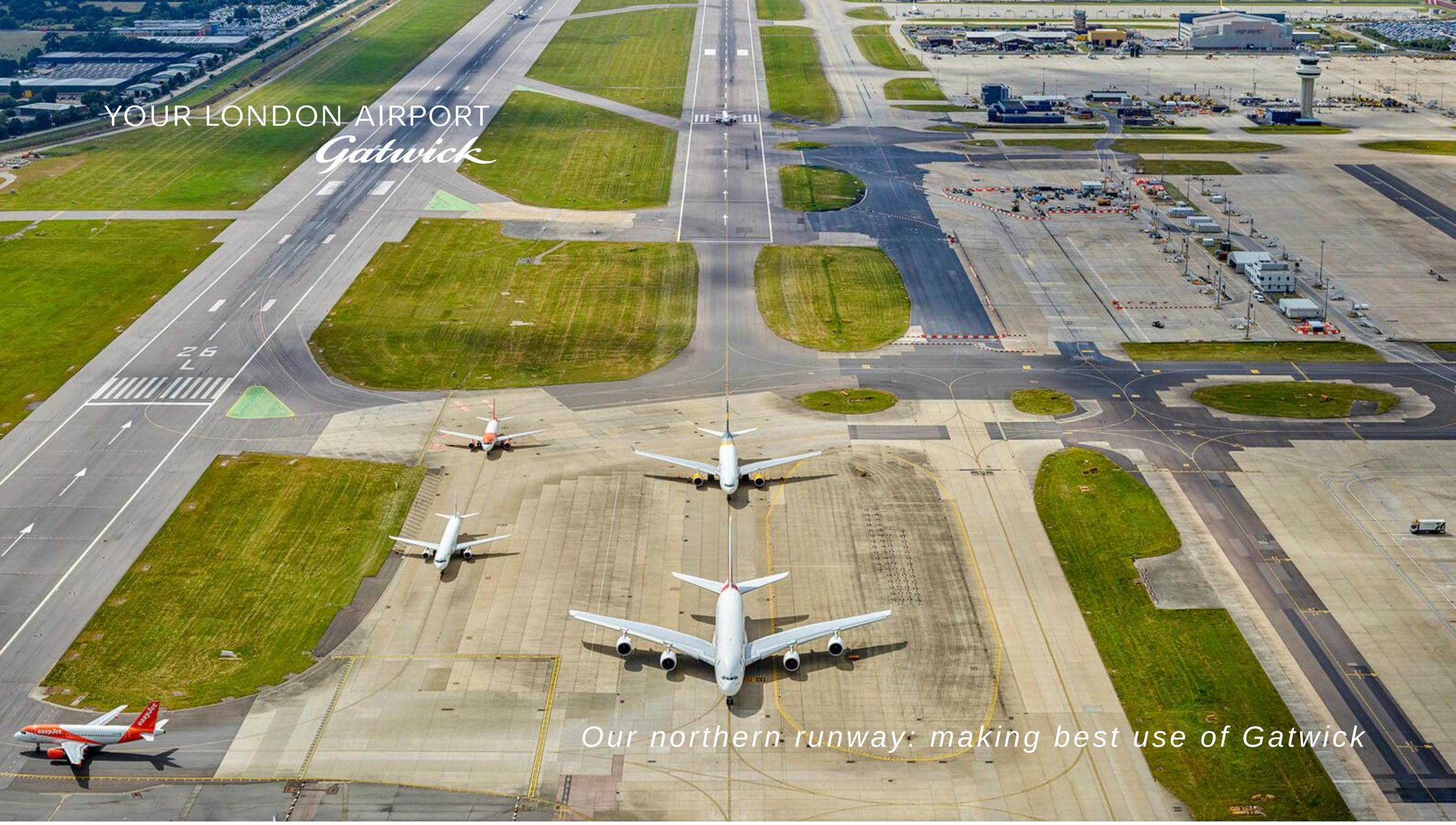

Preliminary Environmental Information Report
Appendix 14.9.2: Air Noise

September 2021

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1 Introduction

1.1 General

1.1.1 This document forms Appendix 14.9.2 of the Preliminary Environmental Information Report (PEIR) prepared on behalf of Gatwick Airport Limited (GAL). The PEIR presents the preliminary findings of the Environmental Impact Assessment (EIA) process for the proposal to make best use of Gatwick Airport's existing runways (referred to within this report as 'the Project'). The Project proposes alterations to the existing northern runway which, together with the lifting of the current restrictions on its use, would enable dual runway operations. The Project includes the development of a range of infrastructure and facilities which, with the alterations to the northern runway, would enable the airport passenger and aircraft operations to increase. Further details regarding the components of the Project can be found in the Chapter 5: Project Description.

1.1.2 This document provides details of the air noise modelling for the Project. Details of relevant legislation, policy and guidance documents can be found in Chapter 14.

2 Assessment Methodology

2.1 Air Noise Modelling

2019 Historic Contours

2.1.1 The 2019 historic contours were produced using the 20-year rolling average 'standard' modal split (75% west / 25% east) for daytime and the 10-year average modal split for night-time (75% west / 25% east). The contours were modelled with the latest version of ANCON (v2.4). A full description of modelling assumptions can be found in ERCD Report 2002: Noise Exposure Contours for Gatwick Airport 2019.

2029, 2032, 2038 and 2047 Forecast Contours

2.1.2 Secondary forecast traffic data were provided by ICF. Mean departure and arrival flight tracks from the 2019 summer Leq contour analysis were assumed for operations on the main runway. The ICF traffic forecasts provided distributions across the departure routes by aircraft type. For arrivals, the 2019 summer traffic distributions across each approach sub-track by ANCON aircraft type were assumed.

2.1.3 Where an aircraft type is modelled by two or more engine variants in the ANCON model (eg Airbus A320), the forecast movements were split according to engine statistics from the 2019 summer period.

2.1.4 RNAV (the newer area navigation system) dispersion (as used in previous Gatwick forecast studies) was modelled for all departure tracks.

2.1.5 Average flight profiles of height, speed and thrust from 2019 Gatwick data were used for existing aircraft types. Noise assumptions for next-generation aircraft types that were not available from the 2019 Gatwick database are summarised in Table 2.1.1.

Table 2.1.1: Next Generation Aircraft Noise Adjustments

Next generation ANCON type	Surrogate ANCON type	Departure adjustment (dB)	Arrival adjustment (dB)
B73710MAX	B738MAX	+1.5	+0.5
B779X	B773G	-3.3	-1.8
EA319NEO	EA319C	-5.2	-2.6

2.1.6 For the forecast contours (with the Project in place), the northern runway was modelled as being available for use by departures of ICAO Code C aircraft types between the hours 0600-2300 local time (LT) only. Code C aircraft were apportioned across the two runways as summarised in the table below:

Table 2.1.2: Code C Aircraft Runway Usage

Time period	Westerly mode	Easterly mode
0700-2300 LT (day)	90% northern runway/10% main runway	90% northern runway/10% main runway
0600-0700 LT (night)	30% northern runway/70% main runway	30% northern runway/70% main runway

2.1.7 ICF provided a traffic data subset for the 1-hour period 0600-0700 local time to enable modelling of northern runway departures within the night period. The distribution across the Standard Instrument Departure (SID) route for 0600-0700 local time was assumed to be the same as for the whole night period (2300-0700 Local Time).

2.1.8 Mean departure and arrival flight tracks from the 2019 summer Leq contour analysis were used for the main runway. Departure tracks for the northern runway were straight along the extended northern runway centre lines until making the turns onto the existing main runway routes.

2.1.9 Runway end coordinates for the northern runway were provided. Start-of-roll locations were assumed to be inset 150 metres from the runway ends, as is the case for the main runway modelling. RNAV dispersion was modelled for all northern runway departure routes.

2.1.10 The following long-term runway modal splits were assumed for average summer day all forecast scenarios:

- Summer day 75% west / 25% east (20-year average).
- Summer night 75% west / 25% east (10-year average).

2.1.11 For annual average noise metrics, L_{den} and L_{night} the following long term runway modal splits were used:

- Annual day 68% west / 32% east (10-year average).
- Annual night 68% west / 32% east (10-year average).

2.1.12 For all the future baseline (no northern runway) cases, as a worst case assumption flights operating from the standby runway where not included in the noise model.

2.1.13 The population/household estimates are based on a 2019 population database update of the 2011 Census supplied by CACI Ltd. For the forecast contour scenarios, population and households within the Forge Wood development were accounted for by estimating the Forge Wood area enclosed by each contour and applying a pro-rata adjustment to the total Forge Wood population of 4,703 (1,900 households). Because part of the Forge Wood development has already been built and included in the 2019 population database, their postcodes were removed from the population data to avoid double-counting when the above adjustments were made. No residential populations from any other future development were included in the population estimates.

