Appendix 7E
Figures

LEGEND:

CIVIL AVIATION AUTHORITY

UNITED KINGDOM AIP

AERO INFO DATE 08 MAY 17

AIRCRAFT PARKING/DOCKING CHART - ICAO

ARP 512258N 0024309W

AD ELEV 622FT

BRISTOL
EGGD

RUNWAY/TAXIWAY/APRON PHYSICAL CHARACTERISTICS		
APRON / RWY / TWY	SURFACE	BEARING STRENGTH
RWY 09/27	Grooved Marshall Asphalt	51/F/C/W/T
Main Apron	Concrete/Asphalt	51/R/C/W/T 51/F/C/W/T
West Apron	Concrete	51/R/C/W/T
Southern Parking Area	Asphalt	30/F/C/W/T
Light Aircraft Park	Asphalt	20/F/C/Y/T
TWY A/G/Z	Asphalt	51/F/C/W/T
TWY B	Asphalt	53/F/C/W/T
TWY D	Asphalt	42/F/C/W/T
TWY F	Asphalt	25/F/C/W/T
TWY H	Asphalt/Grass	20/F/C/Y/T
TWY J	Asphalt	30/F/C/W/T

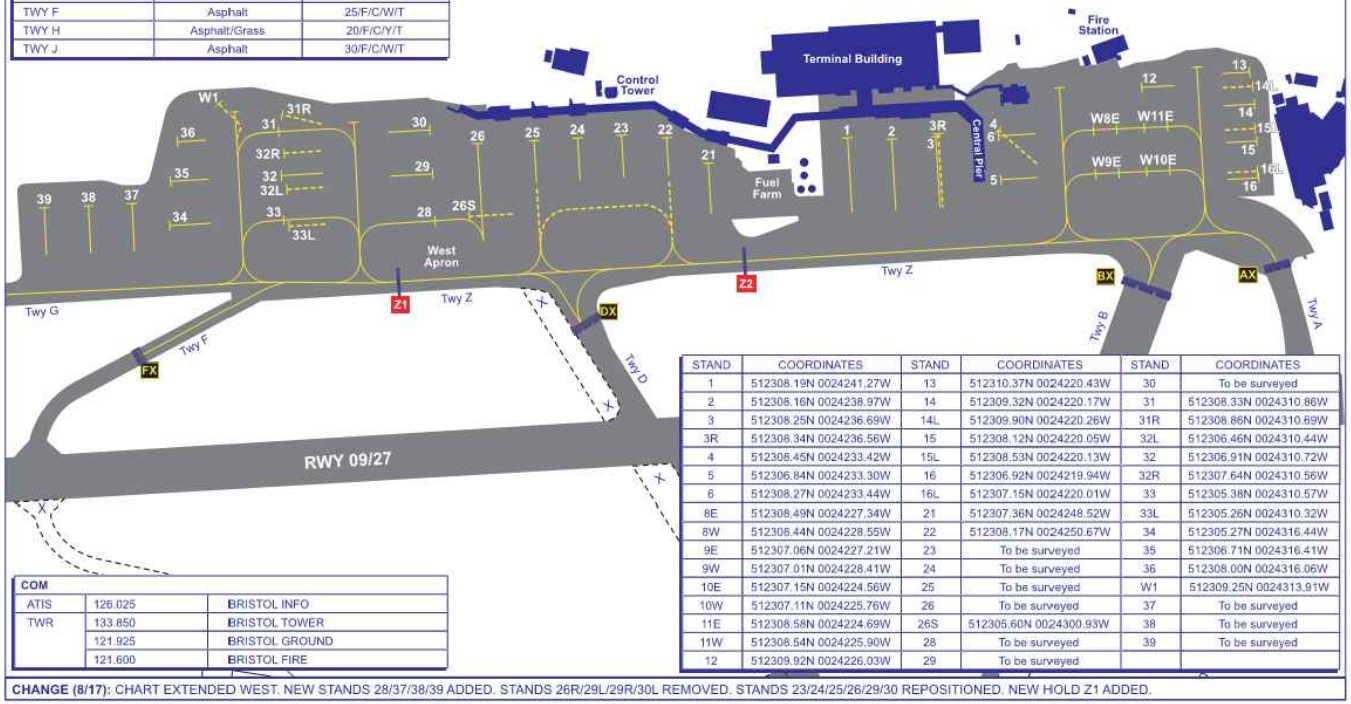
GUND (Geoid Undulation) = The height of the Geoid (MSL) above the Reference Elipsoid (WGS 84) at the stated position.

BEARINGS ARE MAGNETIC
ELEVATIONS AND HEIGHTS ARE IN FEET

ELEVATIONS IN FEET AMSL **609**

50 0 50 100 150m
100 0 100 200 300 400 500ft

VAR 1.4°W - 2017
N
Annual Rate of Change 0.15°E



COM		
ATIS	126.025	BRISTOL INFO
TWR	133.850	BRISTOL TOWER
	121.925	BRISTOL GROUND
	121.600	BRISTOL FIRE

STAND	COORDINATES	STAND	COORDINATES	STAND	COORDINATES
1	512308.19N 0024241.27W	13	512310.37N 0024220.43W	30	To be surveyed
2	512308.16N 0024238.97W	14	512309.32N 0024220.17W	31	512308.33N 0024310.86W
3	512308.25N 0024236.69W	14L	512309.90N 0024220.26W	31R	512308.86N 0024310.69W
3R	512308.34N 0024236.56W	15	512308.12N 0024220.05W	32L	512306.46N 0024310.44W
4	512308.45N 0024233.42W	15L	512308.53N 0024220.13W	32	512306.91N 0024310.72W
5	512306.84N 0024233.30W	16	512306.92N 0024219.94W	32R	512307.64N 0024310.56W
6	512308.27N 0024233.44W	16L	512307.15N 0024220.01W	33	512305.38N 0024310.57W
8E	512308.49N 0024227.34W	21	512307.36N 0024248.52W	33L	512305.26N 0024310.32W
8W	512308.44N 0024228.55W	22	512308.17N 0024250.67W	34	512305.27N 0024316.44W
9E	512307.06N 0024227.21W	23	To be surveyed	35	512306.71N 0024316.41W
9W	512307.01N 0024228.41W	24	To be surveyed	36	512308.00N 0024316.06W
10E	512307.15N 0024224.56W	25	To be surveyed	W1	512309.25N 0024313.91W
10W	512307.11N 0024225.76W	26	To be surveyed	37	To be surveyed
11E	512308.58N 0024224.69W	26S	512305.60N 0024300.93W	38	To be surveyed
11W	512308.54N 0024225.90W	28	To be surveyed	39	To be surveyed
12	512309.92N 0024226.03W	29	To be surveyed		

CHANGE (8/17): CHART EXTENDED WEST. NEW STANDS 28/37/38/39 ADDED. STANDS 26R/29L/29R/30L REMOVED. STANDS 23/24/25/26/29/30 REPOSITIONED. NEW HOLD Z1 ADDED.

AMDT 8/2017

AD 2-EGGD-2-2
20 Jul 2017

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12mppa Planning Application

Figure 7E.1
Aircraft Parking/Docking
UK AIP 2017

DRAWN: MP CHECKED: NW

DATE: October 2018 SCALE: 1:20000@A4

Drawing No:

A11172_04_DR001

LEGEND:

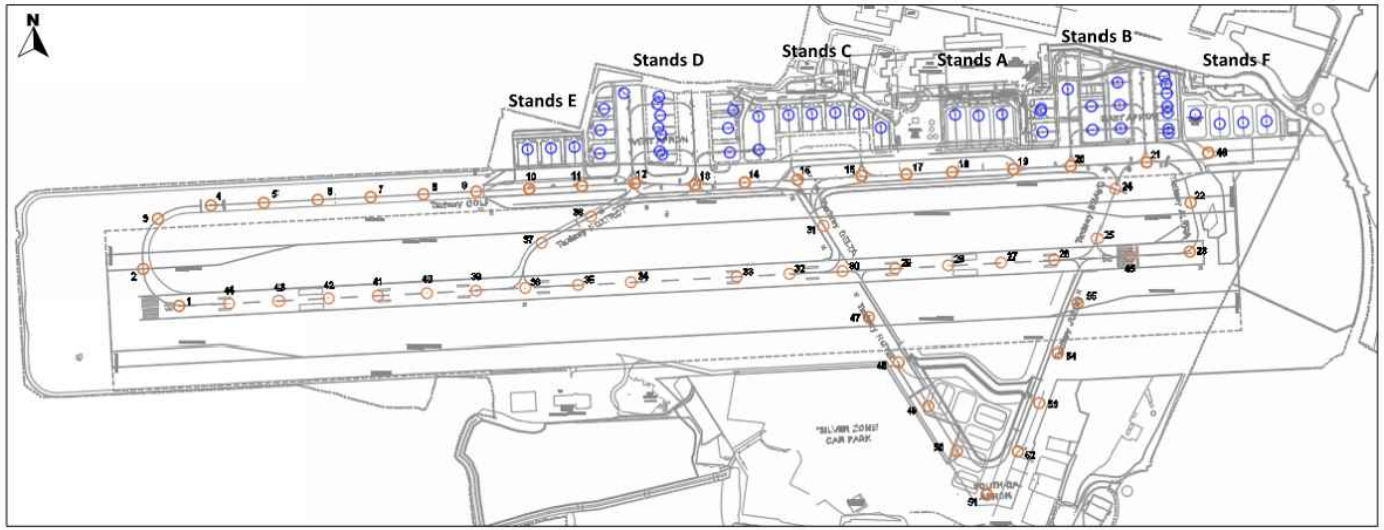

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Figure 7E.2
Aircraft Taxi Routes

DRAWN: MP CHECKED: NW

DATE: October 2018 SCALE: 1:20000@A4

Drawing No:

A11172_04_DR002

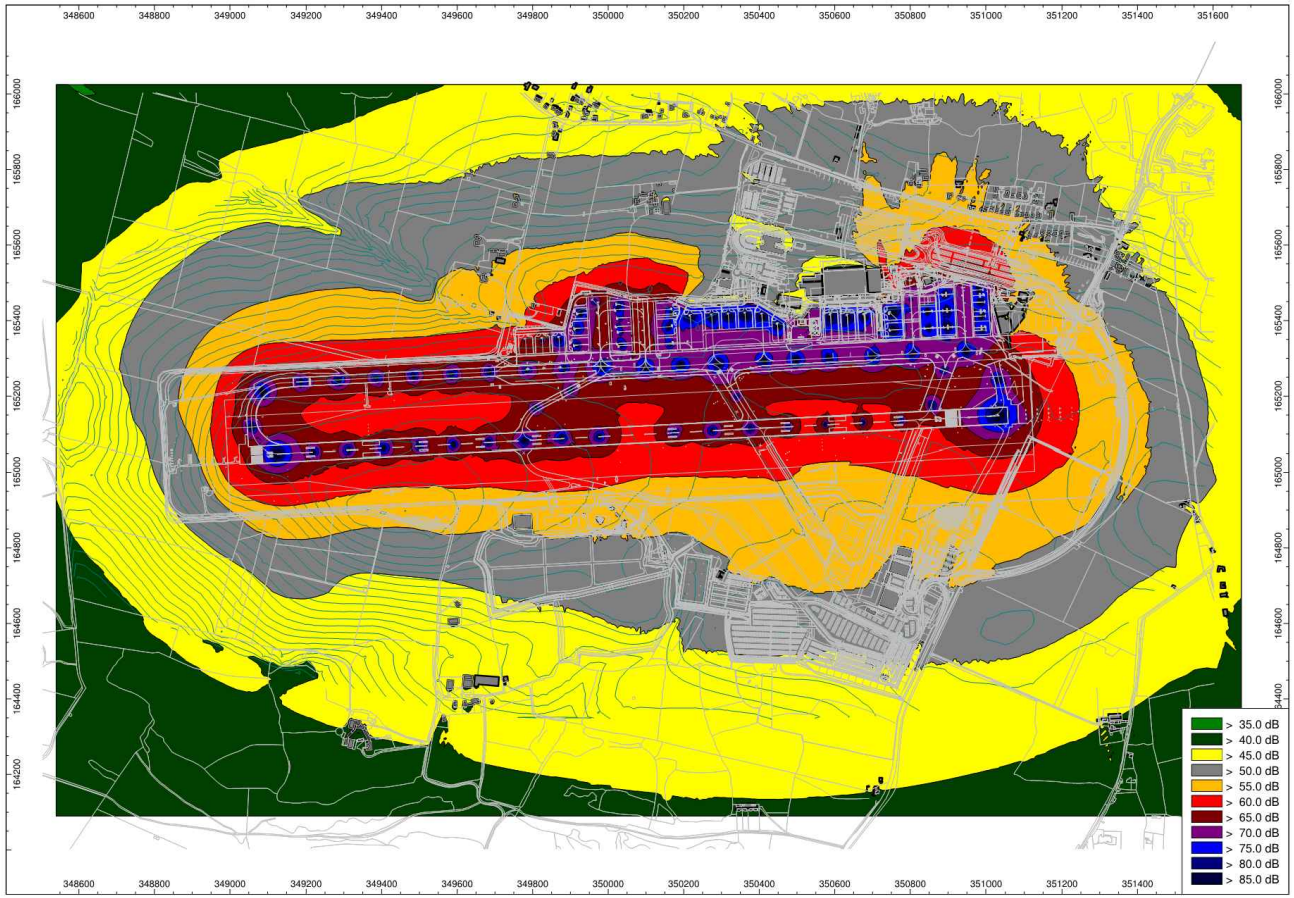

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Figure 7E.3
2017 Ground Noise Contours
Summer $L_{Aeq,16h}$

DRAWN: MP CHECKED: NW

DATE: October 2018 SCALE: 1:20000@A4

Drawing No:

A11172_04_DR003_2.0

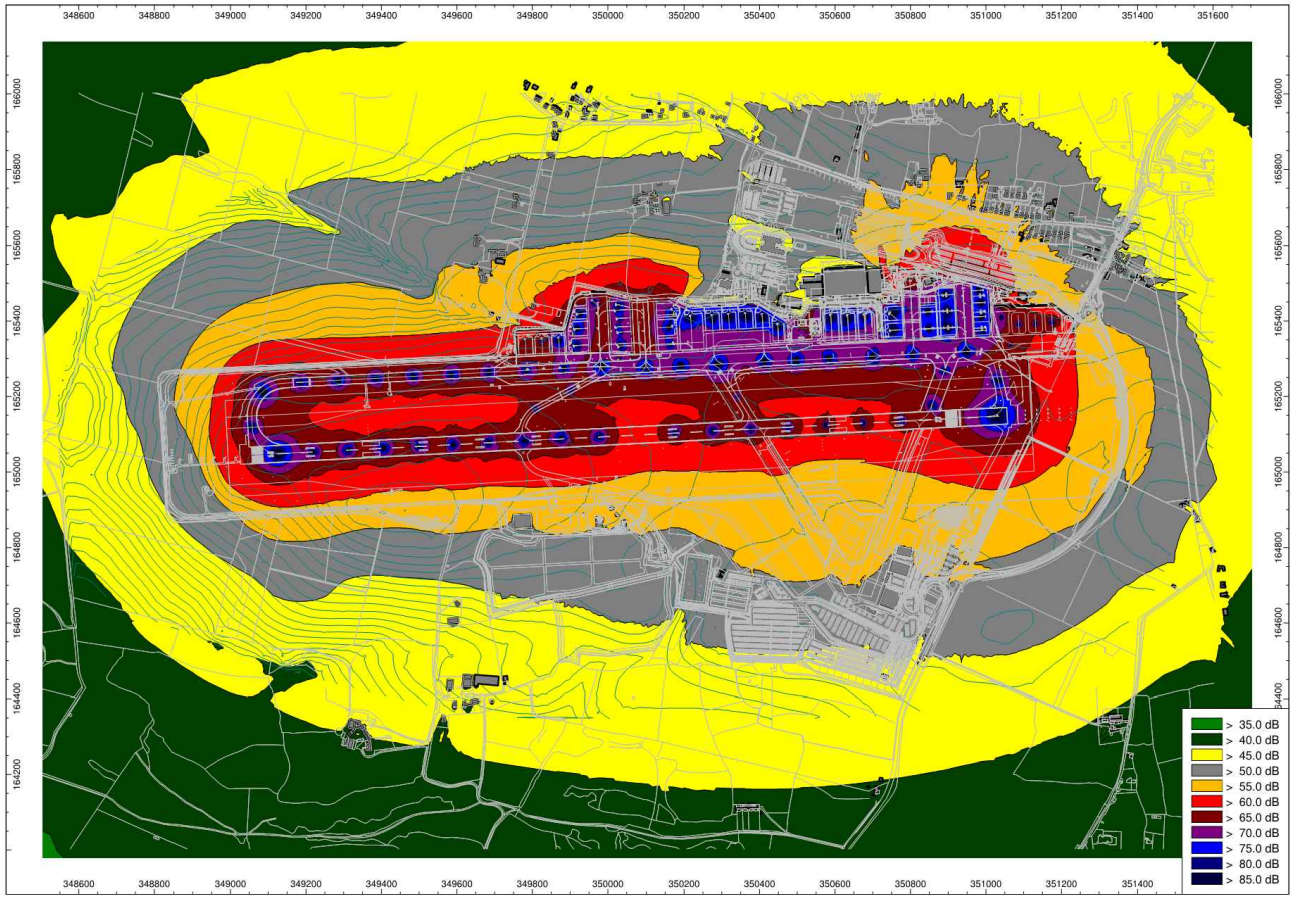

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Figure 7E.4
10mppa Ground Noise Contours
Summer $L_{Aeq,16h}$

DRAWN: MP CHECKED: NW

DATE: October 2018 SCALE: 1:20000@A4

Drawing No:

A11172_04_DR004_2.0

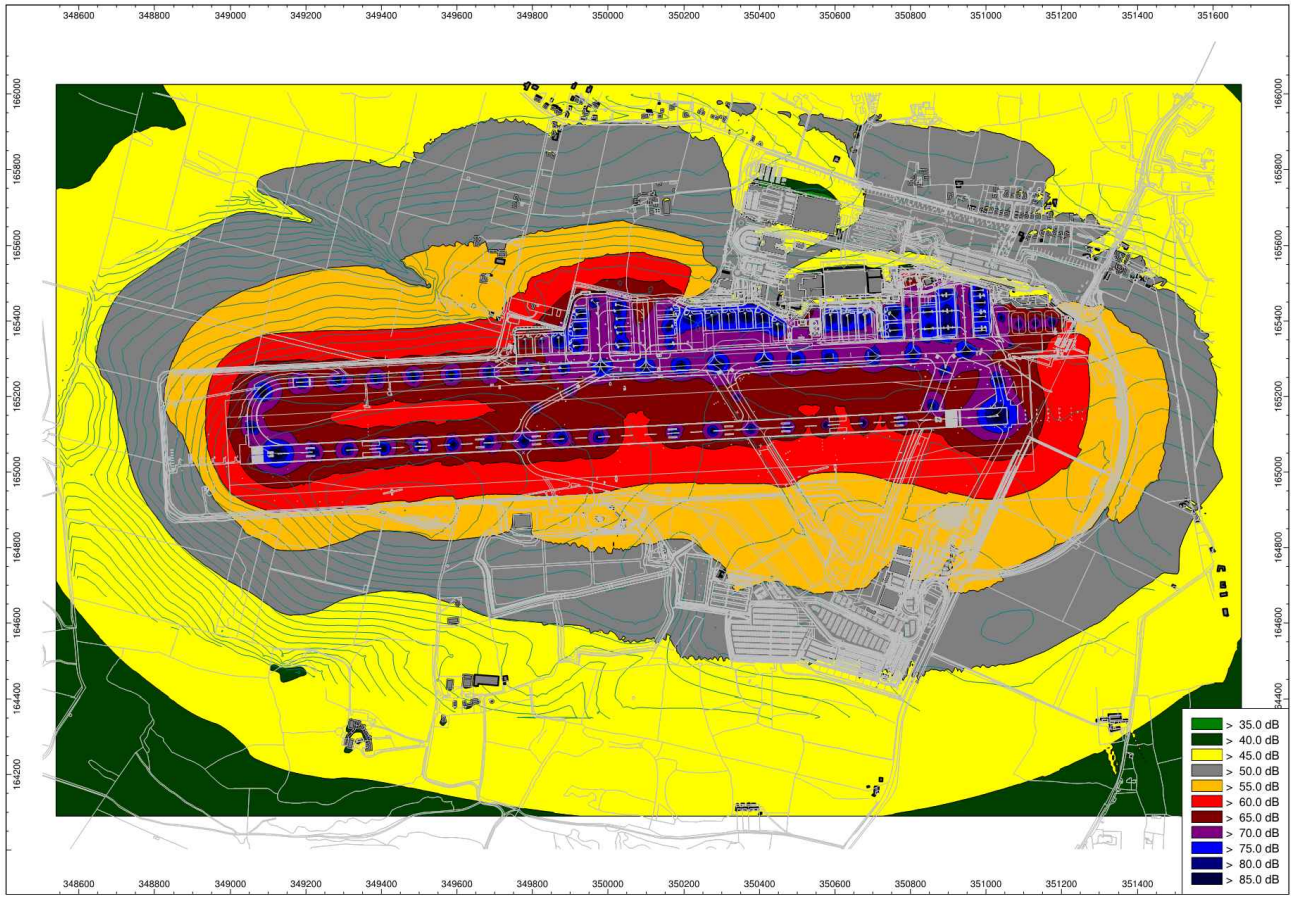

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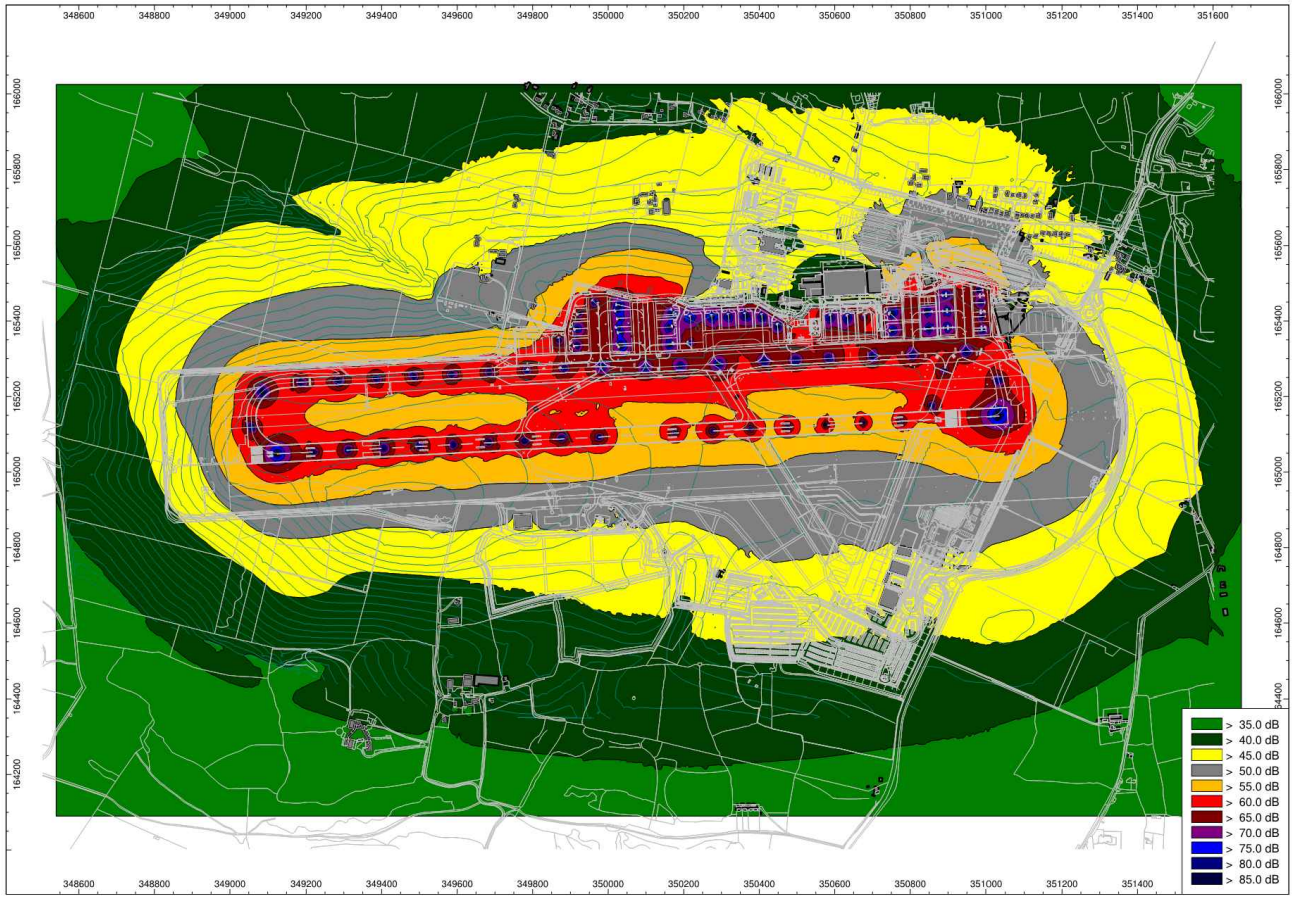
Figure 7E.5
12mppa Ground Noise Contours
Summer $L_{Aeq,16h}$

DRAWN: MP CHECKED: NW

DATE: October 2018 SCALE: 1:20000@A4

Drawing No:

A11172_04_DR005_2.0



LEGEND:

Rev	Date	Description	Initials
2.0	13/11/2018	Revised contours	MP
3.0	04/12/2018	Revised contours	MP

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Figure 7E.6
2017 Ground Noise Contours
Summer $L_{Aeq,8h}$

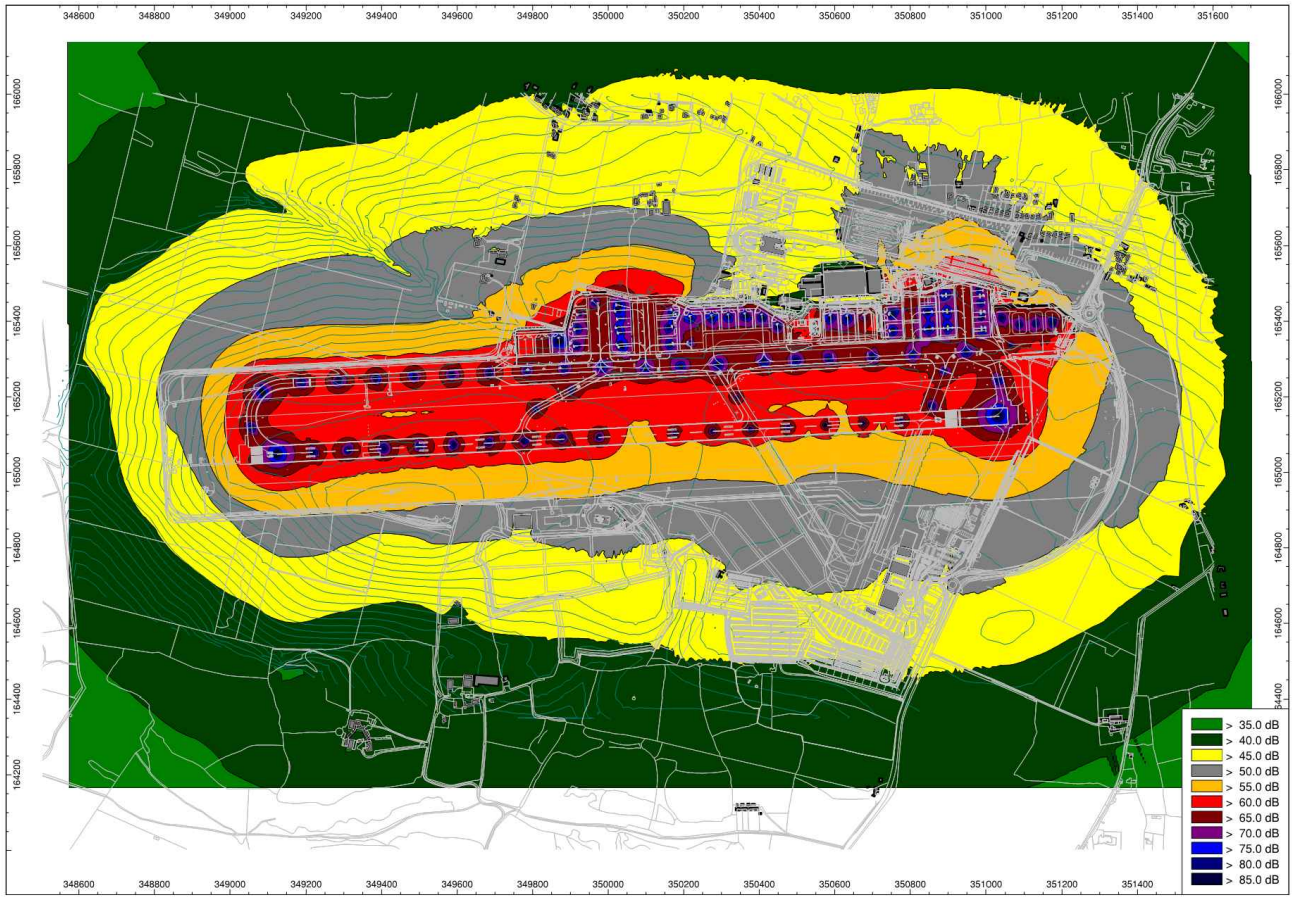
DRAWN: MP CHECKED: NW

DATE: October 2018 SCALE: 1:20000@A4

Drawing No:

A11172_04_DR006_3.0

LEGEND:



Rev	Date	Description	Initials
2.0	13/11/2018	Revised contours	MP
3.0	04/12/2018	Revised contours	MP

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Figure 7E.7
10mppa Ground Noise Contours
Summer $L_{Aeq,8h}$

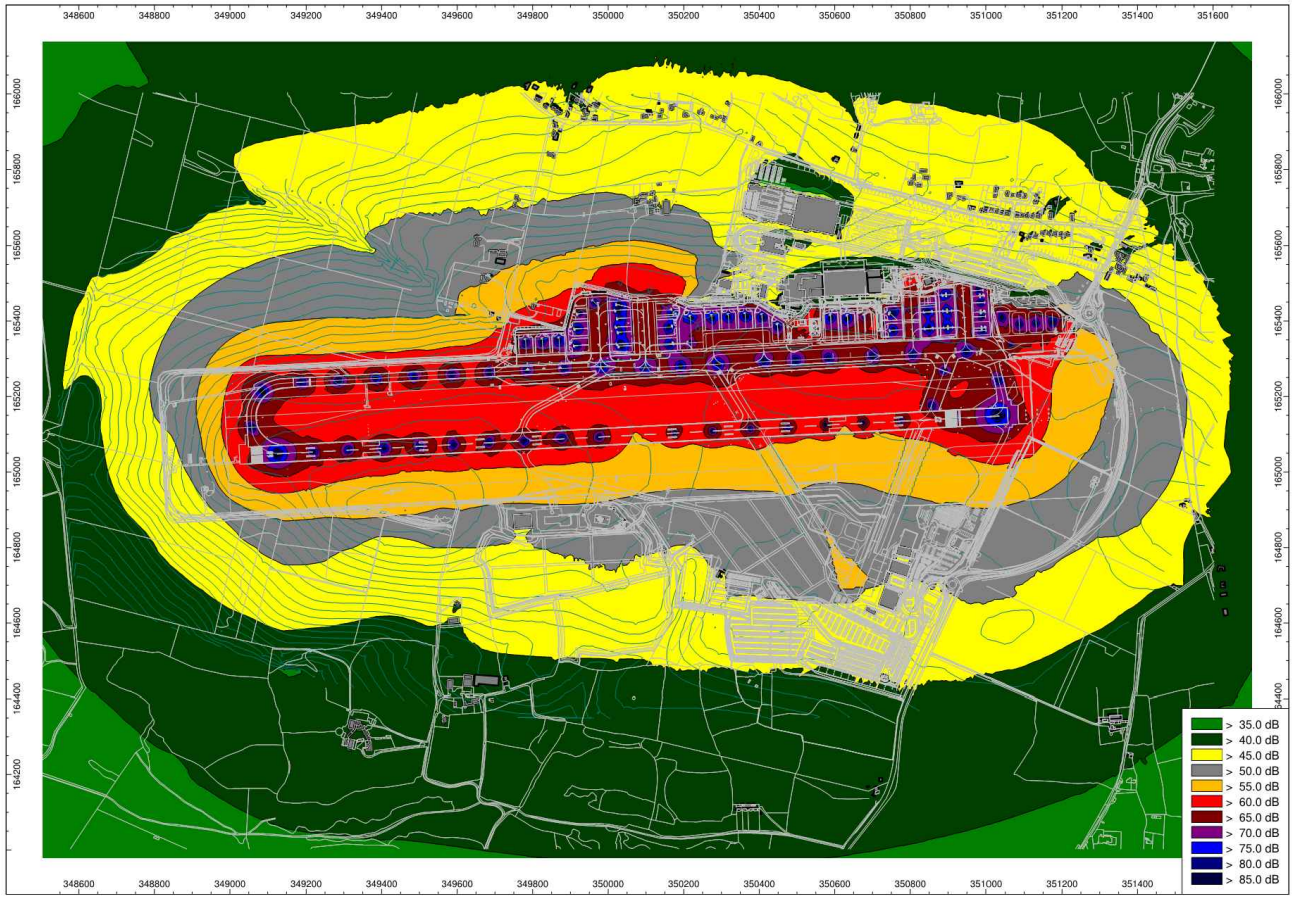
DRAWN: MP CHECKED: NW

DATE: October 2018 SCALE: 1:20000@A4

Drawing No:

A11172_04_DR007_3.0

LEGEND:



Rev	Date	Description	Initials
2.0	13/11/2018	Revised contours	MP
3.0	04/12/2018	Revised contours	MP

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Figure 7E.8
12mppa Ground Noise Contours
Summer $L_{Aeq,8h}$

