	H50-2R
Do-something scenarios					
Gatwick	No sensitivity test	-	G30-2R-X	G40-2R-X	G50-2R-X
Heathrow LHR NWR	Minimise total affected	-	H30-3R-T	H40-3R-T	H50-3R-TR
	Minimise newly affected	-	H30-3R-N	H40-3R-N	H50-3R-N
	Respite option	-	H30-3R-R	H40-3R-R	H50-3R-R
	Sensitivity 3.5° approach	-	-	-	H50-3R-T-35
	Sensitivity HAL fleet*	-	H30-3R-T-F	H40-3R-T-F	-
Heathrow LHR ENR	No sensitivity test (Peak Flow operating mode)	-	H30-HH-X	H40-HH-X	H50-HH-X
	Respite operating modes	-	H30-HH-R	-	-
National assessment scenarios					
Gatwick do-minimum with Heathrow LHR NWR*		-	G30-1R-3R	G40-1R-3R	G50-1R-3R
Gatwick do-minimum with Heathrow LHR ENR*		-	G30-1R-HH	G40-1R-HH	G50-1R-HH
Carbon-traded scenarios					
Gatwick LGW 2R		-	G30-2R-X-C	G40-2R-X-C	G50-2R-X-C
Heathrow LHR NWR		-	H30-3R-T-C	H40-3R-T-C	H50-3R-T-C
Heathrow LHR ENR		-	H30-HH-X-C	H40-HH-X-C	H50-HH-X-C

* LAeq,16h, LAeq,8h and Lden metrics only

APPENDIX C

Future Aircraft Types for Forecasting

Introduction

The requirement to forecast aircraft noise exposure to 2050 necessitates the definition of future aircraft types and their associated noise characteristics.

Historical trends clearly show that each generation of aircraft are quieter than their predecessor, significantly so in some cases. This is a reflection of the introduction of new technologies, of which some are aimed purely at reducing aircraft noise, whilst others are, for example, aimed at reducing fuel burn.

This changing of noise performance over time necessitates the need to take into account how the aircraft fleet will change.

Methodology

For each future aeroplane type, an explicit 'surrogate' has been chosen; a similar aircraft type whose certificated noise levels are known. For a given future type, the noise model data for this surrogate aircraft are then adjusted based on the differences between the future type's predicted certification data and the surrogate aircraft's known data.

The same approach has been used as in previous assessments such as the noise study undertaken in support of the Department for Transport's (DfT) Consultation: Adding Capacity at Heathrow Airport, which formed part of the Project for the Sustainable Development of Heathrow (PSDH)[17].

Future aircraft types

The assumptions on the noise characteristics of the future aircraft types presented in this assessment are based on the latest available data. They update the assumptions used in the previous ERCD studies and are aligned to the ICAO report on long-term noise technology goals[18] and guidance in The

[17] ERCD Report 0705, Revised Future Aircraft Noise Exposure Estimates for Heathrow Airport, November 2007. www.caa.co.uk/ERCDreport0705

[18] ICAO (2014), Report by the Second CAEP Noise Technology Independent Expert Panel, ICAO Doc. 10017, ISBN 978-92-9249-401-8, ICAO, 2014.

Sustainable Aviation Noise Road-Map[19]. There are two categories of future aircraft:

- Imminent aircraft types incorporating Generation 1 technology with significant fuel burn and noise benefits. These have recently entered, or are currently offered for sale to the market, and include all-new aircraft as well as re-engined aircraft.
- Future aircraft types incorporating Generation 2 technology, which aim to achieve the noise goals set out in Flightpath 2050[20]. These types are envisaged to eventually replace the Imminent Generation 1 aircraft.

In the former case, the noise characteristics are well-defined. In the latter case, the assumptions are based on expected technological advances and underlying trends as well as the entry into service (EIS) date of the Generation 2 aircraft type relative to Generation 1 predecessors.

Use has been made of the ICAO and Sustainable Aviation assumption of a 0.1 dB/year baseline rate of improvement from the Generation 1 introduction dates (assuming no technological step-changes or major configuration changes). Tables C1 and C2 below identify the new types, presenting the category, types, number of seats and approximate entry into service year.

[19] The SA Noise Road-Map, A Blueprint for Managing Noise from Aviation Sources to 2050. 2013, Sustainable Aviation.

[20] Flightpath 2050, Europe's Vision for Aviation. 2011, European Commission.

Table C1: Generation 1 Imminent aircraft types and modelling assumptions

Aircraft category	Aircraft type	Seats	Approx. entry into service
Airbus single-aisle	A319 NEO	120	2016
Airbus single-aisle	A320 NEO	150	2016
Airbus single-aisle	A321 NEO	180	2016
Airbus twin-aisle	A350-800	250	2014
Airbus twin-aisle	A350-900	300	2015
Airbus twin-aisle	A350-1000	350	2016
Airbus very large	A380-900	650	2020
Boeing single-aisle	B737-7 MAX	140	2017
Boeing single-aisle	B737-8 MAX	170	2018
Boeing single-aisle	B737-9 MAX	180	2018
Boeing twin-aisle	B777-8X	353	2019
Boeing twin-aisle	B777-9X	407	2019
Boeing twin-aisle	B787-8	210-250	2012
Boeing twin-aisle	B787-9	250-290	2014
Boeing twin-aisle	B787-10	300-330	2017
Boeing very large	B747-8	470	2012
Boeing very large	B747-8F	n/a	2011
Generic regional jet	E175-E2	80	2020
Generic regional jet	E190-E2	97	2018
Generic regional jet	E195-E2	118	2019

Table C2: Generation 2 Future aircraft types and modelling assumptions

Aircraft category	Aircraft type	Seats	Approx. entry into service
Large twin-turboprop	LTT G2	80	2025
Airbus single-aisle	A319 NEO G2	120	2025
Airbus single-aisle	A320 NEO G2	150	2025
Airbus single-aisle	A321 NEO G2	180	2025
Airbus twin-aisle	A350-800 G2	250	2035
Airbus twin-aisle	A350-900 G2	300	2040
Airbus twin-aisle	A350-1000 G2	350	2040
Airbus very large	A380-800 NEO G2	550	2040
Airbus very large	A380-900 NEO G2	650	2040
Boeing single-aisle	B737-7 MAX G2	140	2025
Boeing single-aisle	B737-8 MAX G2	170	2025
Boeing single-aisle	B737-9 MAX G2	180	2025
Boeing twin-aisle	B777-8X G2	350	2040
Boeing twin-aisle	B777-9X G2	400	2040
Boeing twin-aisle	B787-8 G2	220	2035
Boeing twin-aisle	B787-9 G2	250	2040
Boeing twin-aisle	B787-10 G2	300	2040
Boeing very large	B747-8 G2	470	2040
Generic regional jet	E175-E2 G2	80	2035
Generic regional jet	E190-E2 G2	97	2035
Generic regional jet	E195-E2 G2	118	2035

APPENDIX D

Traffic Forecasts

Table D1: 16-hour average summer day air traffic forecast for Heathrow Airport current, do minimum and North West Runway scenarios

Seat Cat.	Aircraft Type	2013	DM 2030	DM 2040	DM 2050	LHR-NWR 2030	LHR-NWR 2040	LHR-NWR 2050
1	Small twin-turboprop	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	Bombardier RJ100/200	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	Large twin-turboprop	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	Embraer 135/145	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	Executive Jet (Chapter 2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	Executive Jet (Chapter 3)	0.3	9.0	5.0	2.1	21.2	30.6	9.2
1	New G1 CL1	0.0	0.0	0.0	2.4	0.0	0.0	0.0
1	New G2 Post 2030 CL1	0.0	0.0	0.0	3.6	0.0	0.0	0.0
1	New G3 Post 2040 CL1	0.0	0.0	0.0	1.8	0.0	0.0	0.0
2	BAe 146/Avro RJ	1.8	0.0	0.0	0.0	0.0	0.0	0.0
2	Airbus A318	3.2	1.5	0.0	0.0	1.9	0.0	0.0
2	Airbus A319	263.9	21.0	0.0	0.0	28.6	0.0	0.0
2	Boeing 717	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2	Boeing 737-200/300/400/500	11.7	0.0	0.0	0.0	0.0	0.0	0.0
2	Boeing 737-600/700/Freight Dom	23.5	10.1	0.0	0.0	12.5	0.0	0.0
2	Bombardier RJ 700/900	2.1	0.0	0.0	0.0	0.0	0.0	0.0
2	Bombardier C Series	0.0	5.4	3.6	1.0	6.7	5.3	1.5
2	Bombardier DHC-8 Q400	0.0	50.0	41.0	29.4	61.9	60.8	47.8
2	Embraer 170/175	0.0	0.0	0.0	0.4	0.0	0.0	0.0
2	Embraer 190/195	3.3	18.0	3.6	0.9	22.2	5.3	1.5
2	Fokker 100	4.7	0.0	0.0	0.0	0.0	0.0	0.0
2	New Gen Post 2016 B737-600/700	0.0	18.0	15.3	4.0	22.3	22.7	6.5
2	Post 2016 G2 Airbus A319/320	0.0	150.0	137.3	26.1	240.9	243.6	42.1
2	New G1 CL2	0.0	29.6	73.4	49.6	36.7	108.9	80.8
2	New G2 Post 2030 CL2	0.0	0.0	18.4	36.9	0.0	27.3	60.1
2	New G3 Post 2040 CL2	0.0	0.0	0.0	12.3	0.0	0.0	20.1
3	Airbus A300	3.7	0.0	0.0	0.0	0.0	0.0	0.0
3	Airbus A310	0.4	0.0	0.0	0.0	0.0	0.0	0.0
3	Airbus A320/321	485.4	89.3	0.0	0.0	124.5	0.0	0.0
3	Airbus A350-800	0.0	49.4	42.6	5.7	74.9	72.0	10.3