2.2 Overflights Assessment

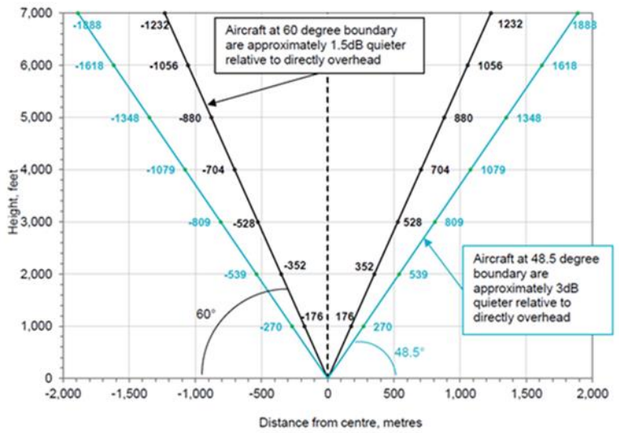
2.2.1 The methodologies for assessing Airspace Change (CAP1616) adopted for the EIA process require consideration of overflights in two areas.

- Air Noise – 'Overflight' as defined by CAP1498.

- Tranquillity – CAP1616 requires consideration of increased overflights affecting particular areas such as Areas of Outstanding Natural Beauty (AONBs) and National Parks.

2.2.2 Diagram 2.2.1 below shows the CAP1498 definition of 'overflight'. Of the two options Gatwick Airport Limited (GAL) has adopted the wider 48.5 degree option. Overflights are capped at a height of 7,000 feet (CAP1616 defines this as above ground level). Hence for this study, flights below 7,000 feet within a distance of 1.8 km from an observer may be counted as an overflight.

Diagram 2.2.1: CAP1498 Definition of Overflight



2.2.3 Using the CAA overflight definition, a grid size of 3.6 km was used, and the grid was aligned with the Gatwick runway orientation.

2.2.4 The method does not attempt to exclude any flight paths that overfly a given 3.6 km by 3.6 km grid square but are at angles of less than 48.5 degrees to the horizontal and therefore strictly speaking not overflights under the CAP1498 definition (eg a flight at 3,000 feet, 1.5 km to the side). This leads to a count of overflight densities that may be too high, and hence worst case, particularly in areas where flights are lower, ie near Gatwick in the case of Gatwick flights. However, this is a worst case approach, and one that is most accurate at greater distance from the airport, which may be of most interest for tranquillity assessment, where flights are higher and nearer to the 7,000 feet height where there would be no over-estimation.

2.2.5 Neither CAP1616 nor CAP1498 give any guidance on how to assess the numbers of overflights statistically. The method presented here adopts a lower threshold of one overflight per average summer day and, in consultation with the wider EIA team, considers all flights in the day or night equally.

2.2.6 The analysis used the 92 day (noise modelling) summer season for 2018 and considers all Gatwick flights below 7,000 feet, on the 26 easterly days and on the 66 westerly days (70,000 flights).

2.2.7 For non-Gatwick flights (ie flights to or from all other airports), 7 days (Monday to Sunday) of easterly and 7 days of westerly operations between 16 June and 11 July 2018 were analysed (37,000 flights below 7,000 feet). The results were weighted to reflect the Gatwick 2018 average summer east/west runway % modal split (28/72).

2.2.8 Each flight track in these two samples was overlaid on a digital terrain map to establish its height above the ground in each grid square and hence whether it was below 7,000 feet above local ground level. Whilst departures generally climb continuously, some arrivals flight tracks dip below a height above ground of 7,000 feet, raise above and dip below again, usually because the terrain is rising below. The analysis captured these overflights correctly.

2.2.9 The study area was developed so as to cover the area within which there is at least one Gatwick overflight, plus at least a 3.6 km grid buffer so as to be able to report non-Gatwick overflights over the Gatwick overflight area. This resulted in a circular study area with a diameter of 70 miles centred at Gatwick Airport. There are Gatwick overflights outside this area, but mostly above 7,000 feet and those below 7,000 feet were present at frequencies of less than one per average summer day.

2.2.10 To give an indication of the effect of the Project, some simplifying assumptions were used to ensure a worst case assessment. The largest effect of the Project in terms of increasing flight numbers is forecast to be in 2032 when there would be increases of approximately 10% at night and 19% in the day. For this analysis a simplistic assumption of increasing 20% over 2018 levels was used, and this was assessed against a 2018 baseline for non-Gatwick flights assuming no growth and no changes to routings for any airport. Since there will inevitably be some increases in non-Gatwick flights as well at Gatwick flights prior to 2032, this is considered a reasonable worst case simplifying assumption, ie it will not understate the additional effect of the Project.

2.2.11 As explained elsewhere, the distribution of Gatwick flights to and from the airport is assumed to be similar as today, so the assumed 20% of additional Gatwick flights have been spread equally over all areas.

3 Summary of Noise Management System

3.1 Introduction

3.1.1 Gatwick Airport has a comprehensive noise management system, as reported in the Noise Action Plan that is updated and reviewed by DfT every five years. The system follows the ICAO balanced approach that consists of four main elements:

- noise at source;
- land use planning;
- operating procedures; and
- operating restrictions.

3.1.2 This section summarises the ongoing noise management activities under each of these headings.

3.2 Noise at Source

3.2.1 ICAO establishes International Standards, recommended practices and procedures regarding the technical areas of aviation, including aircraft noise. The standards, once adopted, are put into effect by each ICAO member state in its own country.

3.2.2 An important pillar of the Balanced Approach to Aircraft Noise Management is the reduction of noise at source. Aircraft noise ("noise at source") has been controlled since the 1970s by the setting of noise limits for aircraft in the form Standards and Recommended Practices (SARPs) contained in Annex 16 to the Convention on International Civil Aviation (the "Chicago Convention"). This continues to be the case today. Noise provisions appear in Volume I of Annex 16. The primary purpose of noise certification is to ensure that the latest available noise reduction technology is incorporated into aircraft design and that this is demonstrated by procedures that are relevant to day-to-day operations. This aims to ensure that noise reductions offered by technology are reflected in reductions around airports.

3.2.3 The first noise standard was developed by the ICAO Committee on Aircraft Noise in 1971 and became applicable in 1973, setting noise limits as a direct function of Maximum Take-off Mass (MTOM) in order to recognize that heavier aeroplanes, which were of greater transport capability, produce more noise than lighter aeroplane types. This is the Chapter 2 Noise Standard contained in Annex 16, Volume I.

3.2.4 In the years following the introduction of Chapter 2, much higher bypass ratio jet engines were introduced into service. Not only did this new technology deliver improved fuel efficiency, it also resulted in reductions in engine noise. This allowed for the ICAO noise standard to be made more stringent and in 1977 the Chapter 3 Noise Standard was added to Annex 16, Volume I. In the following years, further noise reduction technologies were incorporated into engine and airframe designs which led to incremental improvements in aircraft noise performance and this resulted in progressively further increases in the stringency of noise standards as reflected in Annex 16, Volume I, Chapter 4 and Chapter 14.

3.2.5 Over time it has become common parlance when discussing aviation noise to refer to civil jet aircraft by which chapter of Annex 16 Volume 1 they sit in. The adoption of progressively more stringent standards has encouraged the phase out of noisier aircraft meeting the noise standards of earlier Chapters. Chapter 2 aeroplanes have been banned from operating within the EU since 1st April 2002, unless they are granted specific exemptions. The vast majority of civil aircraft now operating therefore fall within Chapters 3 and 4, and are much quieter than the previous Chapter 2 aircraft types. As yet, there is no agreed date for the phase out of Chapter 3 aircraft.

3.2.6 All new aircraft manufactured from 2006 onwards must meet the requirements of Chapter 4. The standard for Chapter 4 has been set at 10dB quieter than Chapter 3. This is based on an aggregate of reductions in noise measured at three standardised locations close to an airport, so that noise levels experienced at any one location on the ground will be about 1/3 of this quieter, ie about 3dB. During the process of agreeing the Chapter 4 standard, the industry discussed a stricter level at 18dB (aggregate) below the current Chapter 3, which would have reflected best available technology. This now forms the basis of Chapter 14 standard adopted in 2014 by the ICAO Council. This represented a new noise standard for jet and propeller-driven aeroplanes which is Chapter 4 minus 7dB (Chapter 3, -17dB). This new, more stringent standard will be the mainstay ICAO Standard for subsonic jet and propeller-driven aeroplane noise for the coming years. It is applicable to new aeroplane types submitted for certification on or after 31 December 2017, and on or after 31 December 2020 for aircraft less than 55 tonnes in mass.

3.2.7 The Chapter 14 noise standard is expected to drive the continued reduction in aircraft noise emissions and lead to long term reductions in the number of people affected by aircraft noise.

3.2.8 GAL operates a system of aircraft landing charges that are based each aircraft's noise levels measured under ICAO certification processes. Each type of aircraft is placed in to one of five noise categories according to the margin by which it is quieter is than the ICAO Chapter 3 Standard. These landing charges for the summer season are given in the following. Winter season changes are lower.

Table 3.2.1: Gatwick Airport Summer Season Landing Charges

Noise Category	Chapter 3 Margin dB	Day Charge £	Night Charge £
Chapter 14 Minus	>=23	£17.45	£458.25
Chapter 14 Base	20 to 23	£21.82	£572.80
Chapter 14 High	17 to 20	£26.19	£687.37
Chapter 4	10 to 17	£43.65	£1,145.62
Chapter 3 and below	<=10	£87.28	£2,291.25
Unmodified A320 Family		£872.85	£2,291.25

3.2.9 Higher landing charges are used to incentivise airlines to fly quieter aircraft.

3.3 Land Use Planning

3.3.1 Land use planning is largely the responsibility of relevant local planning authorities. Gatwick Airport works with local authorities and provides noise exposure information to assist them.