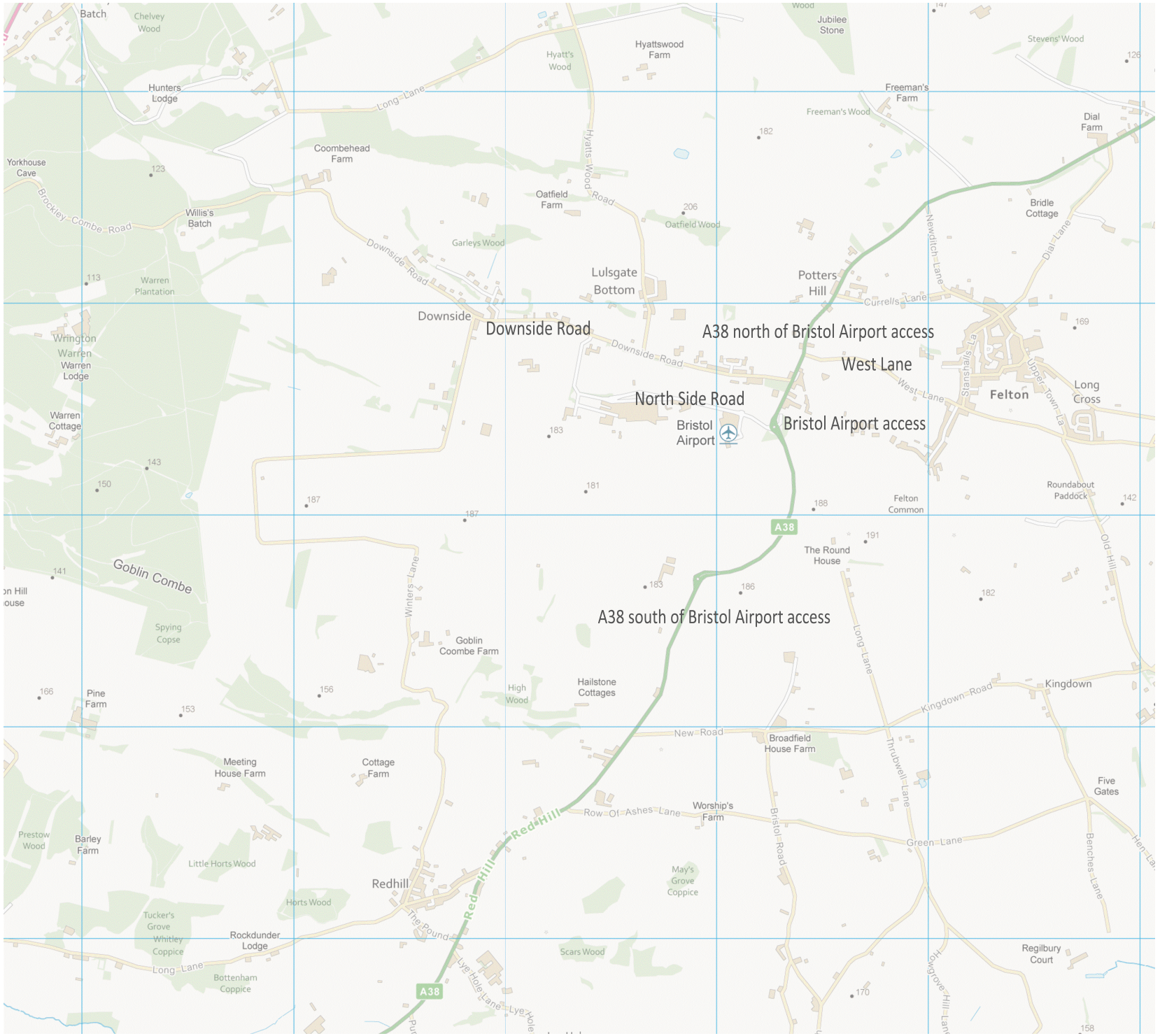
DRAWN: MP CHECKED: NW

DATE: October 2018 SCALE: 1:20000@A4

Drawing No:

A11172_04_DR008_2.0

Appendix 7F
Figures



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Location of Residential Receptor

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12mppa Planning Application

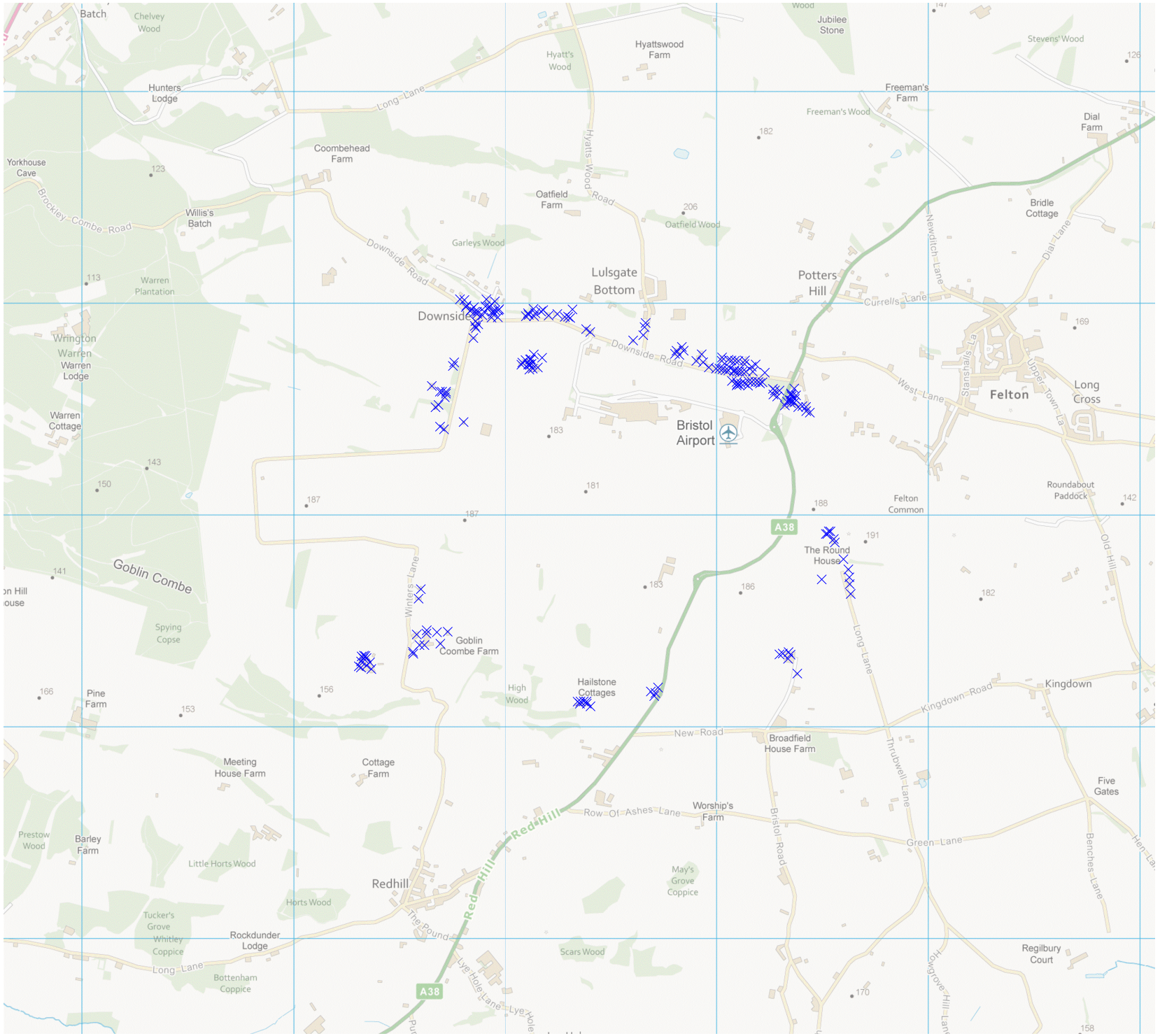
Figure 7F.1
Road network around the Proposed Development

DRAWN: MP CHECKED: NW

DATE: October 2018 SCALE: 1:25000@A4

Drawing No:

A11172_05_DR001



This drawing contains Ordnance Survey data © Crown Copyright and database right 2018.

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Location of Residential Receptor

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Figure 7F.2
Residential Receptors
Road Traffic Noise

DRAWN: MP CHECKED: NW

DATE: October 2018 SCALE: 1:25000@A4

Drawing No:

A11172_05_DR002

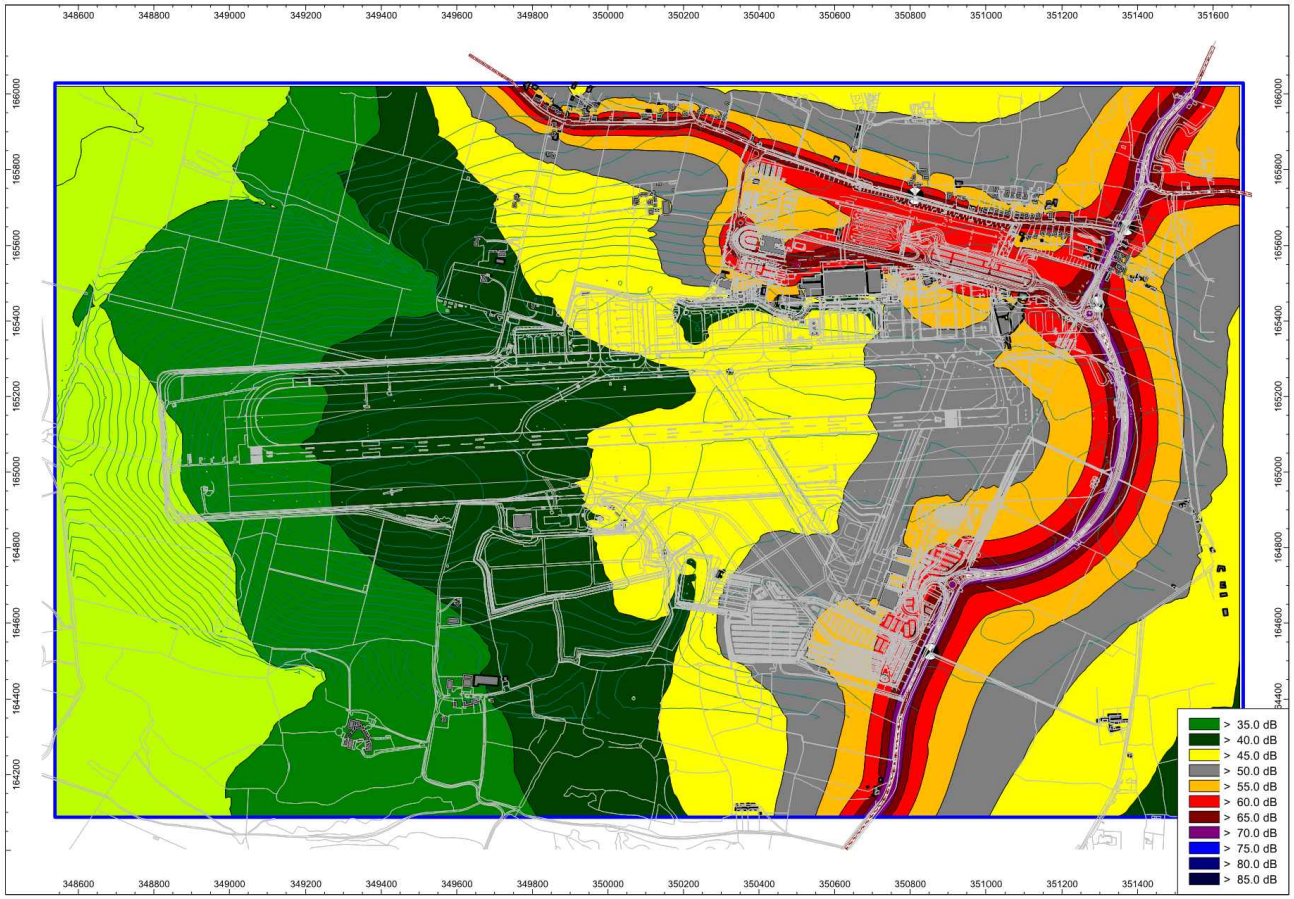

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Figure 7F.3
2017 Road Traffic Noise Contours
$L_{A10,18h}$