Seat Cat.	Aircraft Type	2013	DM 2030	DM 2040	DM 2050	LHR-NWR 2030	LHR-NWR 2040	LHR-NWR 2050
3	Boeing 737-800/900	19.0	23.6	0.0	0.0	37.0	0.0	0.0
3	Boeing 757-200/300	17.1	0.0	0.0	0.0	0.0	0.0	0.0
3	Boeing 767-200	0.9	0.0	0.0	0.0	0.0	0.0	0.0
3	McDonnell Douglas MD80 series	1.4	0.0	0.0	0.0	0.0	0.0	0.0
3	Ilyushin Il-62	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	New Gen Post 2016 B737-800/900	0.0	103.1	92.3	12.6	161.6	167.6	24.3
3	Post 2016 G2 Airbus A321	0.0	103.1	92.3	12.6	161.6	167.6	24.3
3	New G1 CL3	0.0	77.9	190.9	161.8	118.0	322.7	292.1
3	New G2 Post 2030 CL3	0.0	0.0	41.4	291.3	0.0	69.9	526.1
3	New G3 Post 2040 CL3	0.0	0.0	0.0	98.9	0.0	0.0	178.5
4	Airbus A330-200/300	47.3	15.3	0.0	0.0	20.8	0.0	0.0
4	Airbus A340-200/300	10.4	0.0	0.0	0.0	0.0	0.0	0.0
4	Airbus A350 PAX/900	0.0	53.1	48.1	8.2	62.0	59.4	12.0
4	Boeing 767-300/400	85.3	0.0	0.0	0.0	0.0	0.0	0.0
4	Boeing 787	6.9	155.9	136.1	20.8	210.9	194.3	35.2
4	McDonnell Douglas MD11	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	New G1 CL4	0.0	58.4	82.8	61.7	68.2	102.2	90.0
4	New G2 Post 2030 CL4	0.0	0.0	47.7	120.9	0.0	58.9	176.4
4	New G3 Post 2040 CL4	0.0	0.0	0.0	96.6	0.0	0.0	140.9
5	Airbus A340-500/600	18.7	7.1	0.0	0.0	7.7	0.0	0.0
5	Boeing 747-300	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Boeing 747-400	76.9	0.0	0.0	0.0	0.0	0.0	0.0
5	Boeing 747-8/Freight Intl	0.0	59.8	45.2	11.2	60.9	49.2	10.7
5	Boeing 777	151.0	127.9	66.3	0.9	132.7	72.7	1.0
5	New G1 CL5 (Twin)	0.0	21.0	30.7	10.5	21.1	31.0	9.3
5	New G2 Post 2030 CL5	0.0	0.0	40.6	87.3	0.0	41.1	76.8
5	New G3 Post 2040 CL5	0.0	0.0	0.0	57.6	0.0	0.0	50.7
6	Airbus A380 pax	20.0	26.0	24.0	1.4	31.3	28.6	1.1
6	New G1 CL6	0.0	0.0	0.0	13.0	0.0	0.0	10.3
6	New G2 Post 2030 CL6	0.0	0.0	0.0	7.4	0.0	0.0	5.9
6	New G3 Post 2040 CL6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total		1258.8	1283.6	1278.5	1251.2	1748.1	1941.9	1945.5

Table D2: 8-hour average summer night air traffic forecast for Heathrow Airport current, do minimum and North West Runway scenarios

Seat Cat.	Aircraft Type	2013	DM 2030	DM 2040	DM 2050	LHR-NWR 2030	LHR-NWR 2040	LHR-NWR 2050
1	Small twin-turboprop	0.1	0.0	0.0	0.0	0.0	0.0	0.0
1	Bombardier RJ100/200	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	Large twin-turboprop	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	Embraer 135/145	0.1	0.0	0.0	0.0	0.0	0.0	0.0
1	Executive Jet (Chapter 2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	Executive Jet (Chapter 3)	0.0	0.0	0.0	0.4	0.0	0.0	1.0
1	New G1 CL1	0.0	0.0	0.0	0.5	0.0	0.0	0.0
1	New G2 Post 2030 CL1	0.0	0.0	0.0	0.7	0.0	0.0	0.0
1	New G3 Post 2040 CL1	0.0	0.0	0.0	0.4	0.0	0.0	0.0
2	BAe 146/Avro RJ	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	Airbus A318	0.0	0.1	0.0	0.0	0.1	0.0	0.0
2	Airbus A319	5.6	1.1	0.0	0.0	1.0	0.0	0.0
2	Boeing 717	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	Boeing 737-200/300/400/500	0.6	0.0	0.0	0.0	0.0	0.0	0.0
2	Boeing 737-600/700/Freight Dom	0.0	0.5	0.0	0.0	0.4	0.0	0.0
2	Bombardier RJ 700/900	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	Bombardier C Series	0.0	0.3	0.1	0.0	0.2	0.2	0.1
2	Bombardier DHC-8 Q400	0.0	2.6	1.7	0.4	2.2	1.8	2.1
2	Embraer 170/175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	Embraer 190/195	0.0	0.9	0.1	0.0	0.8	0.2	0.1
2	Fokker 100	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	New Gen Post 2016 B737-600/700	0.0	0.9	0.6	0.0	0.8	0.7	0.3
2	Post 2016 G2 Airbus A319/320	0.0	7.9	5.6	0.3	8.4	7.3	1.8
2	New G1 CL2	0.0	1.6	3.0	0.6	1.3	3.3	3.5
2	New G2 Post 2030 CL2	0.0	0.0	0.8	0.5	0.0	0.8	2.6
2	New G3 Post 2040 CL2	0.0	0.0	0.0	0.2	0.0	0.0	0.9
3	Airbus A300	0.7	0.0	0.0	0.0	0.0	0.0	0.0
3	Airbus A310	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	Airbus A320/321	9.6	2.6	0.0	0.0	5.8	0.0	0.0
3	Airbus A350-800	0.0	1.4	1.5	0.3	3.5	3.3	0.3
3	Boeing 737-800/900	0.8	0.7	0.0	0.0	1.7	0.0	0.0
3	Boeing 757-200/300	1.6	0.0	0.0	0.0	0.0	0.0	0.0
3	Boeing 767-200	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	McDonnell Douglas MD80 series	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	Ilyushin Il-62	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	New Gen Post 2016 B737-800/900	0.0	3.0	3.2	0.6	7.5	7.7	0.7

Seat Cat.	Aircraft Type	2013	DM 2030	DM 2040	DM 2050	LHR-NWR 2030	LHR-NWR 2040	LHR-NWR 2050
3	Post 2016 G2 Airbus A321	0.0	3.0	3.2	0.6	7.5	7.7	0.7
3	New G1 CL3	0.0	2.3	6.6	7.7	5.5	14.8	8.2
3	New G2 Post 2030 CL3	0.0	0.0	1.4	13.9	0.0	3.2	14.7
3	New G3 Post 2040 CL3	0.0	0.0	0.0	4.7	0.0	0.0	5.0
4	Airbus A330-200/300	4.3	1.3	0.0	0.0	1.6	0.0	0.0
4	Airbus A340-200/300	1.3	0.0	0.0	0.0	0.0	0.0	0.0
4	Airbus A350 PAX/900	0.0	4.5	4.4	0.6	4.9	5.6	1.2
4	Boeing 767-300/400	8.1	0.0	0.0	0.0	0.0	0.0	0.0
4	Boeing 787	0.4	13.2	12.5	1.5	16.5	18.2	3.5
4	McDonnell Douglas MD11	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	New G1 CL4	0.0	4.9	7.6	4.6	5.3	9.6	8.9
4	New G2 Post 2030 CL4	0.0	0.0	4.4	8.9	0.0	5.5	17.4
4	New G3 Post 2040 CL4	0.0	0.0	0.0	7.1	0.0	0.0	13.9
5	Airbus A340-500/600	4.4	0.6	0.0	0.0	0.8	0.0	0.0
5	Boeing 747-300	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Boeing 747-400	17.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Boeing 747-8/Freight Intl	0.0	5.2	5.2	1.5	6.6	6.7	1.1
5	Boeing 777	22.1	11.2	7.6	0.1	14.5	10.0	0.1
5	New G1 CL5 (Twin)	0.0	1.8	3.5	1.4	2.3	4.2	1.0
5	New G2 Post 2030 CL5	0.0	0.0	4.7	11.9	0.0	5.6	7.9
5	New G3 Post 2040 CL5	0.0	0.0	0.0	7.8	0.0	0.0	5.2
6	Airbus A380 pax	5.4	2.0	3.0	0.3	5.1	4.1	0.4
6	New G1 CL6	0.0	0.0	0.0	3.0	0.0	0.0	3.6
6	New G2 Post 2030 CL6	0.0	0.0	0.0	1.7	0.0	0.0	2.1
6	New G3 Post 2040 CL6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total		82.4	73.9	80.8	82.2	104.1	120.5	107.8

Table D3: 16-hour average summer day air traffic forecast for Heathrow Airport current, do minimum and Extended Northern Runway scenarios

Seat Cat.	Aircraft Type	2013	DM 2030	DM 2040	DM 2050	LHR-ENR 2030	LHR-ENR 2040	LHR-ENR 2050
1	Small twin-turboprop	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	Bombardier RJ100/200	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	Large twin-turboprop	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	Embraer 135/145	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	Executive Jet (Chapter 2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	Executive Jet (Chapter 3)	0.3	9.0	5.0	2.1	18.2	5.1	3.0
1	New G1 CL1	0.0	0.0	0.0	2.4	0.0	0.0	0.0
1	New G2 Post 2030 CL1	0.0	0.0	0.0	3.6	0.0	0.0	0.0
1	New G3 Post 2040 CL1	0.0	0.0	0.0	1.8	0.0	0.0	0.0
2	BAe 146/Avro RJ	1.8	0.0	0.0	0.0	0.0	0.0	0.0
2	Airbus A318	3.2	1.5	0.0	0.0	2.0	0.0	0.0
2	Airbus A319	263.9	21.0	0.0	0.0	29.3	0.0	0.0
2	Boeing 717	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2	Boeing 737-200/300/400/500	11.7	0.0	0.0	0.0	0.0	0.0	0.0
2	Boeing 737-600/700/Freight Dom	23.5	10.1	0.0	0.0	12.9	0.0	0.0
2	Bombardier RJ 700/900	2.1	0.0	0.0	0.0	0.0	0.0	0.0
2	Bombardier C Series	0.0	5.4	3.6	1.0	6.9	4.9	1.6
2	Bombardier DHC-8 Q400	0.0	50.0	41.0	29.4	63.5	55.6	50.5
2	Embraer 170/175	0.0	0.0	0.0	0.4	0.0	0.0	0.0
2	Embraer 190/195	3.3	18.0	3.6	0.9	22.8	4.9	1.6
2	Fokker 100	4.7	0.0	0.0	0.0	0.0	0.0	0.0
2	New Gen Post 2016 B737-600/700	0.0	18.0	15.3	4.0	22.8	20.8	6.8
2	Post 2016 G2 Airbus A319/320	0.0	150.0	137.3	26.1	247.1	223.0	44.4
2	New G1 CL2	0.0	29.6	73.4	49.6	37.6	99.7	85.2
2	New G2 Post 2030 CL2	0.0	0.0	18.4	36.9	0.0	25.0	63.4
2	New G3 Post 2040 CL2	0.0	0.0	0.0	12.3	0.0	0.0	21.2
3	Airbus A300	3.7	0.0	0.0	0.0	0.0	0.0	0.0
3	Airbus A310	0.4	0.0	0.0	0.0	0.0	0.0	0.0
3	Airbus A320/321	485.4	89.3	0.0	0.0	121.7	0.0	0.0
3	Airbus A350-800	0.0	49.4	42.6	5.7	73.2	65.1	9.2
3	Boeing 737-800/900	19.0	23.6	0.0	0.0	36.1	0.0	0.0
3	Boeing 757-200/300	17.1	0.0	0.0	0.0	0.0	0.0	0.0
3	Boeing 767-200	0.9	0.0	0.0	0.0	0.0	0.0	0.0
3	McDonnell Douglas MD80 series	1.4	0.0	0.0	0.0	0.0	0.0	0.0
3	Ilyushin Il-62	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	New Gen Post 2016 B737-800/900	0.0	103.1	92.3	12.6	158.0	151.6	21.7