3.3.2 Guidance on the planning of new noise sensitive development, such as housing, near airports is found in most local authority local planning guidance. Following the repeal of national guidance on the subject, the Institute of Acoustics, Chartered Institute of Environmental Health and the Association of Noise Consultants produced Professional Practice Guidance (ProPG) Planning and Noise; New Residential Development in May 2017 which promotes good acoustics design to achieved suitable design standards in new housing in existing noisy environments including near airports. Under the Noise Management Board's work programme Gatwick Airport has worked with local authorities to promote good land use planning, and held a workshop sharing experiences in November 2017. The Noise Management Board has included in its 2021 work plan a project to work with local authorities to help improve land use planning with regards new noise sensitive developments affected by noise from the airport. (See https://www.gatwickairport.com/business-community/aircraft-noise-airspace/engagement/noise-management-board/ for more details of the Noise Management Board).

3.4 Operating Procedures

3.4.1 A range of noise controls relating directly to aircraft operations are set out in statutory notices and are published in the Gatwick Aerodrome Aeronautical Information Publication (AIP) and elsewhere as appropriate. These include the following.

3.4.2 Departures:

- After take-off the aircraft shall be operated in such a way that it is at a height of not less than 1,000ft above aerodrome level at 6.5 km from the start of roll as measured along the departure track of that aircraft.
- After taking off the aircraft shall avoid flying over the congested areas of Horley and Crawley.

3.4.3 Arrivals:

- Between the hours of 23:30 (local) and 06:00 (local), inbound aircraft, whether or not making use of the ILS (instrument landing system) localiser and irrespective of weight or type of approach, shall not join the centre-line below 3,000 ft (Gatwick QNH[1]) closer than 10 nm (nautical miles) from touchdown.
- Before landing at the aerodrome the aircraft shall maintain as high an altitude as practicable and shall not fly over the

[1] QNH (no acronym) – when set to QNH, an altimeter reads the altitude above mean sea level.

congested areas of Crawley, East Grinstead, Horley and Horsham at an altitude of less than 3,000ft (Gatwick QNH) nor over the congested area of Lingfield at an altitude of less than 2,000ft (Gatwick QNH).

- Additionally, pilots are requested to avoid the use of reverse thrust after landing, unless required for safe operation of the aircraft, between 23:00 and 06:00 (local time). This is to minimise disturbance in areas adjacent to the airport.

3.4.4 Gatwick Airport has defined 'noise preferential' routes (NPR's) as one way used to reduce exposure to noise for people living near airports. Such routes are chosen because they direct aircraft, where possible, over less densely populated areas. Gatwick Airport's Flight Performance Team monitor compliance with the NPRs using the Noise and Track Keeping system, providing quarterly report to the Noise and Track Monitoring Advisory Group (NaTMAG). The FPT also investigate complaints of aircraft flying off track.

3.4.5 Continuous Descent Operation (CDO) is an important tool for reducing the noise of aircraft approaching airports. It involves starting a continuous steady descent, from 6,000ft or higher, rather than following a number of short descents to set 'cleared' altitudes where level segments are flow before finally joining the 3° approach glide-slope from below, as is normally required by Air Traffic Control.

3.4.6 The CDO technique results in lower noise levels on the ground through two effects:

- 1. the CDO flight-path is always higher than in the traditional stepped approach - being further from the ground also results in lower noise levels; and
- 2. by keeping the aircraft on a continuous descent, the overall engine power levels are kept lower, generating less noise than if the aircraft were required to fly level.

3.4.7 Gatwick Airport Ltd raised the level at which a CDO is measured to 7,000ft in 2016 and is exploring ways to raise this further through work with the Noise Management Board (NMB).

3.4.8 Additional noise reductions may be achieved by using a Low Power/Low Drag (LPLD) procedure. In this, the aircraft is flown in a 'clean' condition (i.e. with no flap or wheels deployed) as long as possible, consistent with safety, this can result in lower noise levels when the aircraft are close to the ground. The NMB is also carrying out a project to investigate if noise levels due to landing gear deployment can be further reduced.

3.4.9 GAL operates a system of Departure Noise Limits in which all aircraft leaving the airport are measured at a set of locations about 3 km from the airport, and airlines are fined if they exceed defined noise limits as follows:

- Day (07:00-23:00 hour) L_{max} 94 dB
- Shoulder (23:00- 23:30 and 07:00-07:00 hours) L_{max} 89 dB
- Night (23:00 to 06:00 hours) L_{max} 87 dB.

3.4.10 Departure noise limits are the responsibility of the DfT and have applied at Gatwick since 1959, and were last reduced in 2001.

3.4.11 Airlines are fined £500 if their aircraft exceed these limits by up to 3 dB, and £1000 if they exceed by more than 3 dB.

3.4.12 Departure noise limits are intended to incentivise good operational procedures on departure, ie flying a given aircraft as quietly as possible. In 2021 GAL carried out a review of compliance with these limits and is proposing changing the limits to increase the inceptive to fly good departure procedures. Section 14.8 of the PEIR discusses this proposals and seeks consultees views.

3.5 Noise Insulation Scheme

3.5.1 The current Gatwick NIS was based on an L_{eq16hr} 60 dB contour with 15km extensions to cover areas under the extended runway centreline. At the time of introduction, this was seen as one of the most innovative schemes in the UK and exceeded Government policy that noise insulation should be provided at levels of $L_{eq\ 16\ hr}$ 63dB.

3.5.2 The current NIS scheme provides a £3,000 grant to spend on acoustic windows and doors at owners' discretion. Homeowners can also buy additional windows and doors at heavily discounted rates from the suppliers of the NIS products and can therefore use the scheme to undertake further home improvements if they wish. An enhanced NIS has been developed for the Northern Runway Project and is described in Section 14.8 of the PEIR.

3.6 Operating Restriction

3.6.1 Operating restrictions may be necessary for some airports where noise mitigation is required, and other methods prove to be insufficient. In this respect, as part of the "Balanced Approach", operating restrictions may be applied to aircraft whose noise emissions are marginally below the Chapter 3 limits. Strict rules apply for the introduction of operating restrictions to ensure fair competition across Europe and maintain the efficiency of the EU aviation network.

3.6.2 Night Restrictions are in place at Gatwick, set by the DfT that limit the number of flights and the total Quota Count during in the 6.5 hour night period from 2330 to 0600 in the summer and winter seasons as follows:

- Summer Movements Limit 11,200
- Summer Quota Points 5,150
- Winter Movements Limit 3,250
- Summer Quota Points 1,785

3.6.3 The DfT is consulting in 2021 on revising the limits.

3.6.4 Gatwick works with its airline customers to stay within these limits and reports compliance to the Noise and Track Monitoring Advisory Group.

4 Assessment Results

4.1 Air Noise Contours

4.1.1 Table 4.1.1 to Table 4.1.16 give the noise contour areas and population count results from noise modelling 2029, 2032, 2038 and 2047 for the two primary and two supplementary noise metrics, for the central case fleet forecasts. The central fleet forecast considered the most likely rate of fleet transition based on current assumptions regarding the airlines' fleet procurement programmes and business models. The slower transition fleet (see results below) supposes the rate of fleet transition is delayed by about five years, particularly owing to uncertainties due to Covid (Appendix 14.9.5 gives further details). In each table the 2019 base case, assessment year base case and assessment year with the Project results are given.

Table 4.1.1: 2029 L_{eq} 16 hour Day, Central Case

Leq, 16hr dB	Area (km^2)			Population		
	2019 Base	2029 Base	2029 with Project	2019 Base	2029 Base	2029 with Project
>51	136.0	120.1	126.0	24,050	21,000	20,100
>54	74.0	62.4	66.8	9,850	8,200	8,800

Leq, 16hr dB	Area (km²)			Population		
	2019 Base	2029 Base	2029 with Project	2019 Base	2029 Base	2029 with Project
>57	38.7	32.5	34.4	2,550	2,000	2,200
>60	22.4	18.9	20.2	1,450	1,100	1,200
>63	12.6	10.6	11.6	500	500	600
>66	6.7	5.5	6.3	250	200	200
>69	3.5	2.9	3.5	100	100	0

Table 4.1.2: 2029 L_{eq} 8 hour Night, Central Case

Leq, 8hr dB	Area (km²)			Population		
	2019 Base	2029 Base	2029 with Project	2019 Base	2029 Base	2029 with Project
>45	159.4	139.8	141.5	27,650	23,700	23,700
>48	90.3	77.4	78.5	12,100	10,100	10,500
>51	46.5	38.6	39.3	5,550	4,300	4,400
>54	24.8	21.3	21.9	1,550	1,300	1,400
<55	22.6	17.7	18.2	1,250	1,000	1,100
>57	14.0	11.9	12.4	750	500	500
>60	7.4	6.3	6.7	300	300	300
>63	3.8	3.2	3.5	150	200	200
>66	2.1	1.7	2.0	0	0	0
>69	1.3	1.0	1.3	0	0	0

Table 4.1.3: 2029 N65 Day, Central Case

N65 Day	Area (km²)			Population		
	2019 Base	2029 Base	2029 with Project	2019 Base	2029 Base	2029 with Project
>20	149.9	121.5	128.4	24,100	20,400	20,700
>50	97.7	87.3	90.6	14,600	12,800	14,000
>100	72.7	60.4	62.6	9,500	7,200	8,200
>200	50.8	42.7	43.6	5,750	4,800	5,200
>500	2.4	3.4	2.8	100	100	100