DRAWN: MP CHECKED: NW

DATE: October 2018 SCALE: 1:20000@A4

Drawing No:

A11172_05_DR003

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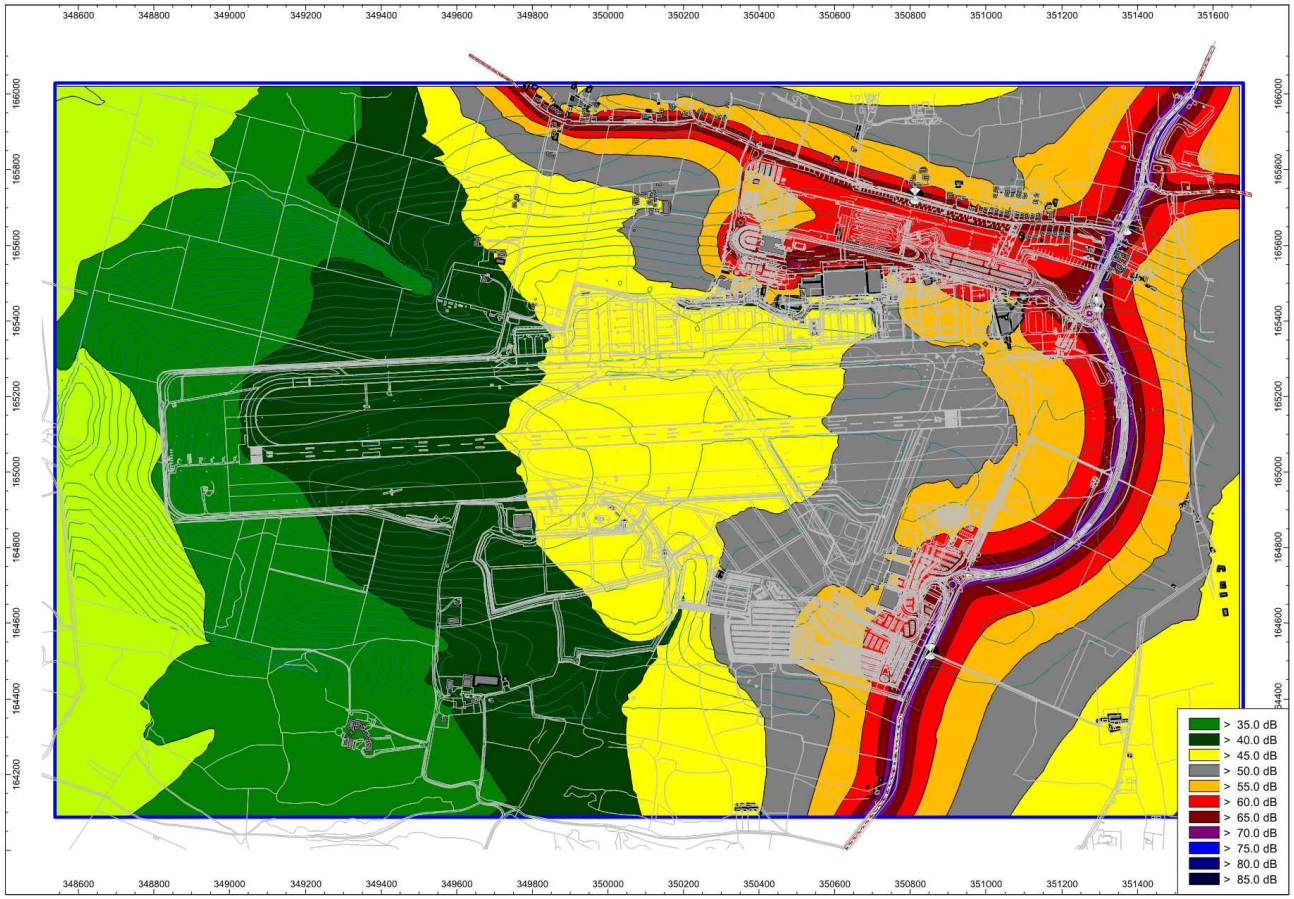

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Figure 7F.4
10mppa Road Traffic Noise Contours
$L_{A10,18h}$

DRAWN: MP CHECKED: NW

DATE: October 2018 SCALE: 1:20000@A4

Drawing No:

A11172_05_DR004

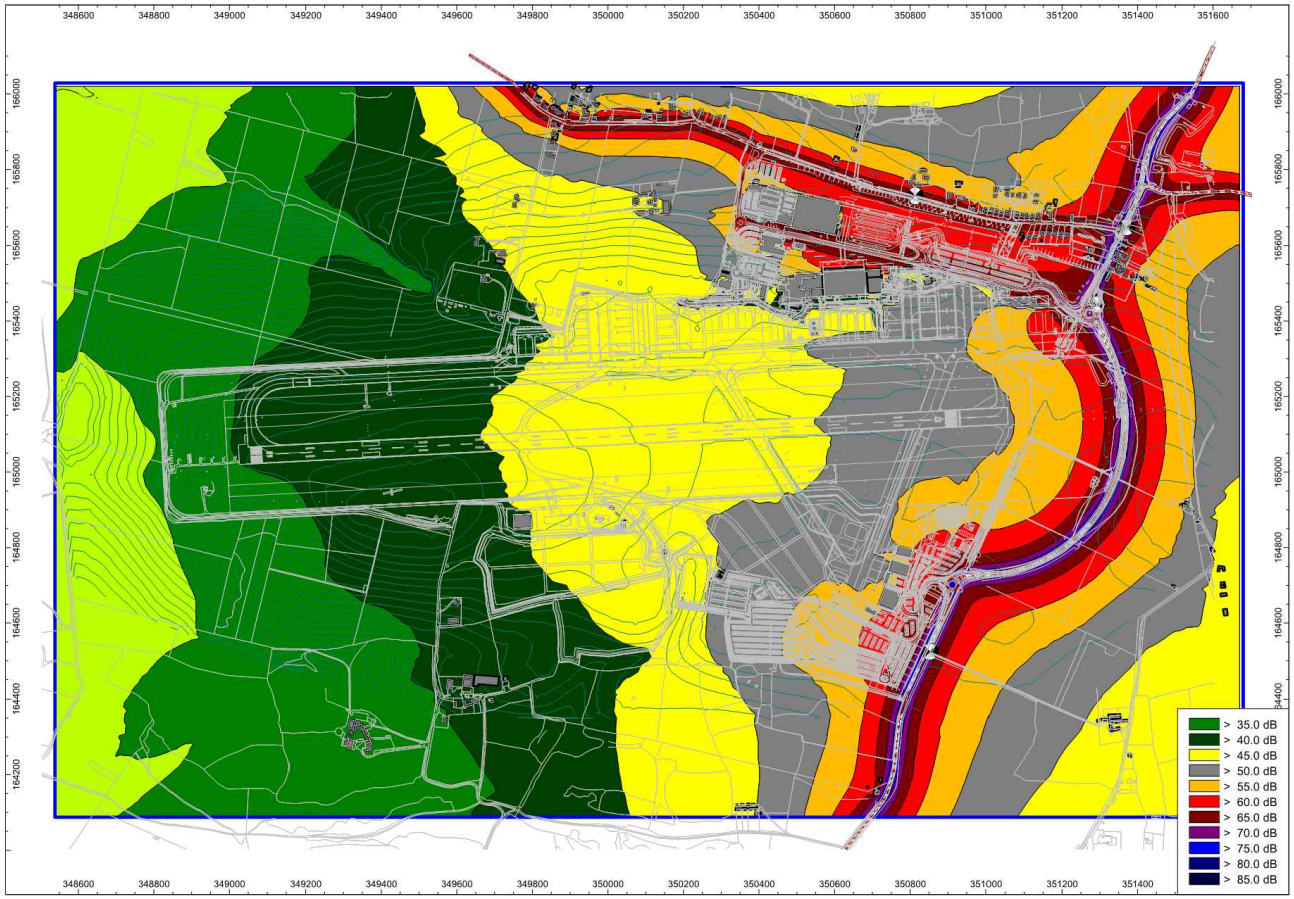

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Figure 7F.5
12mppa Road Traffic Noise Contours
$L_{A10,18h}$

DRAWN: MP CHECKED: NW

DATE: October 2018 SCALE: 1:20000@A4

Drawing No:

A11172_05_DR005

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Project: **BRISTOL AIRPORT – POST APPLICATION**

File Ref: A11260_01_MO001_4.0

Date: 25 March 2019

Subject: **Detailed Response to NSC comments**

From: N Williams/P Henson

To:

Name	Role	Company	Initials
R Allard		North Somerset Council	RA
A Melling		Wood PLC	AM
J Shearman		Bristol Airport	JS

1.0 INTRODUCTION

North Somerset Council (NSC) has provided comments, including those by their consultants (Jacobs), on the noise and vibration chapter (Chapter 7) of the Environmental Statement (ES) accompanying the planning application by Bristol Airport Ltd (BAL) for the development of Bristol Airport to accommodate 12 million passengers per annum (mppa) (Application No. 18/P/5118/OUT). The comments were received on 7th February 2019 and discussed at a meeting held on 11th February 2019, which was also attended by Bickerdike Allen Partners LLP (BAP). As BAL's noise consultants and the authors of Chapter 7 of the ES, BAP has prepared responses to the comments which are addressed in this memo. The memo also addresses agreed actions arising from the meeting.

2.0 NORTH SOMERSET COUNCIL COMMENTS

This section addresses the comments made in the NSC response. Each comment is reproduced and then a response given.

2.1 Comparison of 12 mppa 2026 Scenario with 10 mppa 2026 Scenario

2.1.1 NSC comment:

"It is usual in Environmental Impact Assessments to compare the With Development Scenario (12 mppa, 2026) with the Without Development scenario (10 mppa, 2026)."

2.1.2 BAP response:

BAP agree that this is the normal comparison. This is the reason why this comparison has been clearly made in the ES. It has however been made as a "sensitivity" test since BAL has made it clear elsewhere in the ES (and also in the Noise and Vibration Chapter) that the 10 mppa, 2026 scenario (Without Development) is considered a conservative assessment as a result of the

assumptions made concerning the extent of modernisation of the aircraft fleet. The ES considers a more realistic comparison is with 10 mppa, 2021, particularly since permission is already granted for the environmental consequences arising from such operations.

NSC has concluded from Tables 7D.22 and 7D.23, when comparing those affected by an increase in noise during the daytime for all contours for 12 mppa 2026 compared with 10 mppa 2026, that there will be 1171 dwellings and a population of 2803.

This is a slight misinterpretation, as NSC have added the values in the relevant tables, when they are in fact cumulative values, i.e. those dwelling assessed as being within the 54 dB $L_{Aeq,16h}$ daytime contour are also within the corresponding 51 dB contour. In practice, the number of additional dwellings that come within the stated contour bands are a total of 900 dwellings, with a population of 2100. The number of dwellings experiencing an increase in noise however is 3100 (obtained from ES table 7D.97).

Similarly for night noise, NSC has concluded from Tables 7D.24 and 7D.25, when comparing those affected by an increase in noise during the night-time for all contours for 12 mppa 2026 compared with 10 mppa 2026, that there will be 2271 dwellings and a population of 5453.

In practice, the number of additional dwellings that come within the stated contour bands are a total of 900 dwellings, with a population of 2200. The number of dwellings experiencing an increase in noise however is 5050 (obtained from ES table 7D.98).

2.2 Summer season

2.2.1 NSC comment:

"However, the noise chapter has based its assessments on the 92 day period between 16 June and 15 September. It is not clear if the extended summer period has been taken into account and what impact this has on noise levels and disturbance."