Seat Cat.	Aircraft Type	2013	DM 2030	DM 2040	DM 2050	LHR-ENR 2030	LHR-ENR 2040	LHR-ENR 2050
3	Post 2016 G2 Airbus A321	0.0	103.1	92.3	12.6	158.0	151.6	21.7
3	New G1 CL3	0.0	77.9	190.9	161.8	115.4	291.9	261.5
3	New G2 Post 2030 CL3	0.0	0.0	41.4	291.3	0.0	63.2	470.8
3	New G3 Post 2040 CL3	0.0	0.0	0.0	98.9	0.0	0.0	159.8
4	Airbus A330-200/300	47.3	15.3	0.0	0.0	22.9	0.0	0.0
4	Airbus A340-200/300	10.4	0.0	0.0	0.0	0.0	0.0	0.0
4	Airbus A350 PAX/900	0.0	53.1	48.1	8.2	68.4	58.8	11.0
4	Boeing 767-300/400	85.3	0.0	0.0	0.0	0.0	0.0	0.0
4	Boeing 787	6.9	155.9	136.1	20.8	232.8	192.3	32.4
4	McDonnell Douglas MD11	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	New G1 CL4	0.0	58.4	82.8	61.7	75.3	101.1	82.7
4	New G2 Post 2030 CL4	0.0	0.0	47.7	120.9	0.0	58.3	162.0
4	New G3 Post 2040 CL4	0.0	0.0	0.0	96.6	0.0	0.0	129.5
5	Airbus A340-500/600	18.7	7.1	0.0	0.0	7.2	0.0	0.0
5	Boeing 747-300	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Boeing 747-400	76.9	0.0	0.0	0.0	0.0	0.0	0.0
5	Boeing 747-8/Freight Intl	0.0	59.8	45.2	11.2	56.8	53.8	11.0
5	Boeing 777	151.0	127.9	66.3	0.9	123.7	79.6	1.0
5	New G1 CL5 (Twin)	0.0	21.0	30.7	10.5	19.7	34.0	9.6
5	New G2 Post 2030 CL5	0.0	0.0	40.6	87.3	0.0	45.0	79.2
5	New G3 Post 2040 CL5	0.0	0.0	0.0	57.6	0.0	0.0	52.3
6	Airbus A380 pax	20.0	26.0	24.0	1.4	25.3	31.5	1.6
6	New G1 CL6	0.0	0.0	0.0	13.0	0.0	0.0	15.1
6	New G2 Post 2030 CL6	0.0	0.0	0.0	7.4	0.0	0.0	8.6
6	New G3 Post 2040 CL6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total		1258.8	1283.6	1278.5	1251.2	1757.6	1816.9	1818.6

Table D4: 8-hour average summer night air traffic forecast for Heathrow Airport current, do minimum and Extended Northern Runway scenarios

Seat Cat.	Aircraft Type	2013	DM 2030	DM 2040	DM 2050	LHR-ENR 2030	LHR-ENR 2040	LHR-ENR 2050
1	Small twin-turboprop	0.1	0.0	0.0	0.0	0.0	0.0	0.0
1	Bombardier RJ100/200	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	Large twin-turboprop	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	Embraer 135/145	0.1	0.0	0.0	0.0	0.0	0.0	0.0
1	Executive Jet (Chapter 2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	Executive Jet (Chapter 3)	0.0	0.0	0.0	0.4	1.0	0.0	1.0
1	New G1 CL1	0.0	0.0	0.0	0.5	0.0	0.0	0.0
1	New G2 Post 2030 CL1	0.0	0.0	0.0	0.7	0.0	0.0	0.0
1	New G3 Post 2040 CL1	0.0	0.0	0.0	0.4	0.0	0.0	0.0
2	BAe 146/Avro RJ	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	Airbus A318	0.0	0.1	0.0	0.0	0.1	0.0	0.0
2	Airbus A319	5.6	1.1	0.0	0.0	0.8	0.0	0.0
2	Boeing 717	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	Boeing 737-200/300/400/500	0.6	0.0	0.0	0.0	0.0	0.0	0.0
2	Boeing 737-600/700/Freight Dom	0.0	0.5	0.0	0.0	0.4	0.0	0.0
2	Bombardier RJ 700/900	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	Bombardier C Series	0.0	0.3	0.1	0.0	0.2	0.1	0.1
2	Bombardier DHC-8 Q400	0.0	2.6	1.7	0.4	1.7	1.6	2.6
2	Embraer 170/175	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	Embraer 190/195	0.0	0.9	0.1	0.0	0.6	0.1	0.1
2	Fokker 100	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	New Gen Post 2016 B737-600/700	0.0	0.9	0.6	0.0	0.6	0.6	0.4
2	Post 2016 G2 Airbus A319/320	0.0	7.9	5.6	0.3	6.7	6.3	2.3
2	New G1 CL2	0.0	1.6	3.0	0.6	1.0	2.8	4.4
2	New G2 Post 2030 CL2	0.0	0.0	0.8	0.5	0.0	0.7	3.3
2	New G3 Post 2040 CL2	0.0	0.0	0.0	0.2	0.0	0.0	1.1
3	Airbus A300	0.7	0.0	0.0	0.0	0.0	0.0	0.0
3	Airbus A310	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	Airbus A320/321	9.6	2.6	0.0	0.0	5.0	0.0	0.0
3	Airbus A350-800	0.0	1.4	1.5	0.3	3.0	3.6	0.3
3	Boeing 737-800/900	0.8	0.7	0.0	0.0	1.5	0.0	0.0
3	Boeing 757-200/300	1.6	0.0	0.0	0.0	0.0	0.0	0.0
3	Boeing 767-200	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	McDonnell Douglas MD80 series	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	Ilyushin Il-62	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	New Gen Post 2016 B737-800/900	0.0	3.0	3.2	0.6	6.5	8.3	0.7

Seat Cat.	Aircraft Type	2013	DM 2030	DM 2040	DM 2050	LHR-ENR 2030	LHR-ENR 2040	LHR-ENR 2050
3	Post 2016 G2 Airbus A321	0.0	3.0	3.2	0.6	6.5	8.3	0.7
3	New G1 CL3	0.0	2.3	6.6	7.7	4.8	16.0	8.4
3	New G2 Post 2030 CL3	0.0	0.0	1.4	13.9	0.0	3.5	15.2
3	New G3 Post 2040 CL3	0.0	0.0	0.0	4.7	0.0	0.0	5.1
4	Airbus A330-200/300	4.3	1.3	0.0	0.0	1.4	0.0	0.0
4	Airbus A340-200/300	1.3	0.0	0.0	0.0	0.0	0.0	0.0
4	Airbus A350 PAX/900	0.0	4.5	4.4	0.6	4.2	5.7	1.2
4	Boeing 767-300/400	8.1	0.0	0.0	0.0	0.0	0.0	0.0
4	Boeing 787	0.4	13.2	12.5	1.5	14.1	18.6	3.4
4	McDonnell Douglas MD11	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	New G1 CL4	0.0	4.9	7.6	4.6	4.6	9.8	8.6
4	New G2 Post 2030 CL4	0.0	0.0	4.4	8.9	0.0	5.6	16.9
4	New G3 Post 2040 CL4	0.0	0.0	0.0	7.1	0.0	0.0	13.5
5	Airbus A340-500/600	4.4	0.6	0.0	0.0	1.1	0.0	0.0
5	Boeing 747-300	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Boeing 747-400	17.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Boeing 747-8/Freight Intl	0.0	5.2	5.2	1.5	8.6	7.0	1.5
5	Boeing 777	22.1	11.2	7.6	0.1	18.7	10.3	0.1
5	New G1 CL5 (Twin)	0.0	1.8	3.5	1.4	3.0	4.4	1.3
5	New G2 Post 2030 CL5	0.0	0.0	4.7	11.9	0.0	5.8	10.5
5	New G3 Post 2040 CL5	0.0	0.0	0.0	7.8	0.0	0.0	6.9
6	Airbus A380 pax	5.4	2.0	3.0	0.3	5.1	3.0	0.4
6	New G1 CL6	0.0	0.0	0.0	3.0	0.0	0.0	3.6
6	New G2 Post 2030 CL6	0.0	0.0	0.0	1.7	0.0	0.0	2.1
6	New G3 Post 2040 CL6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total		82.4	73.9	80.8	82.2	101.1	121.9	115.6

Table D5: 16-hour average summer day air traffic forecast for Gatwick Airport current, do minimum and Two-Runway scenarios

Seat Cat.	Aircraft Type	2013	DM 2030	DM 2040	DM 2050	LGW-2R 2030	LGW-2R 2040	LGW-2R 2050
1	Small twin-turboprop	0.1	0.0	0.0	0.0	0.0	0.0	0.0
1	Bombardier RJ100/200	0.1	0.0	0.0	0.0	0.0	0.0	0.0
1	Large twin-turboprop	31.7	0.4	0.0	0.0	1.2	0.0	0.0
1	Embraer 135/145	0.2	1.9	0.1	0.0	5.5	0.0	0.0
1	Executive Jet (Chapter 2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	Executive Jet (Chapter 3)	3.0	4.6	10.6	3.0	25.2	20.2	30.4
1	New G1 CL1	0.0	0.8	3.8	0.9	2.2	3.1	3.1
1	New G2 Post 2030 CL1	0.0	0.0	3.0	1.4	0.0	2.4	4.6
1	New G3 Post 2040 CL1	0.0	0.0	0.0	0.7	0.0	0.0	2.3
2	BAe 146/Avro RJ	0.6	0.0	0.0	0.0	0.0	0.0	0.0
2	Airbus A318	0.1	2.1	0.0	0.0	2.7	0.0	0.0
2	Airbus A319	248.5	26.6	0.0	0.0	33.6	0.0	0.0
2	Boeing 737-200/300/400/500	86.0	0.0	0.0	0.0	0.0	0.0	0.0
2	Boeing 737-600/700/Freight Dom	0.4	15.4	0.1	0.2	19.5	0.2	0.2
2	Bombardier RJ 700/900	0.3	0.0	0.0	0.0	0.0	0.0	0.0
2	Bombardier C Series	0.0	6.7	3.5	0.7	8.9	7.0	2.8
2	Bombardier DHC-8 Q400	0.0	39.9	29.4	22.8	54.5	64.0	88.9
2	Embraer 170/175	18.4	3.8	1.7	0.4	4.9	2.5	0.7
2	Embraer 190/195	12.7	14.4	2.6	0.7	19.7	5.7	2.9
2	Fokker 100	0.8	0.0	0.0	0.0	0.0	0.0	0.0
2	New Gen Post 2016 B737-600/700	0.0	33.9	34.4	6.6	42.1	51.5	17.8
2	Post 2016 G2 Airbus A319/320	0.0	120.4	109.2	49.5	147.7	175.8	97.7
2	New G1 CL2	0.0	27.0	65.0	50.2	36.1	129.1	169.4
2	New G2 Post 2030 CL2	0.0	0.0	13.9	45.8	0.0	29.5	139.9
2	New G3 Post 2040 CL2	0.0	0.0	0.0	17.1	0.0	0.0	49.6
3	Airbus A300	2.7	0.0	0.0	0.0	0.0	0.0	0.0
3	Airbus A310	1.2	0.0	0.0	0.0	0.0	0.0	0.0
3	Airbus A320/321	132.6	43.1	1.3	0.0	45.4	1.6	0.0
3	Airbus A350-800	0.0	15.8	12.0	1.5	14.1	16.7	2.6
3	Boeing 737-800/900	84.2	30.2	1.3	0.0	29.2	1.6	0.0
3	Boeing 757-200/300	27.9	1.9	0.0	0.0	1.7	0.0	0.0
3	Boeing 767-200	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	McDonnell Douglas MD80 series	1.5	0.0	0.0	0.0	0.0	0.0	0.0
3	Ilyushin Il-62	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	New Gen Post 2016 B737-800/900	0.0	112.3	117.0	70.3	108.7	148.7	90.4
3	Post 2016 G2 Airbus A321	0.0	59.3	58.9	28.6	56.8	77.3	38.0