Table: 4.1.4: 2029 N60 Night, Central Case

N60 Night	Area (km²)			Population		
	2019 Base	2029 Base	2029 with Project	2019 Base	2029 Base	2029 with Project
>10	204.2	188.1	190.4	33,850	30,700	30,700
>20	126.8	119.6	120.3	15,250	14,400	14,200
>50	56.4	55.2	55.9	7,600	7,400	7,500
>100	2.7	2.8	2.2	150	100	100

Table: 4.1.5: 2032 L_{eq} 16 hour Day, Central Case

$L_{eq, 16hr}$ dB	Area (km²)			Population		
	2019 Base	2032 Base	2032 with Project	2019 Base	2032 Base	2032 with Project
>51	136.0	107.3	125.1	24,050	16,100	18,800
>54	74.0	54.1	66.1	9,850	6,700	9,000
>57	38.7	28.4	33.3	2,550	1,800	2,200
>60	22.4	16.6	19.4	1,450	900	1,200
>63	12.6	9.2	11.3	500	400	500
>66	6.7	4.7	6.2	250	200	200
>69	3.5	2.5	3.3	100	100	0

Table 4.1.6: 2032 L_{eq} 8 hour Night, Central Case

$L_{eq, 8hr}$ dB	Area (km²)			Population		
	2019 Base	2032 Base	2032 with Project	2019 Base	2032 Base	2032 with Project
>45	159.4	124.6	136.2	27,650	18,800	21,600
>48	90.3	67.8	75.1	12,100	8,900	9,900
>51	46.5	33.6	37.5	5,550	3,600	4,400
>54	24.8	18.7	20.8	1,550	1,000	1,300
>55	22.6	15.5	17.4	1,250	900	1,000
>57	14.0	10.5	12.0	750	500	500
>60	7.4	5.5	6.5	300	300	300
>63	3.8	2.8	3.4	150	100	200
>66	2.1	1.5	2.0	0	0	0
>69	1.3	0.9	1.3	0	0	0

Table 4.1.7: 2032 N65 Day, Central Case

N65 Day	Area (km²)			Population		
	2019 Base	2032 Base	2032 with Project	2019 Base	2032 Base	2032 with Project
>20	149.9	106.2	113.4	24,100	15,300	17,400
>50	97.7	75.4	83.0	14,600	10,900	13,300
>100	72.7	53.5	60.4	9,500	6,200	9,300
>200	50.8	39.6	42.6	5,750	4,500	5,100
>500	2.4	3.2	3.9	100	100	100

Table 4.1.8: 2032 N60 Night, Central Case

N60 Night	Area (km²)			Population		
	2019 Base	2032 Base	2032 with Project	2019 Base	2032 Base	2032 with Project
>10	204.2	176.4	185.0	33,850	28,900	29,600
>20	126.8	112.9	118.0	15,250	13,700	14,000
>50	56.4	53.2	59.3	7,600	7,000	8,200
>100	2.7	2.6	2.9	150	100	100

Table 4.1.9: 2038 L_{eq} 16 hour Day, Central Case

$L_{eq, 16hr}$ dB	Area (km²)			Population		
	2019 Base	2038 Base	2038 with Project	2019 Base	2038 Base	2038 with Project
>51	136.0	96.5	113.7	24,050	13,000	16,500
>54	74.0	47.6	58.7	9,850	5,700	7,500
>57	38.7	25.2	29.9	2,550	1,600	1,800
>60	22.4	14.8	17.6	1,450	700	1,000
>63	12.6	8.3	10.3	500	300	500
>66	6.7	4.1	5.6	250	200	200
>69	3.5	2.2	3.0	100	100	0

Table 4.1.10: 2038 L_{eq} 8 hour Night, Central Case

$L_{eq, 8hr}$ dB	Area (km²)			Population		
	2019 Base	2038 Base	2038 with Project	2019 Base	2038 Base	2038 with Project
>45	159.4	115.3	125.8	27,650	15,700	18,300
>48	90.3	61.9	68.7	12,100	8,100	8,900
>51	46.5	30.6	34.2	5,550	3,300	4,000
>54	24.8	17.1	19.1	1,550	1,000	1,100
>55	22.6	14.2	16.0	1,250	800	900
>57	14.0	9.7	11.0	750	400	500
>60	7.4	5.0	6.0	300	300	300
>63	3.8	2.5	3.1	150	100	100
>66	2.1	1.4	1.8	0	0	0
>69	1.3	0.9	1.2	0	0	0

Table 4.1.11: 2038 N65 Day, Central Case

N65 Day	Area (km²)			Population		
	2019 Base	2038 Base	2038 with Project	2019 Base	2038 Base	2038 with Project
>20	149.9	94.3	102.2	24,100	13,400	15,200
>50	97.7	61.0	69.7	14,600	9,000	11,600
>100	72.7	50.3	56.2	9,500	6,000	8,700
>200	50.8	37.6	39.8	5,750	4,300	4,600
>500	2.4	3.1	3.9	100	100	100

Table 4.1.12: 2038 N60 Night, Central Case

N60 Night	Area (km²)			Population		
	2019 Base	2038 Base	2038 with Project	2019 Base	2038 Base	2038 with Project
>10	204.2	169.1	176.8	33,850	27,900	28,200
>20	126.8	109.4	113.4	15,250	12,900	13,700
>50	56.4	53.7	58.5	7,600	7,100	8,000
>100	2.7	2.6	2.7	150	100	100

Table 4.1.13: 2047 L_{eq} 16 hour Day, Central Case

$L_{eq, 16hr}$ dB	Area (km²)			Population		
	2019 Base	2047 Base	2047 with Project	2019 Base	2047 Base	2047 with Project
>51	136.0	96.2	112.9	24,050	12,800	16,400
>54	74.0	47.4	58.3	9,850	5,600	7,300
>57	38.7	25.2	29.7	2,550	1,600	1,800
>60	22.4	14.8	17.6	1,450	700	1,000
>63	12.6	8.3	10.3	500	300	500
>66	6.7	4.2	5.6	250	200	200
>69	3.5	2.2	3.0	100	100	0

Table 4.1.14: 2047 L_{eq} 8 hour Night, Central Case

$L_{eq, 8hr}$ dB	Area (km^2)			Population		
	2019 Base	2047 Base	2047 with Project	2019 Base	2047 Base	2047 with Project
>45	159.4	114.7	125.2	27,650	15,600	18,200
>48	90.3	61.6	68.5	12,100	8,000	8,800
>51	46.5	30.5	34.2	5,550	3,300	4,000
>54	24.8	17.1	19.1	1,550	1,000	1,100
>55	22.6	14.2	16.0	1,250	800	900
>57	14.0	9.7	11.1	750	400	500
>60	7.4	5.0	6.0	300	300	300
>63	3.8	2.5	3.1	150	100	100
>66	2.1	1.4	1.8	0	0	0
>69	1.3	0.8	1.2	0	0	0

Table 4.1.15: 2047 N65 Day, Central Case

N65 Day	Area (km^2)			Population		
	2019 Base	2047 Base	2047 with Project	2019 Base	2047 Base	2047 with Project
>20	149.9	95.1	102.9	24,100	13,700	15,300
>50	97.7	62.1	70.6	14,600	9,400	11,700
>100	72.7	50.9	56.7	9,500	6,000	8,700
>200	50.8	37.8	40.0	5,750	4,300	4,700
>500	2.4	3.1	3.9	100	100	100

Table 4.1.16: 2047 N60 Night, Central Case

N60 Night	Area (km^2)			Population		
	2019 Base	2047 Base	2047 with Project	2019 Base	2047 Base	2047 with Project
>10	204.2	169.0	176.9	33,850	27,900	28,400
>20	126.8	109.5	113.6	15,250	12,900	13,700
>50	56.4	52.6	58.2	7,600	7,100	8,000
>100	2.7	2.5	2.7	150	100	100

4.1.2 Table 4.1.17 to Table 4.1.24 give the noise contour areas and population count results from noise modelling 2029, 2032, and 2038 for the two primary and two supplementary noise metrics, for the slower transition fleet forecasts. In each table the 2019 base case, assessment year base case and assessment year with the Project results are given.