2.2.2 BAP response:

The 92 day summer period is the standard assessment period for aircraft noise in the UK as this typically represents the worst case situation, as airports are at their busiest due to holiday traffic. The use of this index and time period as the most appropriate for assessing community noise was confirmed recently in the SoNA[1] study undertaken by the Civil Aviation Authority (CAA) for the Department for Transport (DfT).

It is recognised that at Bristol Airport, the summer season relating to planning limits is defined as the period while British Summer Time is in operation. The 92 day summer is entirely included within this period. There is currently a planning condition limiting Bristol Airport to 3,000 aircraft

[1] Survey of Noise Attitudes (2014), CAP 1506, Civil Aviation Authority, Feb 2017

movements between 23:30 and 06:00 in the summer season, and 1,000 aircraft movements in the winter season. BAL are seeking to revise this as part of the application to a total of 4,000 aircraft movements for every two consecutive seasons.

Detailed future forecasts are provided for a "peak week". This has been taken to be representative of the 92 day summer period with no adjustment, although in practice this is likely to be slightly busier than the average day in the 92 day summer period and is therefore slightly conservative.

Noise effects based on the average day in the summer season rather than the 92 day summer would be slightly lower. For example, in 2017, there were approximately 3% more aircraft movements per day (over 24 hours) in the 92 day summer period compared to the 2017 summer season. BAP therefore consider that the noise effects in the summer season would be comparable to (although slightly lower than) the 92 day summer. Changes between scenarios would be identical as the underlying forecast would be the same.

In addition to the above, it should be noted that no variation is proposed to the current Quota Count (QC) limit which covers the same periods as the movement limit. This means that the total noise permitted to be produced in this period will not increase (and will actually reduce if the new lower QC banding is added to the scheme as per the designated London airports).

2.3 Future fleet mix

2.3.1 NSC comment:

"The noise chapter has based its predictions for future scenarios on the fact that the aircraft fleet will change and incorporate quieter aircraft. Whilst this seems logical there is no justification provided for the future fleet mix. Additionally, there does not seem to be any assessment carried out if fleet replacement continues at its current rate and is not updated as quickly as forecast."

2.3.2 BAP response:

BAL commissioned an independent consultant (Mott MacDonald) to produce a report on the likely rate of fleet modernisation in the 2021 (10 mppa) and 2026 (12 mppa) scenarios. This report verified that the modernisation assumptions made by BAL were reasonable, and the report was submitted as part of the application.

Additionally, some key airlines have provided responses to the consultation on the planning application indicating their commitment to utilising modernised aircraft at Bristol Airport. Extracts from these are repeated below:

Easyjet response:

"easyJet's business model supports fuel efficiency and minimising carbon emissions, through means such as investment in efficient aircraft, use of fuel efficiency measures and operating flights with a high load factor. easyJet is a short-haul operator, which has a lower carbon impact per passenger kilometre than the major European airlines whose operations include a significant amount of long-haul flights. By operating 'point-to-point' flights rather than encouraging customers to transfer, we make customer journeys more efficient. easyJet started to operate a new generation of Airbus A320 family aircraft in 2017. These aircraft are 15% more fuel efficient than previous generation aircraft. As at 30 September 2018, 13 A320neo aircraft were in operation, with a further 87 to be delivered by August 2022. Two of the larger A321neo aircraft were also in the fleet at this date, with a further 28 to be delivered by October 2020.

easyJet has entered into an agreement with Bristol airport which encourages the deployment of more fuel efficient next generation aircraft. We are working hard with the airport operator to minimise noise and environmental impact and we take our environmental responsibilities very seriously."

Ryanair response:

"Ryanair will take delivery of 200 new aircraft over the next 6 years and we believe there is potential to add new routes and additional connections to Bristol providing suitable facilities are available.

Ryanair's operation is environmentally friendly due to our high load factors (very few empty seats) and point to point routes. Ryanair operates an all-Boeing fleet, the youngest in Europe, with an average age of six and a half years. From 2019, we will start to take delivery of new Boeing 737-MAX aircraft, which will reduce fuel consumption by up to 16% and reduce noise emissions by 40%, while offering 4% more seats per flights (197 v 189) allowing us to lower fares even further, while ensuring that Ryanair remains Europe's greenest and cleanest airline."

2.4 Stands 38 and 39

2.4.1 NSC comment:

"The planning application seeks to revise the operation of stands 38 and 39, however there does not seem to be any specific assessment of noise from these two stands in the noise chapter."

2.4.2 BAP response:

The proposed variation of the extant planning condition relating to stands 38 and 39 was assessed as being part of the development and is therefore one of the differences between the 10 mppa and 12 mppa scenarios. The effect of the variation in the condition relating to stands 38 and 39 is highlighted specifically in paragraph 7.11.37 of the ES, which is reproduced below:

"The other factor at night is the variation in the restriction of night-time APU usage on stands 38 and 39. This results in slight increases for the dwellings closest to these stands, although the increases are still less than 2 dB and therefore of negligible magnitude."

As discussed at the meeting of 11th February, BAP have run calculations to show the relative contributions of Stands 38 and 39 for the most sensitive receptor, which is Core Hill, on Cooks Bridle Path. This shows that the total noise level in the worst case situation will increase by under 2 dB (see Table 1) and is therefore considered not significant in the ES.

Noise Source	10 mppa Night-Time Noise Level, dB $L_{Aeq,8h}$	12 mppa Night-Time Noise Level, dB $L_{Aeq,8h}$
Stand 38	-	54.2
Stand 39	-	53.6
Total Noise Level	59.3	60.7

Table 1: Modelled Night-Time Noise Levels of Stands 38-39 at Core Hill

2.5 Health impacts

2.5.1 NSC comment:

"The noise chapter has assessed the impacts on annoyance and sleep disturbance, it does not however, seem to have assessed the wider impacts such as cognitive impairment, quality of life, wellbeing and mental health etc. It is suggested that the Director of Public Health is consulted with regards to this aspect."

2.5.2 BAP response:

These effects (where appropriate) are considered in the health chapter of the ES (Chapter 16).

2.6 Noise insulation scheme

2.6.1 NSC comment:

"It is acknowledged and welcomed the proposals to enhance and improve the noise insulation scheme. However, before any further comments can be made it would be useful to understand the uptake of the current scheme. Additionally, it would also be useful to have some further data on the specification of the double glazing to be used as well as the ventilation system."

2.6.2 BAP response:

A summary of the uptake of the current scheme is given in Table 2 below.

Year	# Properties Treated	Total Value of Grants
2000-2001 (A38 scheme)	Circa 261	Circa £900,000
2015	14	£37,000
2016	40	£106,000
2017	8	£21,000
2018	12	£28,000

Table 2: Summary of Insulation Scheme Works

Strictly the A38 scheme was not based on aircraft noise criteria, however the large majority of properties treated are currently within the 57 dB $L_{Aeq,16h}$ contour.

The specification of the current scheme is available on Bristol Airport's website[2] and repeated below:

"*1. Provision of new glazing:*

Where chosen, replacement double glazing works and specification to meet acoustic requirements are as follows:

- *Windows of habitable rooms within the dwelling (bedrooms / living rooms / dining rooms / studies/kitchen etc.) can be upgraded with new high performance double glazed units and will be covered by the offer of the grant scheme.*
- *Additional windows to habitable or non-habitable areas (i.e. halls / bathrooms etc.) can also be upgraded, although are not covered by the grant scheme.*
- *High performance units shall be formed from a sealed glazing configuration which has at least one laminated pane, and achieves a weighted sound reduction index of R_w38dB, tested and rated in accordance with BS EN ISO 140-3 and BS EN ISO 717 respectively.*
- *Windows should be adequately openable for means of escape, where required.*
- *Openable windows should be fitted with double neoprene seals all round.*
- *Supply and fitting of new double glazed units should be in accordance with any applicable current regulations or standard.*
- *Windows should not be fitted with trickle vents, unless they achieve the sound insulation performance for passive ventilation as detailed below*

2. Provision of secondary glazing:

[2] https://www.bristolairport.co.uk/about-us/community/local-community/noise-insulation-grants

Where chosen, secondary glazing works and specification to meet acoustic requirements are as follows:

- *Windows of habitable rooms within the dwelling (bedrooms / living rooms / dining rooms / studies/kitchen etc.) can be upgraded with new high performance double glazed units and will be covered by the offer of the grant scheme.*
- *Additional windows to habitable or non-habitable areas (i.e. halls / bathrooms etc.) can also be upgraded, although are not covered by the grant scheme.*
- *Outer windows made good and effectively sealed by compressible strips or otherwise:*
- *Secondary glazing should fit within, or cover the full area of the existing window reveal*
- *Secondary glazing shall be formed by minimum 6mm thick laminated glass panes.*
- *Separation between outer and inner glazing should be a minimum of 100mm.*
- *Inner and outer windows should be adequately openable for means of escape, where required.*
- *Inner windows should be well sealed at junctions and edges by any effective means.*
- *The reveals between panes may be lined with acoustically absorptive treatments to increase attenuation; however, this is not required to be undertaken as part of the scheme.*
- *Supply and fitting of secondary glazing should be in accordance with any applicable current regulations or standard.*

3. Ventilation

Ventilation is recommended in order to maximise the acoustic benefits of the new glazing, by allowing in fresh air while keeping the windows closed. Ventilation may also be a requirement under Building Regulations. The decision on whether ventilation is required is at the discretion of the householder. Where quoted the fund will ensure the costs are included in any successful grant funding.

- *Should replacement double glazing or secondary glazing be chosen, passive or mechanical ventilator unit(s) should be installed in each room where replacement or secondary glazing is fitted.*
- *The size and/or flow rate of any ventilator(s) must be in line with current regulations and standards, according to rooms sizing and any combustion appliances.*
- *The sound insulation performance of the ventilator must achieve a minimum laboratory tested element normalised weighted sound pressure level difference of $D_{ne,w}$40dB.*

- *If more than one ventilator is required within a room, the performance of each must be increased to $D_{ne,w}$40dB+10*log(N), where N is the total number of ventilators installed within a room.*
- *Noise levels from mechanical ventilators at the minimum required operational duty should not exceed 35dBL_{Aeq} when measured not nearer than 1m away from the unit or any of the room surfaces, and normalised by the subtraction of 10*log_{10}(10/A), where A is the measured sound absorption in the room in m².*
- *Noise levels from mechanical ventilators at maximum operational duty should not exceed 40dBL_{Aeq} when measured as above.*
- *Any existing air bricks or ventilators in habitable rooms should be upgraded to meet the acoustic requirements above.*
- *Should additional ventilation be required or desired, the passive ventilators should achieve a minimum laboratory tested element normalised weighted sound pressure level difference of $D_{ne,w}$40dB+10*log(N), where N is the total number of vents installed within a room (including active inlet vents)"*

It is proposed as part of this planning application to improve the specification of the ventilators such that the sound insulation performance of the ventilator must achieve a minimum laboratory tested element normalised weighted sound pressure level difference of $D_{ne,w}$45dB rather than 40dB. The minimum window specification will not change however the funding attributed to a property will increase with the new scheme allowing for a higher number of rooms to be treated or a higher specification of windows to be installed.

2.7 Wind turbines

2.7.1 NSC comment:

"It is understood that the planning application proposes to install a number of wind turbines on the top storey of the multi-storey car park, however there does not seem to be any assessment of the noise impact from these included in the noise chapter."

2.7.2 BAP response:

As discussed at the meeting of 11th February, the location of the wind turbines is not finalised and therefore a noise assessment has not been carried out at this stage. It was agreed that a condition requiring BAL to submit details of the noise impacts of the proposed turbines (or alternative renewable energy technologies) could be imposed.