Seat Cat.	Aircraft Type	2013	DM 2030	DM 2040	DM 2050	LGW-2R 2030	LGW-2R 2040	LGW-2R 2050
3	New G1 CL3	0.0	135.0	198.6	186.0	129.9	251.3	252.7
3	New G2 Post 2030 CL3	0.0	0.0	12.6	141.1	0.0	17.3	206.0
3	New G3 Post 2040 CL3	0.0	0.0	0.0	59.7	0.0	0.0	86.7
4	Airbus A330-200/300	11.5	4.1	0.4	0.0	5.4	0.4	0.0
4	Airbus A340-200/300	0.1	0.0	0.0	0.0	0.0	0.0	0.0
4	Airbus A350 PAX/900	0.0	11.8	14.1	5.4	14.5	13.3	7.0
4	Boeing 767-300/400	8.5	0.1	0.0	0.0	0.1	0.0	0.0
4	Boeing 787	4.3	34.5	38.1	6.7	47.6	39.8	9.7
4	New G1 CL4	0.0	9.9	22.4	19.8	16.4	21.2	23.8
4	New G2 Post 2030 CL4	0.0	0.0	12.6	38.6	0.0	11.9	46.1
4	New G3 Post 2040 CL4	0.0	0.0	0.0	30.8	0.0	0.0	36.6
5	Airbus A340-500/600	0.2	0.8	0.0	0.0	1.7	0.0	0.0
5	Boeing 747-300	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Boeing 747-400	8.5	0.0	0.0	0.0	0.0	0.0	0.0
5	Boeing 747-8/Freight Intl	0.0	4.3	5.2	2.5	8.6	7.6	8.2
5	Boeing 777	20.6	7.4	5.8	0.2	15.0	8.5	0.6
5	New G1 CL5 (Twin)	0.0	0.8	1.5	1.9	1.5	2.2	6.5
5	New G2 Post 2030 CL5	0.0	0.0	0.1	2.6	0.0	0.1	8.9
5	New G3 Post 2040 CL5	0.0	0.0	0.0	0.5	0.0	0.0	1.7
6	Airbus A380 pax	0.1	0.0	0.0	0.0	0.0	0.0	0.0
6	New G1 CL6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	New G2 Post 2030 CL6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	New G3 Post 2040 CL6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total		706.8	769.4	779.2	796.3	900.6	1110.7	1436.0

Table D6: 8-hour average summer night air traffic forecast for Gatwick Airport current, do minimum and Two-Runway scenarios

Seat Cat.	Aircraft Type	2013	DM 2030	DM 2040	DM 2050	LGW-2R 2030	LGW-2R 2040	LGW-2R 2050
1	Small twin-turboprop	0.1	0.0	0.0	0.0	0.0	0.0	0.0
1	Bombardier RJ100/200	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	Large twin-turboprop	0.1	0.1	0.0	0.0	0.3	0.0	0.0
1	Embraer 135/145	0.1	0.5	0.0	0.0	1.2	0.0	0.0
1	Executive Jet (Chapter 2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	Executive Jet (Chapter 3)	0.3	1.1	1.8	0.5	5.5	3.6	4.3
1	New G1 CL1	0.0	0.2	0.6	0.2	0.5	0.6	0.4
1	New G2 Post 2030 CL1	0.0	0.0	0.5	0.2	0.0	0.4	0.7
1	New G3 Post 2040 CL1	0.0	0.0	0.0	0.1	0.0	0.0	0.3
2	BAe 146/Avro RJ	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	Airbus A318	0.0	0.3	0.0	0.0	0.4	0.0	0.0
2	Airbus A319	27.8	4.2	0.0	0.0	4.9	0.0	0.0
2	Boeing 737-200/300/400/500	8.4	0.0	0.0	0.0	0.0	0.0	0.0
2	Boeing 737-600/700/Freight Dom	0.0	2.5	0.1	0.1	2.8	0.0	0.0
2	Bombardier RJ 700/900	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	Bombardier C Series	0.0	1.1	0.6	0.2	1.3	0.9	0.3
2	Bombardier DHC-8 Q400	0.0	6.3	5.2	5.5	7.9	8.1	8.9
2	Embraer 170/175	0.0	0.6	0.3	0.1	0.7	0.3	0.1
2	Embraer 190/195	0.3	2.3	0.5	0.2	2.9	0.7	0.3
2	Fokker 100	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	New Gen Post 2016 B737-600/700	0.0	5.4	6.1	1.6	6.1	6.5	1.8
2	Post 2016 G2 Airbus A319/320	0.0	19.1	19.2	11.9	21.4	22.3	9.7
2	New G1 CL2	0.0	4.3	11.4	12.1	5.2	16.4	16.9
2	New G2 Post 2030 CL2	0.0	0.0	2.4	11.0	0.0	3.7	13.9
2	New G3 Post 2040 CL2	0.0	0.0	0.0	4.1	0.0	0.0	4.9
3	Airbus A300	0.6	0.0	0.0	0.0	0.0	0.0	0.0
3	Airbus A310	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	Airbus A320/321	35.7	8.1	0.2	0.0	6.1	0.2	0.0
3	Airbus A350-800	0.0	3.0	2.2	0.2	1.9	1.7	0.2
3	Boeing 737-800/900	12.5	5.7	0.2	0.0	3.9	0.2	0.0
3	Boeing 757-200/300	11.7	0.4	0.0	0.0	0.2	0.0	0.0
3	Boeing 767-200	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	McDonnell Douglas MD80 series	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	Ilyushin Il-62	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	New Gen Post 2016 B737-800/900	0.0	21.2	20.9	11.0	14.6	14.9	8.2
3	Post 2016 G2 Airbus A321	0.0	11.2	10.5	4.5	7.6	7.7	3.5

Seat Cat.	Aircraft Type	2013	DM 2030	DM 2040	DM 2050	LGW-2R 2030	LGW-2R 2040	LGW-2R 2050
3	New G1 CL3	0.0	25.4	35.5	29.2	17.4	25.2	23.0
3	New G2 Post 2030 CL3	0.0	0.0	2.3	22.2	0.0	1.7	18.8
3	New G3 Post 2040 CL3	0.0	0.0	0.0	9.4	0.0	0.0	7.9
4	Airbus A330-200/300	3.6	1.1	0.1	0.0	1.2	0.1	0.0
4	Airbus A340-200/300	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	Airbus A350 PAX/900	0.0	3.0	2.8	1.0	3.2	2.6	0.9
4	Boeing 767-300/400	2.0	0.0	0.0	0.0	0.0	0.0	0.0
4	Boeing 787	0.9	8.8	7.6	1.3	10.5	7.6	1.3
4	New G1 CL4	0.0	2.5	4.5	3.7	3.6	4.1	3.2
4	New G2 Post 2030 CL4	0.0	0.0	2.5	7.2	0.0	2.3	6.1
4	New G3 Post 2040 CL4	0.0	0.0	0.0	5.8	0.0	0.0	4.9
5	Airbus A340-500/600	0.0	0.2	0.0	0.0	0.4	0.0	0.0
5	Boeing 747-300	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Boeing 747-400	0.5	0.0	0.0	0.0	0.0	0.0	0.0
5	Boeing 747-8/Freight Intl	0.0	1.2	2.4	1.3	1.8	1.9	0.6
5	Boeing 777	3.1	2.1	2.7	0.1	3.1	2.1	0.0
5	New G1 CL5 (Twin)	0.0	0.2	0.7	1.0	0.3	0.6	0.5
5	New G2 Post 2030 CL5	0.0	0.0	0.0	1.3	0.0	0.0	0.7
5	New G3 Post 2040 CL5	0.0	0.0	0.0	0.3	0.0	0.0	0.1
6	Airbus A380 pax	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	New G1 CL6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	New G2 Post 2030 CL6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	New G3 Post 2040 CL6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total		107.6	142.1	143.9	147.1	136.7	136.3	142.4

Table D7: 16-hour average summer day air traffic forecast for Heathrow Airport North West Runway Carbon-traded scenarios

Seat Cat.	Aircraft Type	LHR-NWR 2030	LHR-NWR 2040	LHR-NWR 2050
1	Small twin-turboprop	0.0	0.0	0.0
1	Bombardier RJ100/200	0.0	0.0	0.0
1	Large twin-turboprop	0.0	0.0	0.0
1	Embraer 135/145	0.0	0.0	0.0
1	Executive Jet (Chapter 2)	0.0	0.0	0.0
1	Executive Jet (Chapter 3)	10.1	4.0	6.0
1	New G1 CL1	0.0	0.0	0.0
1	New G2 Post 2030 CL1	0.0	0.0	0.0
1	New G3 Post 2040 CL1	0.0	0.0	0.0
2	BAe 146/Avro RJ	0.0	0.0	0.0
2	Airbus A318	1.8	0.0	0.0
2	Airbus A319	34.2	0.0	0.0
2	Boeing 717	0.0	0.0	0.0
2	Boeing 737-200/300/400/500	0.0	0.0	0.0
2	Boeing 737-600/700/Freight Dom	11.6	0.0	0.0
2	Bombardier RJ 700/900	0.0	0.0	0.0
2	Bombardier C Series	6.0	4.8	1.1
2	Bombardier DHC-8 Q400	55.5	54.8	33.8
2	Embraer 170/175	0.0	0.0	0.0
2	Embraer 190/195	19.9	4.8	1.1
2	Fokker 100	0.0	0.0	0.0
2	New Gen Post 2016 B737-600/700	20.9	20.5	4.6
2	Post 2016 G2 Airbus A319/320	243.5	229.8	48.4
2	New G1 CL2	33.0	98.2	57.1
2	New G2 Post 2030 CL2	0.0	24.6	42.5
2	New G3 Post 2040 CL2	0.0	0.0	14.2
3	Airbus A300	0.0	0.0	0.0
3	Airbus A310	0.0	0.0	0.0
3	Airbus A320/321	124.4	0.0	0.0
3	Airbus A350-800	75.2	56.4	7.7
3	Boeing 737-800/900	48.4	0.0	0.0
3	Boeing 757-200/300	0.0	0.0	0.0
3	Boeing 767-200	0.0	0.0	0.0
3	McDonnell Douglas MD80 series	0.0	0.0	0.0
3	Ilyushin Il-62	0.0	0.0	0.0
3	New Gen Post 2016 B737-800/900	204.3	179.7	55.5