Table 4.1.17: 2029 L_{eq} 16 hour Day, Slower Transition Case

Leq, 16hr dB	Area (km^2)			Population		
	2019 Base	2029 Base	2029 with Project	2019 Base	2029 Base	2029 with Project
>51	136.0	128.5	134.9	24,050	24,100	23,500
>54	74.0	69.1	73.3	9,850	9,200	9,500
>57	38.7	35.9	37.8	2,550	2,400	2,700
>60	22.4	20.9	22.2	1,450	1,200	1,300
>63	12.6	11.8	12.8	500	500	600
>66	6.7	6.2	7.0	250	200	300
>69	3.5	3.2	3.9	100	100	-

Table 4.1.18: 2029 L_{eq} 8 hour Night, Slower Transition Case

Leq, 8hr dB	Area (km^2)			Population		
	2019 Base	2029 Base	2029 with Project	2019 Base	2029 Base	2029 with Project
>45	159.4	148.3	150.1	27,650	26,600	26,500
>48	90.3	82.9	84.1	12,100	11,100	11,200
>51	46.5	42.0	42.9	5,550	5,000	5,100
>54	24.8	23.2	23.9	1,550	1,400	1,400
<55	22.6	19.3	19.9	1,250	1,200	1,200
>57	14.0	13.1	13.6	750	600	700
>60	7.4	6.9	7.4	300	300	300
>63	3.8	3.5	3.9	150	200	200
>66	2.1	1.9	2.2	0	-	-

Table: 4.1.19: 2032 L_{eq} 16 hour Day, Slower Transition Case

$L_{eq, 16hr}$ dB	Area (km^2)			Population		
	2019 Base	2032 Base	2032 with Project	2019 Base	2032 Base	2032 with Project
>51	136.0	125.8	146.7	24,050	23,500	26,400
>54	74.0	67.1	80.5	9,850	9,100	10,900
>57	38.7	34.9	40.6	2,550	2,200	3,900
>60	22.4	20.3	23.6	1,450	1,200	1,400
>63	12.6	11.5	13.8	500	500	600
>66	6.7	6.0	7.6	250	200	300
>69	3.5	3.1	4.2	100	100	100

Table 4.1.20: 2032 L_{eq} 8 hour Night, Slower Transition Case

$L_{eq, 8hr}$ dB	Area (km²)			Population		
	2019 Base	2032 Base	2032 with Project	2019 Base	2032 Base	2032 with Project
>45	159.4	143.9	157.4	27,650	25,400	28,500
>48	90.3	80.1	88.0	12,100	10,800	11,900
>51	46.5	40.3	45.2	5,550	4,700	5,400
>54	24.8	22.3	24.8	1,550	1,300	1,500
>55	22.6	18.5	20.7	1,250	1,100	1,200
>57	14.0	12.5	14.2	750	500	700
>60	7.4	6.6	7.7	300	300	300
>63	3.8	3.3	4.1	150	200	200
>66	2.1	1.8	2.3	0	-	-
>69	1.3	1.1	1.5	0	-	-

Table 4.1.21: 2032 N65 Day, Slower Transition Case

N65 Day	Area (km²)			Population		
	2019 Base	2032 Base	2032 with Project	2019 Base	2032 Base	2032 with Project
>20	149.9	136.4	151.0	24,100	28,300	32,200
>50	97.7	89.4	97.5	14,600	12,900	15,200
>100	72.7	64.5	72.9	9,500	7,700	11,000
>200	50.8	44.3	48.0	5,750	5,000	5,500
>500	2.4	3.5	4.3	100	100	100

Table 4.1.22: 2032 N60 Night, Slower Transition Case

N60 Night	Area (km²)			Population		
	2019 Base	2032 Base	2032 with Project	2019 Base	2032 Base	2032 with Project
>10	204.2	193.0	207.7	33,850	31,500	33,800
>20	126.8	121.6	127.3	15,250	14,700	15,200
>50	56.4	55.3	62.0	7,600	7,400	8,500
>100	2.7	2.7	3.2	150	100	100

Table 4.1.23: 2038 L_{eq} 16 hour Day, Slower Transition Case

$L_{eq, 16hr}$ dB	Area (km²)			Population		
	2019 Base	2038 Base	2038 with Project	2019 Base	2038 Base	2038 with Project
>51	136.0	107.4	125.7	24,050	16,300	19,200
>54	74.0	54.4	66.8	9,850	6,800	8,900
>57	38.7	28.8	33.8	2,550	1,800	2,200
>60	22.4	16.8	19.8	1,450	1,000	1,200
>63	12.6	9.4	11.6	500	400	500
>66	6.7	4.8	6.3	250	200	300
>69	3.5	2.5	3.4	100	100	-

Table 4.1.24: 2038 L_{eq} 8 hour Night, Slower Transition Case

$L_{eq, 8hr}$ dB	Area (km²)			Population		
	2019 Base	2038 Base	2038 with Project	2019 Base	2038 Base	2038 with Project
>45	159.4	124.3	136.1	27,650	18,700	21,700
>48	90.3	67.9	75.2	12,100	1,800	9,900
>51	46.5	33.9	37.7	5,550	3,600	4,600
>54	24.8	18.9	21.0	1,550	1,000	1,300
>55	22.6	15.7	17.5	1,250	900	1,000
>57	14.0	10.6	12.1	750	500	500
>60	7.4	5.6	6.6	300	300	300
>63	3.8	2.8	3.4	150	100	200
>66	2.1	1.5	2.0	0	-	-
>69	1.3	0.9	1.3	0	-	-

4.1.3 Table 4.1.25 to Table 4.1.26 give the noise contour areas and population count results from noise modelling in 2038, for the annual average L_{den} and L_{Night} noise metrics, for the central case and slower transition fleet forecasts.

Table 4.1.25: 2038 (Standard Mode) Annual L_{den} and L_{night} Baseline Noise Levels (1)

Noise Metric	Noise Contour Area (km²)	Population
L_{den}:		
>55 dB	66.1 - 73.7	8600 - 9700
>60 dB	21.8 - 24.5	1300 - 1400
>65 dB	8.5 - 9.5	400 - 500
>70 dB	2.7 - 3.1	100 - 100
>75 dB	1.1 - 1.2	0 - 0
L_{night}:		
>45 dB	84.4 - 91.6	10900 - 12100
>50 dB	27.1 - 30.1	1700 - 2300
>55 dB	10.6 - 11.6	500 - 500
>60 dB	3.5 - 3.9	200 - 200
>65 dB	1.3 - 1.4	0 - 0
>70 dB	0.6 - 0.6	0 - 0

(1) Ranges cover the central case fleet noise modelling and the slower transition fleet noise modelling

Table 4.1.26: 2038 (Standard Mode) Annual L_{den} and L_{night} With Project Noise Levels (1)

Noise Metric	Noise Contour Area (km^2)	Population
L_{den}:		
>55 dB	78.6 - 86.4	10,500 – 11,500
>60 dB	25.6 - 28.6	1,600 – 1,800
>65 dB	10.5 - 11.5	500 - 500
>70 dB	3.6 - 4.1	100 - 200
>75 dB	1.5 - 1.7	0 - 0
L_{night}:		
>45 dB	94 - 101.8	12,400 – 13,400
>50 dB	30.7 - 33.9	2,900 – 3,300
>55 dB	12.1 - 13.3	500 - 600
>60 dB	4.3 - 4.8	200 - 200
>65 dB	1.7 - 1.8	0 - 0
>70 dB	0.8 - 0.9	0 - 0

(1) Ranges cover the central case fleet noise modelling and the slower transition fleet noise modelling

4.2 Representative Community Locations

4.2.1 Table 4.2.1 to Table 4.2.7 give detailed results of noise modelling at each of the seven representative community locations, for the central case. In each table the noise levels at this location are given for easterly, westerly and average mode operation. Results are given for the two primary noise metrics and the two supplementary noise metrics and for the following cases:

- 2019 Base
- 2032 Base
- 2032 with Project
- 2032 with Project- 2032 Base
- 2032 with Project- 2019 Base

Table 4.2.1: Rusper Primary School (Central Case)

Case	Average Summer Day				Westerly Flights				Easterly Flights			
	$L_{eq,\ 16hr}$	$L_{eq,\ 8hr}$	N65 day	N60 night	$L_{eq,\ 16hr}$	$L_{eq,\ 8hr}$	N65 day	N60 night	$L_{eq,\ 16hr}$	$L_{eq,\ 8hr}$	N65 day	N60 night
2019 Base	52.2	45.5	20	32	52.9	45.8	26	42	48.4	44.6	0	1
2032 Base	50.5	44.1	5	25	51.1	44.4	7	33	47.7	43.2	0	0
2032 with Project	50.8	44.6	5	26	51.3	44.9	7	34	48.5	43.5	0	0
2032 with Project- 2032 Base	0.3	0.5	0	1	0.2	0.5	0	2	0.8	0.3	0	0
2032 with Project- 2019 Base	-1.4	-0.9	-14	-6	-1.6	-0.9	-19	-8	0.1	-1.1	0	-1

Table 4.2.2: Charlwood Village Infant School (Central Case)

Case	Average Summer Day				Westerly Flights				Easterly Flights			
	$L_{eq,\ 16hr}$	$L_{eq,\ 8hr}$	N65 day	N60 night	$L_{eq,\ 16hr}$	$L_{eq,\ 8hr}$	N65 day	N60 night	$L_{eq,\ 16hr}$	$L_{eq,\ 8hr}$	N65 day	N60 night
2019 Base	55.3	48.8	124	36	55.9	49.2	158	45	53.3	47	23	10
2032 Base	52.9	46.9	30	41	53.3	47.3	38	52	51.4	45.4	4	9
2032 with Project	53.4	47.4	78	48	53.6	47.7	102	61	52.8	46.2	7	11
2032 with Project- 2032 Base	0.5	0.5	49	7	0.3	0.4	64	8	1.4	0.8	2	1
2032 with Project- 2019 Base	-1.9	-1.4	-46	12	-2.3	-1.5	-56	16	-0.5	-0.8	-16	1

Table 4.2.3: Lingfield Primary School (Central Case)