2.8 Population and dwelling count

2.8.1 NSC comment:

"Paragraph 7.7.15 notes that for the purposes of dwelling and population counts for air noise, the residential receptors have been identified using a 2017 dataset supplied by CACI Ltd. However, this data does not seem to have been included within the chapter. It is requested that the data is included."

2.8.2 BAP response:

BAP are not permitted to reproduce the raw dataset under the terms of the license agreement with CACI Ltd.

2.9 Tranquillity/Area of Outstanding Natural Beauty (AONB)

2.9.1 NSC comment:

"The noise chapter has not assessed the impact on tranquil areas, particularly the AONB. Paragraph 180 of the NPPF, 2018 states that:

Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;

However, the Planning Practice Guidance recognises that there are no precise rules for the factors for identifying areas of tranquillity. However, it also notes that an area to be protected for its tranquillity it is likely to be relatively undisturbed by noise from human caused sources that undermine the intrinsic character of the area. Such areas are likely to be already valued for their tranquillity, including the ability to perceive and enjoy the natural soundscape, and are quite likely to be seen as special for other reasons including their landscape. In light of this an assessment of the noise impacts on the AONB is required."

2.9.2 BAP response:

BAP understand that the AONB being referred to in this comment is the Mendip Hills area to the south of Bristol Airport.

When considering air noise, this area is currently primarily overflown at an altitude of approximately 5,000-6,000 ft above ground level by aircraft approaching Bristol Airport when runway 27 is in use (i.e. around 80% of the time). When runway 09 is in use, departing aircraft

which turn to the south also overfly this area at an altitude of approximately 10,000 ft. These are relatively infrequent and comprise only around 5% of the departures from Bristol Airport.

Some guidance on this topic is given in CAP1616a *Airspace Design: Environmental requirements technical annex*. This document states the following:

"1.96 The Secretary of State's Air Navigation Guidance recognises that given the finite amount of airspace available, it will not always be possible to avoid overflying National Parks or AONBs, and that there are no legislative requirements to do so as this would be impractical. The Government's policy continues to focus on limiting and, where possible, reducing the number of people in the UK significantly affected by aircraft noise and the health impacts it can bring. As a consequence, this is likely to mean that one of the key principles involved in airspace design will require avoiding overflight of more densely populated areas below 7,000 feet. However, when airspace changes are being considered, it is important that local circumstances, including community views on specific areas that should be avoided, are taken into account where possible. Therefore, in line with the Department for Transport's altitude-based priorities, airspace change sponsors are encouraged, where it is practical, to avoid overflight of National Parks or AONBs below 7,000 feet.

1.97 In terms of portraying 'tranquillity' or any impacts upon it, there is no universally accepted metric by which tranquillity can be measured, although some attempts have been made. For example, Campaign to Protect Rural England (CPRE) presented a set of tranquillity maps for England in October 2006[3]. However, it is not obvious how such a methodology could be reliably adapted for aircraft noise. Indeed, discussions with the researchers who produced the maps indicated the difficulties in applying such maps for the purposes of assessing the environmental impact of an airspace change."

Although this application is not an airspace change, it implies that only aircraft below 7,000 ft are typically considered. Therefore, noise levels at the Mendip Hills AONB of individual events for an Airbus A320 (the most common aircraft type) arriving on runway 27 have been calculated to be approximately 56 dB L_{Amax}, in the worst case situation of a location directly under the flight path (in other locations noise levels will be lower).

The average noise level within the AONB due to aircraft is difficult to assess accurately without a detailed assessment, but is estimated to be in the region of 35 dB $L_{Aeq,16h}$. This is considered a very low level of noise. The actual noise level may well be higher due to existing ambient noise sources not related to Bristol Airport.

These noise levels within the AONB will be the same both in 2017 and the future scenarios, as there is no proposed change to airspace as part of the planning application and the forecasts do

[3] https://www.cpre.org.uk/resources/countryside/tranquil-places/item/1839

not contain any aircraft which are noisier than those currently operating. There will however be more aircraft in the future, although this will be partially offset by the modernisation of aircraft meaning that on average aircraft will be quieter than under current operations.

Table 3 below gives the number of aircraft overflying the Mendip Hills AONB during an average summer daytime period in 2017, as well as those forecast to do so in the future scenarios.

Scenario	Rwy 27 Arrivals (07:00-23:00)
2017	81
10 mppa	81
12 mppa	94

Table 3: Aircraft Movements Overflying Mendip Hills AONB

The increase in aircraft movements, assuming all aircraft were equally loud, would constitute an increase in the average noise level of less than 1 dB(A). This would not be considered significant. This also equates, under the 12 mppa scenario, to just less than one additional flyover per hour on average during the daytime, as compared to around an average of five movements per hour in 2017 and under 10 mppa.

When considering road traffic noise, traffic flows on roads in this region are predicted to change by less than 5%. Therefore any increase in noise levels due to road traffic would be predicted to be 0.2 dB or lower, i.e. not a significant change.

3.0 JACOBS COMMENTS:

This section specifically addresses the comments made in the Jacobs response.

3.1 Methodology – guidance documents

3.1.1 Jacobs comment:

Requests that the following guidance documents are also considered:

- Environmental Protection Act 1990
- Environmental Noise Guidelines for the European Region, World Health Organisation 2018 (in more detail that already mentioned)
- Acoustics of Schools: A Design Guide, Institute of Acoustics 2015
- BS4142:2014 Methods for rating and assessing industrial and commercial sound
- Calculation of Road Traffic Noise
- BS7445:2003 Description and measurement of environmental noise

3.1.2 BAP response:

- Environmental Protection Act 1990

This defines what is deemed to be a statutory nuisance. This does not apply to aircraft (except model aircraft) and is therefore not considered relevant to this application.

- Environmental Noise Guidelines for the European Region, World Health Organisation (WHO) 2018 (in more detail that already mentioned)

The WHO has recently (October 2018) published its updated *Environmental Noise Guidelines*[4]. These guidelines "strongly recommend" that aircraft noise does not exceed 45 dB L_{den} or 40 dB L_{night}. These guideline levels are based on thresholds of 10% highly annoyed for the L_{den} criteria, and 3% highly sleep disturbed for the L_{night} criteria.

It is important to note that these recommendations have not yet been adopted as policy or legislation. In Aviation 2050 (December 2018) the Government stated the following:

> "*3.106 There is also evidence that the public is becoming more sensitive to aircraft noise, to a greater extent than noise from other transport sources, and that there are health costs associated from exposure to this noise. The government is considering the recent new environmental noise guidelines for the European region published by the World Health Organisation (WHO). It agrees with the ambition to reduce noise and to minimise adverse health effects, but it wants policy to be underpinned by the most robust evidence on these effects, including the total cost of an action and recent UK specific evidence which the WHO report did not assess.*"

It is considered unlikely that these guidelines could be adopted as thresholds without imposing very significant restrictions on the current permitted operations of major airports. As an example, even a single Airbus A320 or Boeing 737-800 aircraft operating once per night would expose hundreds of people to noise levels in excess of the guideline L_{night} value at Bristol Airport, despite its relatively rural location. 10 aircraft events during the daytime (07:00-19:00) period (or smaller numbers in the evening and night periods) would expose a similar number of people to noise levels in excess of the L_{den} parameter. The WHO research displays a high degree of variation between studies and includes some studies that are acknowledged to contain bias but have still been included in the dataset without adjustment. Within the WHO dataset, the variation in their defined significance threshold of 10% of the population being highly annoyed was approximately 42-60 dB L_{den}.

[4] World Health Organization Regional Office for Europe (2018). Environmental Noise Guidelines for the European Region. [Online]. Available at: http://www.euro.who.int/__data/assets/pdf_file/0008/383921/noise-guidelines-eng.pdf [Checked: 25/10/2018].

Relating specifically to the L_{den} value, a paper[5] was published in December 2018 highlighting some of the inconsistencies. This paper demonstrated that by following the WHO's criteria for study selection (half of the 12 studies included by WHO did not meet their own criteria), a dataset containing 18 studies yielded a result of 53 dB L_{den}.

Similar issues of study selection and variability between studies exist in the night time dataset.

As highlighted by Jacobs in its response, there is scope within the document for alternative means of arriving at appropriate guideline values.

It is stated in the WHO 2018 document (section 5.5) that it is important to note the uncertainties in the quantification of the health impacts, in particular for annoyance where it recommends:

> "*It is therefore not possible to determine the "exact value" of %HA for each exposure level in any generalized situation. Instead, data and exposure-response curves derived in a local context should be applied wherever possible to assess the specific relationship between noise and annoyance in a given situation.*"

On this basis, it is considered by BAP that recent UK research and government guidance, such as SoNA 2014, is more appropriate for the selection of criteria for daytime noise levels than those proposed in the WHO Guidelines.

Relating to night noise, it is stated in the WHO 2018 document (2.6.3) that:

"*The current environmental noise guidelines for the European Region supersede the CNG from 1999. Nevertheless, the GDG recommends that all CNG indoor guideline values and any values not covered by the current guidelines (such as industrial noise and shopping areas) should remain valid.*"

The 1999 Community Noise Guidelines (CNG) give a guideline internal noise level of 30 dB $L_{Aeq,8hr}$ for "sleep disturbance" in the night-time period. This can be equated to an outdoor noise level of 45 dB $L_{Aeq,8hr}$ based on the estimated difference between indoor and outdoor levels of 15 dB for "tilted or half open" windows given in the WHO 2018 document. This then equates to a level of 55 dB $L_{Aeq,8hr}$ if windows are closed. These are considered by BAP to be more appropriate indicators of the onset of effects and have been adopted in the ES noise and vibration chapter.

- Acoustics of Schools: A Design Guide, Institute of Acoustics 2015

This primarily focuses on the design of schools to achieve the standards set out in BB93 (which was referenced in the ES). As this application is not proposing to build any schools, this guide is not considered relevant.

[5] Gjestland, T. 'A Systematic Review of the Basis for WHO's New Recommendation for Limiting Aircraft Noise Annoyance', International Journal of Environmental Research and Public Health 2018, 15(12), 2717; https://doi.org/10.3390/ijerph15122717

- BS4142:2014 Methods for rating and assessing industrial and commercial sound

This standard is not considered relevant to the assessment of aircraft operating to and from an airport. It was originally designed to address noise from factories, industrial premises, or fixed installations and then extended to include mobile plant and vehicles associated with industrial or commercial premises, including loading and unloading activities in service yards, etc.

The use of this standard to assess aircraft ground noise is rare in BAP's experience, although a variation on this BS standard method is occasionally used as a supplementary device to try to account for prevailing background noise conditions. BAP consider that there is no evidence base for using BS 4142 in this manner and, if adopted at all, it should be used as the standard intended, i.e. in accordance with the prescribed methodology. Were it to be used this way, most airports would not be able to operate aircraft on the ground as it would predict noise complaints around most if not all airports.

- Calculation of Road Traffic Noise

This deals with the method of calculating road traffic noise and is therefore referenced in Appendix 7F (road traffic noise) when discussing methodology.

- BS7445:2003 Description and measurement of environmental noise

The survey work was carried out in accordance with this standard. This standard could have been referenced in Appendix 7C of the ES.

3.2 Methodology – study areas

3.2.1 Jacobs comment:

"Study areas are described at section 7.4. The study areas are 'based on the largest extent of likely effects due to noise', however no justification of the study areas selected has been provided."

3.2.2 BAP response:

For air and ground noise, the extent of the study areas contains all locations exposed to the Lowest Observed Adverse Effect Level (LOAEL) or higher. For road traffic noise, the roads closest to the airport were considered likely to be those where the proposed development would have the greatest potential effect. This was set out in the Scoping Report which stated:

"For ground noise, road traffic and construction noise, this is expected to concentrate on receptors and areas in close proximity to Bristol Airport including properties to the north side of Downside Road, isolated properties to the east in Downside and near Tall Pines Golf Club as well as properties to the south, off the A38."