Seat Cat.	Aircraft Type	LHR-NWR 2030	LHR-NWR 2040	LHR-NWR 2050
3	Post 2016 G2 Airbus A321	178.8	149.4	33.0
3	New G1 CL3	182.4	340.7	306.2
3	New G2 Post 2030 CL3	0.0	55.1	415.5
3	New G3 Post 2040 CL3	0.0	0.0	153.8
4	Airbus A330-200/300	23.0	0.0	0.0
4	Airbus A340-200/300	0.0	0.0	0.0
4	Airbus A350 PAX/900	73.0	67.5	11.8
4	Boeing 767-300/400	0.0	0.0	0.0
4	Boeing 787	234.0	190.7	30.1
4	McDonnell Douglas MD11	0.0	0.0	0.0
4	New G1 CL4	80.3	116.2	88.5
4	New G2 Post 2030 CL4	0.0	67.0	173.4
4	New G3 Post 2040 CL4	0.0	0.0	138.6
5	Airbus A340-500/600	8.1	0.0	0.0
5	Boeing 747-300	0.0	0.0	0.0
5	Boeing 747-400	0.0	0.0	0.0
5	Boeing 747-8/Freight Intl	63.1	53.9	11.8
5	Boeing 777	137.9	80.0	1.1
5	New G1 CL5 (Twin)	21.8	33.9	14.7
5	New G2 Post 2030 CL5	0.0	44.9	121.8
5	New G3 Post 2040 CL5	0.0	0.0	80.4
6	Airbus A380 pax	33.3	33.8	4.0
6	New G1 CL6	0.0	11.3	43.0
6	New G2 Post 2030 CL6	0.0	2.3	24.5
6	New G3 Post 2040 CL6	0.0	0.0	0.1
Total		1924.4	1924.4	1924.4

Table D8: 8-hour average summer night air traffic forecast for Heathrow Airport North West Runway Carbon-traded scenarios

Seat Cat.	Aircraft Type	LHR-NWR 2030	LHR-NWR 2040	LHR-NWR 2050
1	Small twin-turboprop	0.0	0.0	0.0
1	Bombardier RJ100/200	0.0	0.0	0.0
1	Large twin-turboprop	0.0	0.0	0.0
1	Embraer 135/145	0.0	0.0	0.0
1	Executive Jet (Chapter 2)	0.0	0.0	0.0
1	Executive Jet (Chapter 3)	0.0	0.0	0.0
1	New G1 CL1	0.0	0.0	0.0
1	New G2 Post 2030 CL1	0.0	0.0	0.0
1	New G3 Post 2040 CL1	0.0	0.0	0.0
2	BAe 146/Avro RJ	0.0	0.0	0.0
2	Airbus A318	0.1	0.0	0.0
2	Airbus A319	1.5	0.0	0.0
2	Boeing 717	0.0	0.0	0.0
2	Boeing 737-200/300/400/500	0.0	0.0	0.0
2	Boeing 737-600/700/Freight Dom	0.5	0.0	0.0
2	Bombardier RJ 700/900	0.0	0.0	0.0
2	Bombardier C Series	0.3	0.1	0.1
2	Bombardier DHC-8 Q400	2.4	1.0	2.0
2	Embraer 170/175	0.0	0.0	0.0
2	Embraer 190/195	0.8	0.1	0.1
2	Fokker 100	0.0	0.0	0.0
2	New Gen Post 2016 B737-600/700	0.9	0.4	0.3
2	Post 2016 G2 Airbus A319/320	10.4	4.2	2.9
2	New G1 CL2	1.4	1.8	3.4
2	New G2 Post 2030 CL2	0.0	0.5	2.5
2	New G3 Post 2040 CL2	0.0	0.0	0.8
3	Airbus A300	0.0	0.0	0.0
3	Airbus A310	0.0	0.0	0.0
3	Airbus A320/321	4.5	0.0	0.0
3	Airbus A350-800	2.7	2.8	0.3
3	Boeing 737-800/900	1.7	0.0	0.0
3	Boeing 757-200/300	0.0	0.0	0.0
3	Boeing 767-200	0.0	0.0	0.0
3	McDonnell Douglas MD80 series	0.0	0.0	0.0
3	Ilyushin Il-62	0.0	0.0	0.0
3	New Gen Post 2016 B737-800/900	7.3	8.8	1.9

Seat Cat.	Aircraft Type	LHR-NWR 2030	LHR-NWR 2040	LHR-NWR 2050
3	Post 2016 G2 Airbus A321	6.4	7.3	1.1
3	New G1 CL3	6.6	16.7	10.5
3	New G2 Post 2030 CL3	0.0	2.7	14.2
3	New G3 Post 2040 CL3	0.0	0.0	5.3
4	Airbus A330-200/300	2.2	0.0	0.0
4	Airbus A340-200/300	0.0	0.0	0.0
4	Airbus A350 PAX/900	7.0	5.4	0.9
4	Boeing 767-300/400	0.0	0.0	0.0
4	Boeing 787	22.4	15.2	2.4
4	McDonnell Douglas MD11	0.0	0.0	0.0
4	New G1 CL4	7.7	9.3	7.1
4	New G2 Post 2030 CL4	0.0	5.4	13.8
4	New G3 Post 2040 CL4	0.0	0.0	11.1
5	Airbus A340-500/600	1.1	0.0	0.0
5	Boeing 747-300	0.0	0.0	0.0
5	Boeing 747-400	0.0	0.0	0.0
5	Boeing 747-8/Freight Intl	8.3	8.4	1.5
5	Boeing 777	18.1	12.5	0.1
5	New G1 CL5 (Twin)	2.9	5.3	1.8
5	New G2 Post 2030 CL5	0.0	7.0	15.0
5	New G3 Post 2040 CL5	0.0	0.0	9.9
6	Airbus A380 pax	3.0	3.6	0.6
6	New G1 CL6	0.0	1.2	6.7
6	New G2 Post 2030 CL6	0.0	0.2	3.8
6	New G3 Post 2040 CL6	0.0	0.0	0.0
Total		120.0	120.0	120.0

Table D9: 16-hour average summer day air traffic forecast for Heathrow Airport Extended Northern Runway Carbon-traded scenarios

Seat Cat.	Aircraft Type	LHR-ENR 2030	LHR-ENR 2040	LHR-ENR 2050
1	Small twin-turboprop	0.0	0.0	0.0
1	Bombardier RJ100/200	0.0	0.0	0.0
1	Large twin-turboprop	0.0	0.0	0.0
1	Embraer 135/145	0.0	0.0	0.0
1	Executive Jet (Chapter 2)	0.0	0.0	0.0
1	Executive Jet (Chapter 3)	9.1	3.0	6.0
1	New G1 CL1	0.0	0.0	0.0
1	New G2 Post 2030 CL1	0.0	0.0	0.0
1	New G3 Post 2040 CL1	0.0	0.0	0.0
2	BAe 146/Avro RJ	0.0	0.0	0.0
2	Airbus A318	1.9	0.0	0.0
2	Airbus A319	28.2	0.0	0.0
2	Boeing 717	0.0	0.0	0.0
2	Boeing 737-200/300/400/500	0.0	0.0	0.0
2	Boeing 737-600/700/Freight Dom	12.3	0.0	0.0
2	Bombardier RJ 700/900	0.0	0.0	0.0
2	Bombardier C Series	6.6	4.6	1.2
2	Bombardier DHC-8 Q400	60.9	52.6	36.5
2	Embraer 170/175	0.0	0.0	0.0
2	Embraer 190/195	21.8	4.6	1.2
2	Fokker 100	0.0	0.0	0.0
2	New Gen Post 2016 B737-600/700	21.9	19.6	4.9
2	Post 2016 G2 Airbus A319/320	239.8	201.8	36.1
2	New G1 CL2	36.1	94.3	61.6
2	New G2 Post 2030 CL2	0.0	23.7	45.8
2	New G3 Post 2040 CL2	0.0	0.0	15.3
3	Airbus A300	0.0	0.0	0.0
3	Airbus A310	0.0	0.0	0.0
3	Airbus A320/321	123.8	0.0	0.0
3	Airbus A350-800	74.9	61.1	8.7
3	Boeing 737-800/900	36.9	0.0	0.0
3	Boeing 757-200/300	0.0	0.0	0.0
3	Boeing 767-200	0.0	0.0	0.0
3	McDonnell Douglas MD80 series	0.0	0.0	0.0
3	Ilyushin Il-62	0.0	0.0	0.0
3	New Gen Post 2016 B737-800/900	161.5	141.1	20.6

Seat Cat.	Aircraft Type	LHR-ENR 2030	LHR-ENR 2040	LHR-ENR 2050
3	Post 2016 G2 Airbus A321	161.5	141.1	20.6
3	New G1 CL3	118.0	273.9	245.7
3	New G2 Post 2030 CL3	0.0	59.3	442.5
3	New G3 Post 2040 CL3	0.0	0.0	150.2
4	Airbus A330-200/300	23.4	0.0	0.0
4	Airbus A340-200/300	0.0	0.0	0.0
4	Airbus A350 PAX/900	73.3	69.2	10.9
4	Boeing 767-300/400	0.0	0.0	0.0
4	Boeing 787	238.1	200.9	29.5
4	McDonnell Douglas MD11	0.0	0.0	0.0
4	New G1 CL4	80.6	119.1	81.6
4	New G2 Post 2030 CL4	0.0	68.6	159.7
4	New G3 Post 2040 CL4	0.0	0.0	127.7
5	Airbus A340-500/600	8.8	0.0	0.0
5	Boeing 747-300	0.0	0.0	0.0
5	Boeing 747-400	0.0	0.0	0.0
5	Boeing 747-8/Freight Intl	68.6	56.7	12.1
5	Boeing 777	150.0	84.4	1.1
5	New G1 CL5 (Twin)	23.7	36.0	15.0
5	New G2 Post 2030 CL5	0.0	47.7	124.5
5	New G3 Post 2040 CL5	0.0	0.0	82.2
6	Airbus A380 pax	25.2	30.5	3.7
6	New G1 CL6	0.0	10.7	39.4
6	New G2 Post 2030 CL6	0.0	2.1	22.4
6	New G3 Post 2040 CL6	0.0	0.0	0.1
Total		1806.8	1806.8	1806.8