Case	Average Summer Day				Westerly Flights				Easterly Flights			
	$L_{eq,\ 16hr}$	$L_{eq,\ 8hr}$	N65 day	N60 night	$L_{eq,\ 16hr}$	$L_{eq,\ 8hr}$	N65 day	N60 night	$L_{eq,\ 16hr}$	$L_{eq,\ 8hr}$	N65 day	N60 night
2019 Base	55.6	52	240	66	56.4	53	286	82	51.6	45	102	19
2032 Base	55.1	50.8	238	59	56	51.8	301	72	50.1	43.2	49	21
2032 with Project	55.9	51.2	291	64	56.8	52.2	367	76	50.9	44.1	64	25
2032 with Project- 2032 Base	0.8	0.4	53	5	0.8	0.4	66	5	0.8	0.9	16	4
2032 with Project- 2019 Base	0.3	-0.8	51	-3	0.4	-0.8	81	-6	-0.7	-0.9	-38	6

Table 4.2.4: Chiddingstone Church of England School (Central Case)

Case	Average Summer Day				Westerly Flights				Easterly Flights			
	$L_{eq,\ 16hr}$	$L_{eq,\ 8hr}$	N65 day	N60 night	$L_{eq,\ 16hr}$	$L_{eq,\ 8hr}$	N65 day	N60 night	$L_{eq,\ 16hr}$	$L_{eq,\ 8hr}$	N65 day	N60 night
2019 Base	50.8	47.1	5	30	51.8	48.2	6	38	44.5	38.5	1	5
2032 Base	50.6	46	2	26	51.6	47.1	2	34	43.3	37.2	1	1
2032 with Project	51.4	46.4	2	28	52.4	47.4	2	36	44.2	38	1	2
2032 with Project- 2032 Base	0.8	0.4	0	2	0.8	0.3	0	3	0.9	0.8	0	1
2032 with Project- 2019 Base	0.6	-0.7	-3	-2	0.6	-0.8	-4	-2	-0.3	-0.5	-1	-3

Table 4.2.5: Capel Pre-School (Central Case)

Case	Average Summer Day				Westerly Flights				Easterly Flights			
	$L_{eq, 16hr}$	$L_{eq, 8hr}$	N65 day	N60 night	$L_{eq, 16hr}$	$L_{eq, 8hr}$	N65 day	N60 night	$L_{eq, 16hr}$	$L_{eq, 8hr}$	N65 day	N60 night
2019 Base	53.5	47.2	110	15	54.7	48.2	146	20	44	40.2	0	0
2032 Base	51.6	45.5	96	15	52.6	46.5	128	21	43.4	38.8	0	0
2032 with Project	52.8	46.4	122	18	53.9	47.4	163	25	44.1	39.1	0	0
2032 with Project- 2032 Base	1.2	0.9	27	3	1.3	0.9	36	4	0.7	0.3	0	0
2032 with Project- 2019 Base	-0.7	-0.8	13	4	-0.8	-0.8	17	5	0.1	-1.1	0	0

Table 4.2.6: Willow Tree Pre-School, Ifield (Central Case)

Case	Average Summer Day				Westerly Flights				Easterly Flights			
	$L_{eq, 16hr}$	$L_{eq, 8hr}$	N65 day	N60 night	$L_{eq, 16hr}$	$L_{eq, 8hr}$	N65 day	N60 night	$L_{eq, 16hr}$	$L_{eq, 8hr}$	N65 day	N60 night
2019 Base	51.6	45.1	11	13	51.5	45.1	11	14	51.7	45.3	11	9
2032 Base	48.9	43	2	9	48.8	42.9	2	13	49.4	43.5	2	0
2032 with Project	48.3	43.2	2	8	47.7	43	2	10	49.6	43.9	2	0
2032 with Project- 2032 Base	-0.6	0.2	0	-2	-1.1	0.1	0	-3	0.2	0.4	0	0
2032 with Project- 2019 Base	-3.3	-1.9	-9	-5	-3.8	-2.1	-9	-4	-2.1	-1.4	-9	-9

Table 4.2.7: Barnfield Community Care Home, Horley (Central Case)

Case	Average Summer Day				Westerly Flights				Easterly Flights			
	$L_{eq, 16hr}$	$L_{eq, 8hr}$	N65 day	N60 night	$L_{eq, 16hr}$	$L_{eq, 8hr}$	N65 day	N60 night	$L_{eq, 16hr}$	$L_{eq, 8hr}$	N65 day	N60 night
2019 Base	51.7	45.4	5	14	50.9	44.8	0	8	53.4	46.7	19	33
2032 Base	49.6	43.7	1	12	49.1	43.2	0	0	51	45	4	48
2032 with Project	50.3	44.3	5	13	49	43.5	0	0	52.7	45.9	22	53
2032 with Project- 2032 Base	0.7	0.6	5	1	-0.1	0.3	0	0	1.7	0.9	18	6
2032 with Project- 2019 Base	-1.4	-1.1	1	-1	-1.9	-1.3	0	-8	-0.7	-0.8	3	20

4.2.2 Table 4.2.8 to Table 4.2.14 give detailed results of noise modelling at each of the seven representative community locations, for the slower transition fleet case. In each table the noise levels at this location are given for easterly, westerly and average mode operation. Results are given for the two primary noise metrics and the two supplementary noise metrics and for the following cases:

- 2019 Base
- 2032 Base
- 2032 with Project
- 2032 with Project- 2032 Base
- 2032 with Project- 2019 Base

Table 4.2.8: Rusper Primary School (Slower Transition Fleet Case)

Case	Average Summer Day				Westerly Flights				Easterly Flights			
	$L_{eq, 16hr}$	$L_{eq, 8hr}$	N65 day	N60 night	$L_{eq, 16hr}$	$L_{eq, 8hr}$	N65 day	N60 night	$L_{eq, 16hr}$	$L_{eq, 8hr}$	N65 day	N60 night
2019 Base	52.2	45.5	20	32	52.9	45.8	26	42	48.4	44.6	0	1
2032 Base	`	45.2	18	30	52.5	45.6	24	39	48.3	43.9	0	0
2032 with Project	52	45.6	16	32	52.7	46	21	43	49	44.2	0	0
2032 with Project- 2032 Base	0.2	0.4	-2	2	0.2	0.4	-2	3	0.7	0.3	0	0
2032 with Project- 2019 Base	-0.2	0.1	-4	0	-0.2	0.2	-5	1	0.6	-0.4	0	-1

Table 4.2.9: Charlwood Village Infant School (Slower Transition Fleet Case)

Case	Average Summer Day				Westerly Flights				Easterly Flights			
	$L_{eq, 16hr}$	$L_{eq, 8hr}$	N65 day	N60 night	$L_{eq, 16hr}$	$L_{eq, 8hr}$	N65 day	N60 night	$L_{eq, 16hr}$	$L_{eq, 8hr}$	N65 day	N60 night
2019 Base	55.3	48.8	124	36	55.9	49.2	158	45	53.3	47	23	10
2032 Base	54.6	48.2	92	42	55	48.7	115	52	52.9	46.5	23	10
2032 with Project	55.2	48.8	140	49	55.5	49.2	167	61	54.3	47.3	58	13
2032 with Project- 2032 Base	0.6	0.6	48	7	0.5	0.5	53	8	1.4	0.8	35	3
2032 with Project- 2019 Base	-0.1	0	16	13	-0.4	0	10	16	1	0.3	34	3

Table 4.2.10: Lingfield Primary School (Slower Transition Fleet Case)

Case	Average Summer Day				Westerly Flights				Easterly Flights			
	$L_{eq, 16hr}$	$L_{eq, 8hr}$	N65 day	N60 night	$L_{eq, 16hr}$	$L_{eq, 8hr}$	N65 day	N60 night	$L_{eq, 16hr}$	$L_{eq, 8hr}$	N65 day	N60 night
2019 Base	55.6	52	240	66	56.4	53	286	82	51.6	45	102	19
2032 Base	55.6	51.3	250	59	56.4	52.3	306	72	51.3	44.5	83	21
2032 with Project	56.4	51.7	304	64	57.2	52.7	370	77	52.2	45.3	103	25
2032 with Project- 2032 Base	0.8	0.4	53	5	0.8	0.4	64	5	0.9	0.8	21	4
2032 with Project- 2019 Base	0.8	-0.3	63	-3	0.8	-0.3	84	-6	0.6	0.3	1	6

Table 4.2.11: Chiddingstone Church of England School (Slower Transition Fleet Case)

Case	Average Summer Day				Westerly Flights				Easterly Flights			
	$L_{eq, 16hr}$	$L_{eq, 8hr}$	N65 day	N60 night	$L_{eq, 16hr}$	$L_{eq, 8hr}$	N65 day	N60 night	$L_{eq, 16hr}$	$L_{eq, 8hr}$	N65 day	N60 night
2019 Base	50.8	47.1	5	30	51.8	48.2	6	38	44.5	38.5	1	5
2032 Base	50.9	46.5	3	27	51.9	47.5	4	36	44.7	38.6	1	3
2032 with Project	51.7	46.8	4	30	52.6	47.8	5	38	45.6	39.3	1	4
2032 with Project- 2032 Base	0.8	0.3	1	2	0.7	0.3	1	3	0.9	0.7	0	1
2032 with Project- 2019 Base	0.9	-0.3	-1	0	0.8	-0.4	-1	0	1.1	0.8	-1	0