Table D10: 8-hour average summer night air traffic forecast for Heathrow Airport Extended Northern Runway Carbon-traded scenarios

Seat Cat.	Aircraft Type	LHR-ENR 2030	LHR-ENR 2040	LHR-ENR 2050
1	Small twin-turboprop	0.0	0.0	0.0
1	Bombardier RJ100/200	0.0	0.0	0.0
1	Large twin-turboprop	0.0	0.0	0.0
1	Embraer 135/145	0.0	0.0	0.0
1	Executive Jet (Chapter 2)	0.0	0.0	0.0
1	Executive Jet (Chapter 3)	1.0	0.0	0.0
1	New G1 CL1	0.0	0.0	0.0
1	New G2 Post 2030 CL1	0.0	0.0	0.0
1	New G3 Post 2040 CL1	0.0	0.0	0.0
2	BAe 146/Avro RJ	0.0	0.0	0.0
2	Airbus A318	0.1	0.0	0.0
2	Airbus A319	1.5	0.0	0.0
2	Boeing 717	0.0	0.0	0.0
2	Boeing 737-200/300/400/500	0.0	0.0	0.0
2	Boeing 737-600/700/Freight Dom	0.6	0.0	0.0
2	Bombardier RJ 700/900	0.0	0.0	0.0
2	Bombardier C Series	0.3	0.1	0.1
2	Bombardier DHC-8 Q400	3.1	1.5	2.0
2	Embraer 170/175	0.0	0.0	0.0
2	Embraer 190/195	1.1	0.1	0.1
2	Fokker 100	0.0	0.0	0.0
2	New Gen Post 2016 B737-600/700	1.1	0.5	0.3
2	Post 2016 G2 Airbus A319/320	12.4	5.6	2.0
2	New G1 CL2	1.9	2.6	3.4
2	New G2 Post 2030 CL2	0.0	0.7	2.5
2	New G3 Post 2040 CL2	0.0	0.0	0.8
3	Airbus A300	0.0	0.0	0.0
3	Airbus A310	0.0	0.0	0.0
3	Airbus A320/321	4.6	0.0	0.0
3	Airbus A350-800	2.8	2.9	0.3
3	Boeing 737-800/900	1.4	0.0	0.0
3	Boeing 757-200/300	0.0	0.0	0.0
3	Boeing 767-200	0.0	0.0	0.0
3	McDonnell Douglas MD80 series	0.0	0.0	0.0
3	Ilyushin Il-62	0.0	0.0	0.0
3	New Gen Post 2016 B737-800/900	6.0	6.7	0.8

Seat Cat.	Aircraft Type	LHR-ENR 2030	LHR-ENR 2040	LHR-ENR 2050
3	Post 2016 G2 Airbus A321	6.0	6.7	0.8
3	New G1 CL3	4.4	13.1	9.5
3	New G2 Post 2030 CL3	0.0	2.8	17.1
3	New G3 Post 2040 CL3	0.0	0.0	5.8
4	Airbus A330-200/300	2.6	0.0	0.0
4	Airbus A340-200/300	0.0	0.0	0.0
4	Airbus A350 PAX/900	8.0	6.4	1.2
4	Boeing 767-300/400	0.0	0.0	0.0
4	Boeing 787	26.0	18.6	3.1
4	McDonnell Douglas MD11	0.0	0.0	0.0
4	New G1 CL4	8.8	11.0	8.6
4	New G2 Post 2030 CL4	0.0	6.3	16.9
4	New G3 Post 2040 CL4	0.0	0.0	13.5
5	Airbus A340-500/600	1.1	0.0	0.0
5	Boeing 747-300	0.0	0.0	0.0
5	Boeing 747-400	0.0	0.0	0.0
5	Boeing 747-8/Freight Intl	8.3	8.9	1.2
5	Boeing 777	18.1	13.3	0.1
5	New G1 CL5 (Twin)	2.9	5.6	1.5
5	New G2 Post 2030 CL5	0.0	7.5	12.3
5	New G3 Post 2040 CL5	0.0	0.0	8.1
6	Airbus A380 pax	3.0	4.3	0.8
6	New G1 CL6	0.0	1.5	9.1
6	New G2 Post 2030 CL6	0.0	0.3	5.2
6	New G3 Post 2040 CL6	0.0	0.0	0.0
Total		127.0	127.0	127.0

Table D11: 16-hour average summer day air traffic forecast for Gatwick Airport Two-Runway Carbon-traded scenarios

Seat Cat.	Aircraft Type	LGW-2R 2030	LGW-2R 2040	LGW-2R 2050
1	Small twin-turboprop	0.0	0.0	0.0
1	Bombardier RJ100/200	0.0	0.0	0.0
1	Large twin-turboprop	0.9	0.0	0.0
1	Embraer 135/145	4.3	0.0	0.0
1	Executive Jet (Chapter 2)	0.0	0.0	0.0
1	Executive Jet (Chapter 3)	27.6	7.7	2.0
1	New G1 CL1	1.8	3.6	0.0
1	New G2 Post 2030 CL1	0.0	2.9	0.0
1	New G3 Post 2040 CL1	0.0	0.0	0.0
2	BAe 146/Avro RJ	0.0	0.0	0.0
2	Airbus A318	3.8	0.0	0.0
2	Airbus A319	42.4	0.0	0.0
2	Boeing 737-200/300/400/500	0.0	0.0	0.0
2	Boeing 737-600/700/Freight Dom	24.1	0.1	0.1
2	Bombardier RJ 700/900	0.0	0.0	0.0
2	Bombardier C Series	14.9	10.9	2.6
2	Bombardier DHC-8 Q400	118.3	110.7	83.5
2	Embraer 170/175	3.3	2.1	0.0
2	Embraer 190/195	42.6	9.7	2.6
2	Fokker 100	0.0	0.0	0.0
2	New Gen Post 2016 B737-600/700	42.5	41.4	11.3
2	Post 2016 G2 Airbus A319/320	219.2	210.8	56.0
2	New G1 CL2	70.0	198.6	141.0
2	New G2 Post 2030 CL2	0.0	49.8	104.9
2	New G3 Post 2040 CL2	0.0	0.0	35.0
3	Airbus A300	0.0	0.0	0.0
3	Airbus A310	0.0	0.0	0.0
3	Airbus A320/321	108.5	1.4	0.0
3	Airbus A350-800	41.1	30.2	4.8
3	Boeing 737-800/900	23.2	1.4	0.0
3	Boeing 757-200/300	2.2	0.0	0.0
3	Boeing 767-200	0.0	0.0	0.0
3	McDonnell Douglas MD80 series	0.0	0.0	0.0
3	Ilyushin Il-62	0.0	0.0	0.0
3	New Gen Post 2016 B737-800/900	91.7	87.2	24.4
3	Post 2016 G2 Airbus A321	75.2	69.7	14.5

Seat Cat.	Aircraft Type	LGW-2R 2030	LGW-2R 2040	LGW-2R 2050
3	New G1 CL3	81.8	153.1	151.8
3	New G2 Post 2030 CL3	0.0	29.7	272.6
3	New G3 Post 2040 CL3	0.0	0.0	86.6
4	Airbus A330-200/300	12.8	0.6	0.0
4	Airbus A340-200/300	0.0	0.0	0.0
4	Airbus A350 PAX/900	32.3	41.4	11.8
4	Boeing 767-300	0.2	0.0	0.0
4	Boeing 787	119.9	108.9	20.8
4	New G1 CL4	37.4	67.3	58.0
4	New G2 Post 2030 CL4	0.0	37.9	113.0
4	New G3 Post 2040 CL4	0.0	0.0	90.1
5	Airbus A340-500/600	3.6	0.0	0.0
5	Boeing 747-300	0.0	0.0	0.0
5	Boeing 747-400	0.0	0.0	0.0
5	Boeing 747-8/Freight Intl	29.9	27.8	5.2
5	Boeing 777	70.9	44.8	0.6
5	New G1 CL5 (Twin)	13.1	21.1	10.6
5	New G2 Post 2030 CL5	0.0	25.2	64.3
5	New G3 Post 2040 CL5	0.0	0.0	40.3
6	Airbus A380 pax	9.9	12.2	0.0
6	New G1 CL6	0.0	0.0	0.0
6	New G2 Post 2030 CL6	0.0	0.0	0.0
6	New G3 Post 2040 CL6	0.0	0.0	0.0
Total		1369.2	1408.2	1408.2

Table D12: 8-hour average summer night air traffic forecast for Gatwick Airport Two-Runway Carbon-traded scenarios

Seat Cat.	Aircraft Type	LGW-2R 2030	LGW-2R 2040	LGW-2R 2050
1	Small twin-turboprop	0.0	0.0	0.0
1	Bombardier RJ100/200	0.0	0.0	0.0
1	Large twin-turboprop	0.3	0.0	0.0
1	Embraer 135/145	1.2	0.0	0.0
1	Executive Jet (Chapter 2)	0.0	0.0	0.0
1	Executive Jet (Chapter 3)	7.9	1.6	0.0
1	New G1 CL1	0.5	0.8	0.0
1	New G2 Post 2030 CL1	0.0	0.6	0.0
1	New G3 Post 2040 CL1	0.0	0.0	0.0
2	BAe 146/Avro RJ	0.0	0.0	0.0
2	Airbus A318	0.4	0.0	0.0
2	Airbus A319	4.8	0.0	0.0
2	Boeing 737-200/300/400/500	0.0	0.0	0.0
2	Boeing 737-600/700/Freight Dom	2.7	0.0	0.0
2	Bombardier RJ 700/900	0.0	0.0	0.0
2	Bombardier C Series	1.7	1.4	0.4
2	Bombardier DHC-8 Q400	13.3	14.6	13.0
2	Embraer 170/175	0.4	0.3	0.0
2	Embraer 190/195	4.8	1.3	0.4
2	Fokker 100	0.0	0.0	0.0
2	New Gen Post 2016 B737-600/700	4.8	5.4	1.8
2	Post 2016 G2 Airbus A319/320	24.6	27.7	8.7
2	New G1 CL2	7.9	26.1	22.0
2	New G2 Post 2030 CL2	0.0	6.5	16.3
2	New G3 Post 2040 CL2	0.0	0.0	5.5
3	Airbus A300	0.0	0.0	0.0
3	Airbus A310	0.0	0.0	0.0
3	Airbus A320/321	10.6	0.1	0.0
3	Airbus A350-800	4.0	2.6	0.4
3	Boeing 737-800/900	2.3	0.1	0.0
3	Boeing 757-200/300	0.2	0.0	0.0
3	Boeing 767-200	0.0	0.0	0.0
3	McDonnell Douglas MD80 series	0.0	0.0	0.0
3	Ilyushin Il-62	0.0	0.0	0.0
3	New Gen Post 2016 B737-800/900	9.0	7.6	2.2
3	Post 2016 G2 Airbus A321	7.4	6.1	1.3

Seat Cat.	Aircraft Type	LGW-2R 2030	LGW-2R 2040	LGW-2R 2050
3	New G1 CL3	8.0	13.3	13.9
3	New G2 Post 2030 CL3	0.0	2.6	25.0
3	New G3 Post 2040 CL3	0.0	0.0	7.9
4	Airbus A330-200/300	1.1	0.0	0.0
4	Airbus A340-200/300	0.0	0.0	0.0
4	Airbus A350 PAX/900	2.8	3.3	0.8
4	Boeing 767-300	0.0	0.0	0.0
4	Boeing 787	10.5	8.6	1.4
4	New G1 CL4	3.3	5.3	4.0
4	New G2 Post 2030 CL4	0.0	3.0	7.8
4	New G3 Post 2040 CL4	0.0	0.0	6.2
5	Airbus A340-500/600	0.4	0.0	0.0
5	Boeing 747-300	0.0	0.0	0.0
5	Boeing 747-400	0.0	0.0	0.0
5	Boeing 747-8/Freight Intl	3.0	2.6	0.5
5	Boeing 777	7.2	4.2	0.1
5	New G1 CL5 (Twin)	1.3	2.0	1.0
5	New G2 Post 2030 CL5	0.0	2.4	5.9
5	New G3 Post 2040 CL5	0.0	0.0	3.7
6	Airbus A380 pax	0.0	0.0	0.0
6	New G1 CL6	0.0	0.0	0.0
6	New G2 Post 2030 CL6	0.0	0.0	0.0
6	New G3 Post 2040 CL6	0.0	0.0	0.0
Total		146.2	150.4	150.4

Table D13: 16-hour average summer day air traffic forecast for Heathrow Airport North West Runway scenarios if Gatwick Airport develops

Seat Cat.	Aircraft Type	LHR-NWR 2030	LHR-NWR 2040	LHR-NWR 2050
1	Small twin-turboprop	0.0	0.0	0.0
1	Bombardier RJ100/200	0.0	0.0	0.0
1	Large twin-turboprop	0.0	0.0	0.0
1	Embraer 135/145	0.0	0.0	0.0
1	Executive Jet (Chapter 2)	0.0	0.0	0.0
1	Executive Jet (Chapter 3)	7.0	5.0	7.9
1	New G1 CL1	0.0	0.0	0.0
1	New G2 Post 2030 CL1	0.0	0.0	0.0
1	New G3 Post 2040 CL1	0.0	0.0	0.0
2	BAe 146/Avro RJ	0.0	0.0	0.0
2	Airbus A318	1.5	0.0	0.0
2	Airbus A319	21.2	0.0	0.0
2	Boeing 717	0.0	0.0	0.0
2	Boeing 737-200/300/400/500	0.0	0.0	0.0
2	Boeing 737-600/700/Freight Dom	10.1	0.0	0.0
2	Bombardier RJ 700/900	0.0	0.0	0.0
2	Bombardier C Series	5.4	3.5	0.9
2	Bombardier DHC-8 Q400	49.9	39.5	28.0
2	Embraer 170/175	0.0	0.0	0.0
2	Embraer 190/195	17.9	3.5	0.9
2	Fokker 100	0.0	0.0	0.0
2	New Gen Post 2016 B737-600/700	17.9	14.7	3.8
2	Post 2016 G2 Airbus A319/320	155.5	132.1	22.0
2	New G1 CL2	29.5	70.8	47.2
2	New G2 Post 2030 CL2	0.0	17.8	35.1
2	New G3 Post 2040 CL2	0.0	0.0	11.7
3	Airbus A300	0.0	0.0	0.0
3	Airbus A310	0.0	0.0	0.0
3	Airbus A320/321	89.7	0.0	0.0
3	Airbus A350-800	50.6	43.5	5.8
3	Boeing 737-800/900	24.2	0.0	0.0
3	Boeing 757-200/300	0.0	0.0	0.0
3	Boeing 767-200	0.0	0.0	0.0
3	McDonnell Douglas MD80 series	0.0	0.0	0.0
3	Ilyushin Il-62	0.0	0.0	0.0
3	New Gen Post 2016 B737-800/900	105.7	93.9	12.6

Seat Cat.	Aircraft Type	LHR-NWR 2030	LHR-NWR 2040	LHR-NWR 2050
3	Post 2016 G2 Airbus A321	105.7	93.9	12.6
3	New G1 CL3	79.7	194.9	164.3
3	New G2 Post 2030 CL3	0.0	42.2	295.8
3	New G3 Post 2040 CL3	0.0	0.0	100.4
4	Airbus A330-200/300	15.7	0.0	0.0
4	Airbus A340-200/300	0.0	0.0	0.0
4	Airbus A350 PAX/900	54.2	49.1	8.5
4	Boeing 767-300/400	0.0	0.0	0.0
4	Boeing 787	160.1	136.6	20.5
4	McDonnell Douglas MD11	0.0	0.0	0.0
4	New G1 CL4	59.7	84.5	63.4
4	New G2 Post 2030 CL4	0.0	48.7	124.2
4	New G3 Post 2040 CL4	0.0	0.0	99.3
5	Airbus A340-500/600	7.0	0.0	0.0
5	Boeing 747-300	0.0	0.0	0.0
5	Boeing 747-400	0.0	0.0	0.0
5	Boeing 747-8/Freight Intl	58.5	45.8	9.6
5	Boeing 777	125.2	66.9	0.8
5	New G1 CL5 (Twin)	20.5	30.5	9.6
5	New G2 Post 2030 CL5	0.0	40.4	79.9
5	New G3 Post 2040 CL5	0.0	0.0	52.7
6	Airbus A380 pax	27.2	25.1	21.7
6	New G1 CL6	0.0	0.0	0.0
6	New G2 Post 2030 CL6	0.0	0.0	0.0
6	New G3 Post 2040 CL6	0.0	0.0	0.0
Total		1299.8	1282.8	1239.2

Table D14: 8-hour average summer night air traffic forecast for Heathrow Airport North West Runway scenarios if Gatwick Airport develops

Seat Cat.	Aircraft Type	LHR-NWR 2030	LHR-NWR 2040	LHR-NWR 2050
1	Small twin-turboprop	0.0	0.0	0.0
1	Bombardier RJ100/200	0.0	0.0	0.0
1	Large twin-turboprop	0.0	0.0	0.0
1	Embraer 135/145	0.0	0.0	0.0
1	Executive Jet (Chapter 2)	0.0	0.0	0.0
1	Executive Jet (Chapter 3)	0.0	0.0	2.0
1	New G1 CL1	0.0	0.0	0.0
1	New G2 Post 2030 CL1	0.0	0.0	0.0
1	New G3 Post 2040 CL1	0.0	0.0	0.0
2	BAe 146/Avro RJ	0.0	0.0	0.0
2	Airbus A318	0.1	0.0	0.0
2	Airbus A319	1.0	0.0	0.0
2	Boeing 717	0.0	0.0	0.0
2	Boeing 737-200/300/400/500	0.0	0.0	0.0
2	Boeing 737-600/700/Freight Dom	0.5	0.0	0.0
2	Bombardier RJ 700/900	0.0	0.0	0.0
2	Bombardier C Series	0.3	0.1	0.0
2	Bombardier DHC-8 Q400	2.4	1.7	0.4
2	Embraer 170/175	0.0	0.0	0.0
2	Embraer 190/195	0.9	0.1	0.0
2	Fokker 100	0.0	0.0	0.0
2	New Gen Post 2016 B737-600/700	0.9	0.6	0.0
2	Post 2016 G2 Airbus A319/320	7.6	5.6	0.3
2	New G1 CL2	1.4	3.0	0.6
2	New G2 Post 2030 CL2	0.0	0.8	0.5
2	New G3 Post 2040 CL2	0.0	0.0	0.2
3	Airbus A300	0.0	0.0	0.0
3	Airbus A310	0.0	0.0	0.0
3	Airbus A320/321	2.8	0.0	0.0
3	Airbus A350-800	1.6	1.5	0.3
3	Boeing 737-800/900	0.7	0.0	0.0
3	Boeing 757-200/300	0.0	0.0	0.0
3	Boeing 767-200	0.0	0.0	0.0
3	McDonnell Douglas MD80 series	0.0	0.0	0.0
3	Ilyushin Il-62	0.0	0.0	0.0
3	New Gen Post 2016 B737-800/900	3.3	3.2	0.6

Seat Cat.	Aircraft Type	LHR-NWR 2030	LHR-NWR 2040	LHR-NWR 2050
3	Post 2016 G2 Airbus A321	3.3	3.2	0.6
3	New G1 CL3	2.5	6.7	7.9
3	New G2 Post 2030 CL3	0.0	1.4	14.3
3	New G3 Post 2040 CL3	0.0	0.0	4.8
4	Airbus A330-200/300	1.3	0.0	0.0
4	Airbus A340-200/300	0.0	0.0	0.0
4	Airbus A350 PAX/900	4.3	4.3	0.6
4	Boeing 767-300/400	0.0	0.0	0.0
4	Boeing 787	12.8	12.0	1.3
4	McDonnell Douglas MD11	0.0	0.0	0.0
4	New G1 CL4	4.8	7.4	4.1
4	New G2 Post 2030 CL4	0.0	4.3	8.1
4	New G3 Post 2040 CL4	0.0	0.0	6.5
5	Airbus A340-500/600	0.7	0.0	0.0
5	Boeing 747-300	0.0	0.0	0.0
5	Boeing 747-400	0.0	0.0	0.0
5	Boeing 747-8/Freight Intl	5.6	5.5	1.4
5	Boeing 777	11.9	8.0	0.1
5	New G1 CL5 (Twin)	2.0	3.7	1.4
5	New G2 Post 2030 CL5	0.0	4.9	11.3
5	New G3 Post 2040 CL5	0.0	0.0	7.5
6	Airbus A380 pax	2.0	3.0	6.9
6	New G1 CL6	0.0	0.0	0.0
6	New G2 Post 2030 CL6	0.0	0.0	0.0
6	New G3 Post 2040 CL6	0.0	0.0	0.0
Total		74.4	81.2	81.7

Table D15: 16-hour average summer day air traffic forecast for Gatwick Airport Two-Runway scenarios if Heathrow Airport develops