Table 4.2.12: Capel Pre-School (Slower Transition Fleet Case)

Case	Average Summer Day				Westerly Flights				Easterly Flights			
	$L_{eq, 16hr}$	$L_{eq, 8hr}$	N65 day	N60 night	$L_{eq, 16hr}$	$L_{eq, 8hr}$	N65 day	N60 night	$L_{eq, 16hr}$	$L_{eq, 8hr}$	N65 day	N60 night
2019 Base	53.5	47.2	110	15	54.7	48.2	146	20	44	40.2	0	0
2032 Base	52.6	46.8	96	15	53.7	47.9	127	21	43.8	39.4	0	0
2032 with Project	53.9	47.7	122	19	55	48.8	163	25	44.6	39.7	0	0
2032 with Project- 2032 Base	1.3	0.9	27	3	1.3	0.9	36	4	0.8	0.3	0	0
2032 with Project- 2019 Base	0.4	0.5	13	4	0.3	0.6	17	5	0.6	-0.5	0	0

Table 4.2.13: Willow Tree Pre-School, Ifield (Slower Transition Fleet Case)

Case	Average Summer Day				Westerly Flights				Easterly Flights			
	$L_{eq, 16hr}$	$L_{eq, 8hr}$	N65 day	N60 night	$L_{eq, 16hr}$	$L_{eq, 8hr}$	N65 day	N60 night	$L_{eq, 16hr}$	$L_{eq, 8hr}$	N65 day	N60 night
2019 Base	51.6	45.1	11	13	51.5	45.1	11	14	51.7	45.3	11	9
2032 Base	50.8	44.5	9	12	50.6	44.4	9	15	51.2	44.8	9	4
2032 with Project	50.2	44.7	10	11	49.7	44.5	10	14	51.3	45.2	10	4
2032 with Project- 2032 Base	-0.6	0.2	1	-1	-0.9	0.1	1	-2	0.1	0.4	1	1
2032 with Project- 2019 Base	-1.4	-0.4	-1	-1	-1.8	-0.6	-1	0	-0.4	-0.1	-1	-4

Table 4.2.14: Barnfield Community Care Home, Horley (Slower Transition Fleet Case)

Case	Average Summer Day				Westerly Flights				Easterly Flights			
	$L_{eq, 16hr}$	$L_{eq, 8hr}$	N65 day	N60 night	$L_{eq, 16hr}$	$L_{eq, 8hr}$	N65 day	N60 night	$L_{eq, 16hr}$	$L_{eq, 8hr}$	N65 day	N60 night
2019 Base	51.7	45.4	5	14	50.9	44.8	0	8	53.4	46.7	19	33
2032 Base	51.1	44.8	6	14	50.4	44.2	0	4	52.7	46.3	22	46
2032 with Project	51.7	45.3	21	16	50.4	44.5	0	4	54.3	47.2	84	53
2032 with Project- 2032 Base	0.6	0.5	15	2	0	0.3	0	1	1.6	0.9	62	7
2032 with Project- 2019 Base	0	-0.1	16	2	-0.5	-0.3	0	-4	0.9	0.5	65	20

4.3 Noise Sensitive Buildings

4.3.1 The table below shows the predicted $L_{eq\ 16\ hr}$ day noise levels in the base case and 2032 Project central cases at 21 schools, one hospital, 18 places of worship and 7 community buildings that are predicted to be within the $L_{eq\ 16\ hr}$ day 51 dB noise contour in 2032 with the Project.

Table 4.3.1: Noise Sensitive Buildings, $L_{eq\ 16\ hr}$ day Noise Levels and Changes (Central Case)

Name	Postcode	2019	2032 Baseline	2032 with Project	2032 with Project-2019 Base	2032 with Project-2032 Base
Schools						
44 Acorn Cottage Cranbrook Nursery Ltd	RH6 9TE	60.4	58.7	58.7	-1.7	0.0
25 Aurora Redehall School	RH6 9QA	56.4	54.9	56.1	-0.3	1.2
8 Brookfield Day Nursery	RH10 9TR	54.5	51.8	52.5	-2.0	0.7
6 Capel Pre School	RH5 5JX	53.5	51.6	52.8	-0.7	1.2
47 Charlwood House Day Nursery	RH11 0QA	66.3	64.3	60.8	-5.5	-3.5
2 Charlwood Village Primary School	RH6 0DA	55.3	52.9	53.4	-1.9	0.5
7 Chiddingstone Nursery	TN8 7AD	51.0	<51	51.6	0.6	-
42 Childcare & Learning Ltd	RH6 9SW	58.9	57.1	56.9	-2.0	-0.2
41 Cranbrook Nursery	RH6 9TE	59.7	58.0	58.0	-1.7	0.0
5 Forge Wood Primary School	RH10 3SW	53.1	51.1	50.4	-2.7	-0.7
3 Hever Church of England Voluntary Aided Primary School	TN8 7NH	52.5	52.3	53.1	0.6	0.8
43 Kid Co Ltd	RH6 9SW	59.4	57.6	57.4	-2.0	-0.2
24 Lingfield College	RH7 6PH	55.6	55.1	55.9	0.3	0.8
21 Lingfield Primary School	RH7 6HA	55.6	55.1	55.9	0.3	0.8
27 Marsh Green Pre-school	TN8 5QR	54.2	53.9	54.6	0.4	0.7
4 Scott Broadwood C of E Infant School	RH5 5JX	53.6	51.6	52.9	-0.7	1.3
22 St Piers School (Young Epilepsy)	RH7 6PW	55.6	55.1	55.9	0.3	0.8
46 The Little House Montessori	RH6 9RG	65.4	64.7	65.4	0.0	0.7
9 The Stables Nursery School	RH19 2LF	52.3	51.9	52.7	0.4	0.8
26 Wee One's Day Nursery & Pre School	RH7 6HD	55.2	54.8	55.6	0.4	0.8
23 Young Epilepsy (The National Centre for Young People with Epilepsy)	RH7 6PW	55.6	55.1	55.9	0.3	0.8
Hospitals						
1 Edenbridge & District War Memorial Hospital	TN8 5DA	52.8	52.6	53.3	0.5	0.7
Places of Worship						
29 Chapel (Private)	RH7	55.5	55.0	55.8	0.3	0.8
14 Gurdwara Sri Guru Singh Sabha Temple	RH11 0NU	53.7	51.5	50.5	-3.2	-1.0
11 John the Baptist church, Okewood	RH5 5GT	52.0	<51	51.3	-0.7	-
31 Kingdom Hall of Jehovah's Witnesses	TN8	54.2	53.8	54.6	0.4	0.8
30 Providence Chapel	RH6	55.7	53.2	53.7	-2.0	0.5
49 St Bartholomew C of E Church Rectory	RH6 9RG	65.7	65.0	65.7	0.0	0.7
42 St Bernard's Church	RH7	56.0	55.5	56.3	0.3	0.8
10 St John the Baptist's Church, Capel	RH5	53.4	51.4	52.7	-0.7	1.3
33 St John's Church	TN8	54.2	53.9	54.6	0.4	0.7
20 St Mary Magdalene Church	RH12 4PX	53.4	51.6	51.9	-1.5	0.3

Name	Postcode	2019	2032 Baseline	2032 with Project	2032 with Project-2019 Base	2032 with Project-2032 Base
28 St Michael and All Angels' Church	RH11	65.6	63.7	62.5	-3.1	-1.2
40 St Nicholas' Church	RH6 0EE	56.0	53.7	54.7	-1.3	1.0
28 St Peter and St Paul's Church	RH7	55.7	55.2	56.0	0.3	0.8
13 St Peter's C of E Church	TN8 7NH	52.5	52.3	53.1	0.6	0.8
38 The Chapel	RH6 0DQ	57.9	55.5	56.8	-1.1	1.3
35 The Church of St Peter & St Paul	RH7 6BP	55.2	54.8	55.6	0.4	0.8
36 The London Temple	RH7 6HW	57.2	56.4	57.2	0.0	0.8
50 Touchwood Chapel	RH6	68.6	67.4	68.1	-0.5	0.7
Community Buildings						
15 Gurjar Hindu Union	RH11 0AF	53.8	51.5	50.3	-3.5	-1.2
18 Hever Village Hall	TN8 7NH	52.6	52.4	53.2	0.6	0.8
37 Lingfield & Dormansland Community Centre	RH7 6AB	56.2	55.7	56.4	0.2	0.7
45 Newchapel Hall	RH7 6HR	60.2	59.6	60.4	0.2	0.8
16 Okewood Hill Village Hall	RH5 5PU	54.7	53.0	53.9	-0.8	0.9
17 Parish Hall	RH6 0DS	55.2	53.0	53.8	-1.4	0.8
12 The Ellens Green Memorial Hall	RH12 3AS	52.5	51.1	51.9	-0.6	0.8
Heritage Assets						
52 Lowfield Heath Windmill	RH6 0EQ	57.9	55.7	57.7	-0.2	2.0
51 Thunderfield Castle site	RH6 9PP	52.9	51.1	52.3	-0.6	1.2

4.3.2 The table below shows the predicted $L_{eq\ 16\ hr}$ day noise levels in the base case and 2032 Project slower transition fleet case at 21 schools, one hospital, 18 places of worship and 7 community buildings.