		With LHR-NWR			With LHR-ENR		
Seat Cat.	Aircraft Type	2030	2040	2050	2030	2040	2050
1	Small twin-turboprop	0.0	0.0	0.0	0.0	0.0	0.0
1	Bombardier RJ100/200	0.0	0.0	0.0	0.0	0.0	0.0
1	Large twin-turboprop	0.6	0.0	0.0	0.4	0.0	0.0
1	Embraer 135/145	2.9	0.1	0.0	1.7	0.0	0.0
1	Executive Jet (Chapter 2)	0.0	0.0	0.0	0.0	0.0	0.0
1	Executive Jet (Chapter 3)	19.8	31.4	33.9	11.3	17.1	10.2
1	New G1 CL1	1.2	8.4	5.9	0.7	4.7	7.4
1	New G2 Post 2030 CL1	0.0	6.7	8.9	0.0	3.7	11.1
1	New G3 Post 2040 CL1	0.0	0.0	4.5	0.0	0.0	5.6
2	BAe 146/Avro RJ	0.0	0.0	0.0	0.0	0.0	0.0
2	Airbus A318	1.7	0.0	0.0	1.8	0.0	0.0
2	Airbus A319	22.0	0.0	0.0	23.2	0.0	0.0
2	Boeing 737-200/300/400/500	0.0	0.0	0.0	0.0	0.0	0.0
2	Boeing 737-600/700/Freight Dom	12.9	0.1	0.1	13.5	0.1	0.1
2	Bombardier RJ 700/900	0.0	0.0	0.0	0.0	0.0	0.0
2	Bombardier C Series	4.8	4.0	0.6	5.1	4.6	0.9
2	Bombardier DHC-8 Q400	27.2	19.3	18.0	27.9	22.7	26.6
2	Embraer 170/175	3.0	4.0	1.0	3.4	4.5	1.2
2	Embraer 190/195	9.9	1.8	0.6	10.1	2.1	0.9
2	Fokker 100	0.0	0.0	0.0	0.0	0.0	0.0
2	New Gen Post 2016 B737-600/700	29.3	28.7	5.6	30.8	32.3	6.9
2	Post 2016 G2 Airbus A319/320	96.7	87.7	44.5	102.9	99.9	51.8
2	New G1 CL2	19.4	45.6	40.9	20.0	53.0	55.9
2	New G2 Post 2030 CL2	0.0	9.2	38.0	0.0	10.8	49.5
2	New G3 Post 2040 CL2	0.0	0.0	14.2	0.0	0.0	18.1
3	Airbus A300	0.0	0.0	0.0	0.0	0.0	0.0
3	Airbus A310	0.0	0.0	0.0	0.0	0.0	0.0
3	Airbus A320/321	27.4	1.2	0.0	27.7	1.3	0.0
3	Airbus A350-800	10.6	7.5	1.2	11.1	8.0	1.3
3	Boeing 737-800/900	25.5	1.2	0.0	26.0	1.3	0.0
3	Boeing 757-200/300	1.6	0.0	0.0	1.6	0.0	0.0
3	Boeing 767-200	0.0	0.0	0.0	0.0	0.0	0.0
3	McDonnell Douglas MD80 series	0.0	0.0	0.0	0.0	0.0	0.0
3	Ilyushin Il-62	0.0	0.0	0.0	0.0	0.0	0.0
3	New Gen Post 2016 B737-800/900	93.6	95.0	59.9	95.7	98.4	61.7
3	Post 2016 G2 Airbus A321	45.4	43.9	24.1	46.9	45.9	25.0

		With LHR-NWR			With LHR-ENR		
Seat Cat.	Aircraft Type	2030	2040	2050	2030	2040	2050
3	New G1 CL3	116.5	158.2	156.5	118.7	163.8	162.8
3	New G2 Post 2030 CL3	0.0	8.0	118.9	0.0	8.6	126.2
3	New G3 Post 2040 CL3	0.0	0.0	49.8	0.0	0.0	52.4
4	Airbus A330-200/300	3.0	0.3	0.0	3.2	0.4	0.0
4	Airbus A340-200/300	0.0	0.0	0.0	0.0	0.0	0.0
4	Airbus A350 PAX/900	9.2	9.5	4.5	9.6	12.0	4.0
4	Boeing 767-300	0.0	0.0	0.0	0.0	0.0	0.0
4	Boeing 787	24.4	20.4	4.8	26.1	26.1	4.3
4	New G1 CL4	7.5	11.2	12.3	7.9	14.2	11.1
4	New G2 Post 2030 CL4	0.0	6.1	23.9	0.0	7.8	21.6
4	New G3 Post 2040 CL4	0.0	0.0	19.1	0.0	0.0	17.2
5	Airbus A340-500/600	0.8	0.0	0.0	0.7	0.0	0.0
5	Boeing 747-300	0.0	0.0	0.0	0.0	0.0	0.0
5	Boeing 747-400	0.0	0.0	0.0	0.0	0.0	0.0
5	Boeing 747-8/Freight Intl	4.2	4.7	0.3	3.6	2.4	2.0
5	Boeing 777	7.3	5.1	0.0	6.3	2.5	0.1
5	New G1 CL5 (Twin)	0.8	1.5	0.2	0.7	0.7	1.6
5	New G2 Post 2030 CL5	0.0	0.1	0.3	0.0	0.0	2.2
5	New G3 Post 2040 CL5	0.0	0.0	0.1	0.0	0.0	0.4
6	Airbus A380 pax	0.0	0.0	0.0	0.0	0.0	0.0
6	New G1 CL6	0.0	0.0	0.0	0.0	0.0	0.0
6	New G2 Post 2030 CL6	0.0	0.0	0.0	0.0	0.0	0.0
6	New G3 Post 2040 CL6	0.0	0.0	0.0	0.0	0.0	0.0
Total		629.1	621.0	692.8	638.6	648.9	740.5

Table D16: 8-hour average summer night air traffic forecast for Gatwick Airport Two-Runway scenarios if Heathrow Airport develops

		With LHR-NWR			With LHR-ENR		
Seat Cat.	Aircraft Type	2030	2040	2050	2030	2040	2050
1	Small twin-turboprop	0.0	0.0	0.0	0.0	0.0	0.0
1	Bombardier RJ100/200	0.0	0.0	0.0	0.0	0.0	0.0
1	Large twin-turboprop	0.2	0.0	0.0	0.2	0.0	0.0
1	Embraer 135/145	1.0	0.0	0.0	0.8	0.0	0.0
1	Executive Jet (Chapter 2)	0.0	0.0	0.0	0.0	0.0	0.0
1	Executive Jet (Chapter 3)	6.9	5.8	6.1	5.3	4.4	2.8
1	New G1 CL1	0.4	1.5	1.1	0.3	1.2	2.0
1	New G2 Post 2030 CL1	0.0	1.2	1.6	0.0	1.0	3.0
1	New G3 Post 2040 CL1	0.0	0.0	0.8	0.0	0.0	1.5
2	BAe 146/Avro RJ	0.0	0.0	0.0	0.0	0.0	0.0
2	Airbus A318	0.3	0.0	0.0	0.3	0.0	0.0
2	Airbus A319	4.0	0.0	0.0	4.0	0.0	0.0
2	Boeing 737-200/300/400/500	0.0	0.0	0.0	0.0	0.0	0.0
2	Boeing 737-600/700/Freight Dom	2.3	0.0	0.0	2.3	0.0	0.0
2	Bombardier RJ 700/900	0.0	0.0	0.0	0.0	0.0	0.0
2	Bombardier C Series	0.9	0.7	0.1	0.9	0.8	0.2
2	Bombardier DHC-8 Q400	5.0	3.2	3.1	4.8	3.9	5.4
2	Embraer 170/175	0.5	0.7	0.2	0.6	0.8	0.2
2	Embraer 190/195	1.8	0.3	0.1	1.8	0.4	0.2
2	Fokker 100	0.0	0.0	0.0	0.0	0.0	0.0
2	New Gen Post 2016 B737-600/700	5.3	4.8	1.0	5.3	5.6	1.4
2	Post 2016 G2 Airbus A319/320	17.7	14.6	7.8	17.8	17.3	10.4
2	New G1 CL2	3.5	7.6	7.1	3.5	9.2	11.2
2	New G2 Post 2030 CL2	0.0	1.5	6.6	0.0	1.9	9.9
2	New G3 Post 2040 CL2	0.0	0.0	2.5	0.0	0.0	3.6
3	Airbus A300	0.0	0.0	0.0	0.0	0.0	0.0
3	Airbus A310	0.0	0.0	0.0	0.0	0.0	0.0
3	Airbus A320/321	4.7	0.2	0.0	5.0	0.3	0.0
3	Airbus A350-800	1.8	1.5	0.2	2.0	1.6	0.2
3	Boeing 737-800/900	4.3	0.2	0.0	4.7	0.3	0.0
3	Boeing 757-200/300	0.3	0.0	0.0	0.3	0.0	0.0
3	Boeing 767-200	0.0	0.0	0.0	0.0	0.0	0.0
3	McDonnell Douglas MD80 series	0.0	0.0	0.0	0.0	0.0	0.0
3	Ilyushin Il-62	0.0	0.0	0.0	0.0	0.0	0.0
3	New Gen Post 2016 B737-800/900	15.9	18.9	11.5	17.3	19.6	9.8
3	Post 2016 G2 Airbus A321	7.7	8.7	4.6	8.5	9.2	4.0

		With LHR-NWR			With LHR-ENR		
Seat Cat.	Aircraft Type	2030	2040	2050	2030	2040	2050
3	New G1 CL3	19.8	31.5	30.1	21.4	32.7	26.0
3	New G2 Post 2030 CL3	0.0	1.6	22.9	0.0	1.7	20.1
3	New G3 Post 2040 CL3	0.0	0.0	9.6	0.0	0.0	8.4
4	Airbus A330-200/300	0.8	0.1	0.0	0.8	0.1	0.0
4	Airbus A340-200/300	0.0	0.0	0.0	0.0	0.0	0.0
4	Airbus A350 PAX/900	2.3	2.5	0.9	2.3	2.4	0.8
4	Boeing 767-300	0.0	0.0	0.0	0.0	0.0	0.0
4	Boeing 787	6.2	5.3	1.0	6.3	5.3	0.8
4	New G1 CL4	1.9	2.9	2.5	1.9	2.9	2.1
4	New G2 Post 2030 CL4	0.0	1.6	4.9	0.0	1.6	4.1
4	New G3 Post 2040 CL4	0.0	0.0	3.9	0.0	0.0	3.3
5	Airbus A340-500/600	0.5	0.0	0.0	0.5	0.0	0.0
5	Boeing 747-300	0.0	0.0	0.0	0.0	0.0	0.0
5	Boeing 747-400	0.0	0.0	0.0	0.0	0.0	0.0
5	Boeing 747-8/Freight Intl	2.4	2.0	1.2	2.4	1.2	1.8
5	Boeing 777	4.2	2.1	0.1	4.2	1.3	0.1
5	New G1 CL5 (Twin)	0.5	0.6	1.0	0.5	0.4	1.4
5	New G2 Post 2030 CL5	0.0	0.0	1.3	0.0	0.0	1.9
5	New G3 Post 2040 CL5	0.0	0.0	0.3	0.0	0.0	0.4
6	Airbus A380 pax	0.0	0.0	0.0	0.0	0.0	0.0
6	New G1 CL6	0.0	0.0	0.0	0.0	0.0	0.0
6	New G2 Post 2030 CL6	0.0	0.0	0.0	0.0	0.0	0.0
6	New G3 Post 2040 CL6	0.0	0.0	0.0	0.0	0.0	0.0
Total		123.2	121.5	134.0	125.8	126.8	137.0