Table 4.3.2: Noise Sensitive Buildings, $L_{eq\ 16\ hr}$ day Noise Levels and Changes (Slower Transition Fleet Case)

Name	Postcode	2019	2032 Baseline	2032 with Project	2032 with Project-2019 Base	2032 with Project-2032 Base
Schools						
44 Acorn Cottage Cranbrook Nursery Ltd	RH6 9TE	60.4	59.9	59.9	-0.5	0.0
25 Aurora Redehall School	RH6 9QA	56.4	55.9	57.1	0.7	1.2
8 Brookfield Day Nursery	RH10 9TR	54.5	53.7	54.4	-0.1	0.7
6 Capel Pre School	RH5 5JX	53.5	52.6	53.9	0.4	1.3
47 Charlwood House Day Nursery	RH11 0QA	66.3	65.6	62.6	-3.7	-3.0
2 Charlwood Village Primary School	RH6 0DA	55.3	54.6	55.2	-0.1	0.6
7 Chiddingstone Nursery	TN8 7AD	51.0	51.1	51.9	0.9	0.8
42 Childcare & Learning Ltd	RH6 9SW	58.9	58.4	58.2	-0.7	-0.2
41 Cranbrook Nursery	RH6 9TE	59.7	59.2	59.2	-0.5	0.0

Name	Postcode	2019	2032 Baseline	2032 with Project	2032 with Project-2019 Base	2032 with Project-2032 Base
5 Forge Wood Primary School	RH10 3SW	53.1	52.6	52.0	-1.1	-0.6
3 Hever Church of England Voluntary Aided Primary School	TN8 7NH	52.5	52.6	53.4	0.9	0.8
43 Kid Co Ltd	RH6 9SW	59.4	58.9	58.7	-0.7	-0.2
24 Lingfield College	RH7 6PH	55.6	55.6	56.4	0.8	0.8
21 Lingfield Primary School	RH7 6HA	55.6	55.6	56.4	0.8	0.8
27 Marsh Green Pre-school	TN8 5QR	54.2	54.2	55.0	0.8	0.8
4 Scott Broadwood C of E Infant School	RH5 5JX	53.6	52.6	54.0	0.4	1.4
22 St Piers School (Young Epilepsy)	RH7 6PW	55.6	55.6	56.4	0.8	0.8
46 The Little House Montessori	RH6 9RG	65.4	65.3	65.9	0.5	0.6
9 The Stables Nursery School	RH19 2LF	52.3	52.3	53.1	0.8	0.8
26 Wee One's Day Nursery & Pre School	RH7 6HD	55.2	55.2	56.0	0.8	0.8
23 Young Epilepsy (The National Centre for Young People with Epilepsy)	RH7 6PW	55.6	55.6	56.4	0.8	0.8
Hospitals						
1 Edenbridge & District War Memorial Hospital	TN8 5DA	52.8	52.9	53.6	0.8	0.7
Places of Worship						
29 Chapel (Private)	RH7	55.5	55.5	56.3	0.8	0.8
14 Gurdwara Sri Guru Singh Sabha Temple	RH11 0NU	53.7	53.1	52.2	-1.5	-0.9
11 John the Baptist church, Okewood	RH5 5GT	52.0	51.4	52.4	0.4	1.0
31 Kingdom Hall of Jehovah's Witnesses	TN8	54.2	54.2	55.0	0.8	0.8
30 Providence Chapel	RH6	55.7	54.9	55.5	-0.2	0.6
49 St Bartholomew C of E Church Rectory	RH6 9RG	65.7	65.6	66.3	0.6	0.7
42 St Bernard's Church	RH7	56.0	56.0	56.8	0.8	0.8
10 St John the Baptist's Church, Capel	RH5	53.4	52.4	53.8	0.4	1.4
33 St John's Church	TN8	54.2	54.2	55.0	0.8	0.8
20 St Mary Magdalene Church	RH12 4PX	53.4	52.9	53.1	-0.3	0.2
28 St Michael and All Angels' Church	RH11	65.6	65.1	64.1	-1.5	-1.0
40 St Nicholas' Church	RH6 0EE	56.0	55.3	56.4	0.4	1.1
28 St Peter and St Paul's Church	RH7	55.7	55.6	56.4	0.7	0.8
13 St Peter's C of E Church	TN8 7NH	52.5	52.6	53.4	0.9	0.8
38 The Chapel	RH6 0DQ	57.9	57.2	58.5	0.6	1.3
35 The Church of St Peter & St Paul	RH7 6BP	55.2	55.2	56.0	0.8	0.8
36 The London Temple	RH7 6HW	57.2	57.0	57.8	0.6	0.8
50 Touchwood Chapel	RH6	68.6	68.2	68.9	0.3	0.7
Community Buildings						
15 Gurjar Hindu Union	RH11 0AF	53.8	53.1	52.1	-1.7	-1.0
18 Hever Village Hall	TN8 7NH	52.6	52.7	53.5	0.9	0.8

Name	Postcode	2019	2032 Baseline	2032 with Project	2032 with Project-2019 Base	2032 with Project-2032 Base
37 Lingfield & Dormansland Community Centre	RH7 6AB	56.2	56.1	56.9	0.7	0.8
45 Newchapel Hall	RH7 6HR	60.2	60.1	60.9	0.7	0.8
16 Okewood Hill Village Hall	RH5 5PU	54.7	54.1	54.9	0.2	0.8
17 Parish Hall	RH6 0DS	55.2	54.5	55.5	0.3	1.0
12 The Ellens Green Memorial Hall	RH12 3AS	52.5	52.0	52.8	0.3	0.8
Heritage Assets						
52 Lowfield Heath Windmill	RH6 0EQ	57.9	57.2	59.2	1.3	2.0
51 Thunderfield Castle site	RH6 9PP	52.9	52.3	53.5	0.6	1.2

5 Sensitivity Tests

5.1 Runway Modal Split

5.1.1 The ratio of westerly (ie Runway 26) and easterly (ie Runway 08) operations is referred to as the runway modal split. In the summer daytime of 2019 this was 73% westerly and 27% easterly, and in the night-time it was 72% westerly and 28% easterly. Because wind conditions vary from year to year, so does modal split. In 2019 the long term average day and night 'standard' modal split 2019 was 75/25 and this modal split has been used in the baseline and all forecast years used in this assessment.

5.1.2 The results of modelling for variations in runway modal split are shown in Table 5.1.1.

Table 5.1.1: 2029 Runway Modal Split Sensitivity Tests, Summary

	90W/10E	80W/20E	70W/30E	60W/40E	50W/50E
$L_{eq\ 16\ hr}$ Day 51dB Area	135.9	135.4	134.8	133.6	132.1
$L_{eq\ 16\ hr}$ Day 51dB Population	19400	20,500	22,200	23,200	23,700
$L_{eq\ 8\ hr}$ Night 45 dB Area	148.2	148.4	147.8	146.8	145.6
$L_{eq\ 8\ hr}$ Night 45 dB Population	23900	24700	24600	24700	25100

6 WebTAG

6.1 Results

6.1.1 The CAA noise modelling team carried out a WebTAG assessment for air noise using the 2029 and 2038 noise modelling results for the Project. The results are provided in the table below.

6.1.2 There has been an error, which the CAA has confirmed, in the DfT Workbook for some time, which has been uncorrected. The noise Workbook in WebTAG has been used for many years now for roads and railways. More recent aviation policy has defined the Lowest Observable Adverse Effects Levels (LOAEL) for aviation as $L_{eq\ 16\ hr\ day}$ 51 dB and $L_{eq\ 8\ hour}$ night 45 dB.. In response to the policy defining LOAEL for aviation noise, the DfT added a sensitivity test for aviation to exclude the analysis of levels below $L_{eq\ 16hr}$ 51 dB. Unfortunately, in doing so they also excluded the analysis of levels below $L_{eq\ 8\ hr}$ night 51 dB which wrongly changed the night noise element. The CAA confirmed this as an error [2] and provided the webTAG workbook results as follows.

Table 6.1.1: WebTAG Noise Appraisal

	Central Case Fleet **Sensitivity test excluding impacts below 51 dB (for aviation proposals only) Corrected**	**Slower Transition Fleet** **Sensitivity test excluding impacts below 51 dB (for aviation proposals only) Corrected**
Net present value of change in noise (£, 2010 prices):	-£10,737,264	-£12,214,326
Net present value of impact on sleep disturbance (£, 2010 prices):	-£3,482,621	-£4,505,727
Net present value of impact on amenity (£, 2010 prices):	-£5,133,847	-£5,467,146
Net present value of impact on AMI (£, 2010 prices):	-£48,372	-£64,818
Net present value of impact on stroke (£, 2010 prices):	-£826,173	-£867,816
Net present value of impact on dementia (£, 2010 prices):	-£1,246,250	-£1,308,819

*positive value reflects a **net benefit** (ie a reduction in noise)

6.1.3 A number of assumptions are made in order to complete the workbook. There is an assumption that for the 47 years beyond 2038 noise levels are assumed constant in order to arrive at a 60 year discounted appraisal result. This is unlikely and more so for night noise given the night noise restrictions which are expected to prevail. The sleep disturbance costs are less than half the total. This is shown in the night noise contours changing less than day contours because of the assumption that the northern runway would not be used routinely between 2300 and 0600 hours.

[2] Email from CAA, ERCD to Mitchell Environmental Ltd, 4 April 2021