Therefore, traffic counts were prepared for these roads and the receptors closest to them were considered. The effect of the development on roads or receptors more distant from the airport would be expected to be the same or lower than those assessed as part of the ES. No significant effect of the development was found for any of the road traffic receptors assessed.

3.3 Methodology – potential receptors

3.3.1 Jacobs comment:

"Potential receptors are identified at paragraph 7.7.14 onwards. The list of potential receptors does not follow that with the IEMA Guidelines for Environmental Noise Impact Assessment, which is however referred to in other areas e.g. the development of a magnitude scale at paragraph 7.9.55. Consideration should be given to the full list of receptors. Notably occupants of office have been omitted. Clarification is requested as to whether establishments such as hotels, guesthouses and campsites have been included in the residential receptor group. In addition, clarification should be provided regarding hospitals and healthcare receptors. At paragraph 7.7.19 it is stated that no such receptors were identified within the study area; however assessment criteria for these receptors are presented in Appendix 7B. Justification of receptors scoped in and those scoped out of the assessments is requested."

3.3.2 BAP response:

The assessment has concentrated on and identified a variety of noise sensitive receptors including those most likely to be affected by noise from the proposed development. It is not considered necessary to assess every type of receptor in order to determine whether noise effects from the development are likely to have significant effects or not, unless there is a good reason to believe that receptors of low sensitivity are expected to receive significantly higher noise levels than those of a higher sensitivity. We do not consider this to be the case in this instance in light of the close proximity of some housing (of high sensitivity) to the airport. In practice, for receptors of lower sensitivity, such as offices, the changes in noise level would be expected to be similar to those for the receptors considered in detail.

The residential receptor group does not include hotels, guesthouses and campsites although the comments above concerning offices would also apply to these receptors.

Criteria for assessing hospitals were developed. This occurred before the identification of receptors. The assessment then found that there were no receptors of this type within the study area.

3.4 Methodology – places of worship

3.4.1 Jacobs comment:

"The identification of places of worship as sensitive receptors is welcomed, however the use of residential assessment criteria for these receptors requires further justification, particularly as BS8233 provides design criteria for this receptor class, and this British Standard has been used to assess amenity areas."

3.4.2 BAP response:

BS8233 does provide design criteria for this receptor class. This is in the form of internal noise levels of 30-35 dB $L_{Aeq,T}$. This equates to the criteria for dwellings and therefore adopting the residential criteria is considered appropriate.

3.5 Methodology – cross referencing

3.5.1 Jacobs comment:

"There is no-cross referencing in the noise chapter to the assessment of noise effects on non-human receptors. Noise effects are considered in the following chapters, but have not been reviewed for the purposes of this report:

- *Biodiversity*
- *Heritage*
- *Landscape*
- *Human Health*
- *Socio-economics."*

3.5.2 BAP response:

While there may not be a cross reference in the noise chapter, noise impacts have been considered in the chapters listed in the Jacobs response. Noise is also considered in the cumulative effects chapter (Chapter 18).

3.6 Methodology – cumulative effects

3.6.1 Jacobs comment:

"Cumulative effects (e.g. a receptor may be impacted upon by both road, ground and air noise) have not been considered, despite a statement that they will be. When referring to the assessment, paragraph 7.1.3 states *"Within these sections the assessment criteria and methodology are presented, the baseline noise conditions discussed where relevant, and*

assessments are made of any effects (beneficial and adverse) associated with the Proposed Development. Mitigation measures are also described, where appropriate, as are cumulative and residual effects". It is considered that cumulative effects have not been considered and should have been. Although there is no standard methodology for combining noise sources, it would not be difficult to take a few sample receptors and manually add the predicted noise levels."

3.6.2 BAP response:

The cumulative effects of noise as normally assessed in an ES have been addressed in Chapter 18. It was however agreed at the meeting of 11th February to prepare a table of representative receptors showing the "cumulative" effect of adding predicted levels of air noise, ground noise and road traffic noise. The receptors selected are those which overlap between the "key receptors" assessed in the ES for air and ground noise. Their locations are shown in Figure 1.

The cumulative noise levels at each receptor have then been calculated for daytime and night time separately in Table 4 and Table 5.

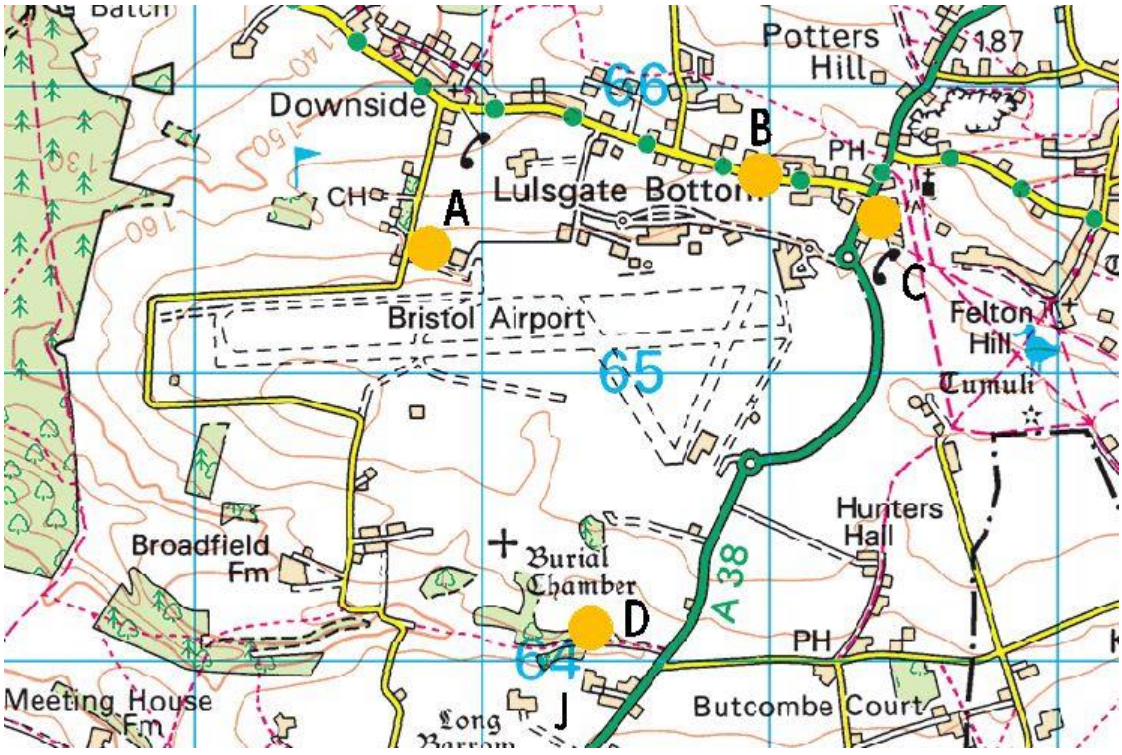

Figure 1: Cumulative Receptor Locations

Location	10 mppa (2026)				12 mppa (2026)			
	Air	Ground	Road	Total	Air	Ground	Road	Total
A	59	61	40	63	60	63	40	65
B	58	58	63	65	59	52	63	65
C	60	52	57	62	61	52	57	63
D	49	45	45	52	51	46	46	53

Table 4: Cumulative Noise Levels, Daytime $L_{Aeq,16h}$

Location	10 mppa (2026)			12 mppa (2026)		
	Air	Ground	Total	Air	Ground	Total
A	56	59	61	57	61	62
B	55	54	57	56	47	57
C	57	50	58	58	49	59
D	46	41	47	48	41	49

Table 5: Cumulative Noise Levels, Night-Time $L_{Aeq,8h}$

As recognised by Jacobs, while it is possible to numerically add the noise contributions from these three sources at each receptor (as has been done above), there is not a current standard or recognised methodology for assessing environmental noise of this cumulative type and there is also no recognised community response studies that allow these cumulative noise levels to be assessed.

The change in cumulative noise levels will always be the same or lower than the change in noise level of individual sources. Therefore, it is considered that if there is no significant effect from individual sources, then there would not be a cumulative significant effect either as a result of the proposed development.

3.7 Baseline monitoring – data processing

3.7.1 Jacobs comment:

"Further information is requested on the data processing methods used to derive the summary statistics, for example, how were the potential effects of adverse weather considered, and how were the 'average' $L_{A90\ 5\ min}$ measurements determined? The data processing methodology should be detailed in full."

3.7.2 BAP response:

The 'average' L_{A90} values given in the report are the mean of the individual $L_{A90,5m}$ measurements over the relevant period. The weather conditions during the survey were presented alongside the results. No adjustment was made to the measured results.

3.8 Baseline monitoring – data presentation

3.8.1 Jacobs comment:

"The use of mean values to describe the background noise levels does not give an indication of the variability of the noise environment. For example, mean $L_{A90,5min}$ values for the night period are likely to be skewed by periods of high existing airport activity. It would be preferable to have a histogram presented, showing the statistical distribution of measured noise levels, as per the recommendations of BS4142:2014."

3.8.2 BAP response:

Graphs are presented in Appendix 7C of the ES showing the time history of the survey measurements. This shows the variation in noise level over time. Airport activity does not have a large effect on the L_{A90}, for example taking the average of the L_{A90} values from 00:00-06:00 (i.e. excluding the two busiest hours of airport activity) reduces the L_{A90} by approximately 1 dB(A) compared to the 8-hour night period.

3.9 Baseline monitoring – complaint statistics

3.9.1 Jacobs comment:

"The scoping report states that complaint data for the previous three years was used to inform the scoping exercise. No further mention of this is made in either the scoping report or the ES. A summary of noise related complaints received directly by the airport should be provided."

3.9.2 BAP response:

Table 6 presents a summary of noise complaint data for the period 2015 to 2017. The complaints also relate to non-aircraft related sources, such as localised noise disturbance from temporary construction night works or unusual noise from the airport e.g. drop off zone barriers making sudden noise at quieter times. Such impacts are often limited and remedied swiftly either with such works only being for a short duration or through measures being put in place to reduce and lessen such noise events occurring. It is estimated around 5-10 complaints were made due to such instances in 2017.

It is worth noting the individual complainants row doesn't consider the number of people who made a complaint from the same household. In a few instances multiple residents of the same property have made separate complaints.

Year	2017	2016	2015
Total number of complaints	172	167	173
Number of individual complainants	100	71	77
Average number of complaints per complainant	1.7	2.4	2.1
Number of aircraft movements per complaint	443	442	393

Table 6: Summary of Complaints

3.10 Air noise – modernisation evidence

3.10.1 Jacobs comment:

"In the current (2017) scenario, the two dominant large aircraft types, responsible for approximately 42% of the total number of annual movements, are the Airbus A319-131 and the A320-211. The predicted annual movements for the future scenarios appear to be based on a dramatic phasing out of these older types, which are assumed to be largely replaced by newer quieter replacements, such as the A320neo. Evidence to support this assumption is required."

3.10.2 BAP response:

See section 2.3.2 of this memo which addresses this point. As discussed at the meeting of 11th February, information on the modelling of future aircraft types was given in the ES (Paragraphs 7D.4.25-28).

3.11 Air noise – population assessment

3.11.1 Jacobs comment:

"Paragraph 7.7.15 states that population information for the air noise assessment has been determined by postcode. Clarification on this point it requested, for example if a postcode includes areas within two different contours bands, how has this been addressed in the population exposure estimates?"

3.11.2 BAP response:

The database includes, for each postcode, a location, number of dwellings and number of people. The locations are typically around the centre of the postcode area. The assessment has calculated the noise level at each of the postcode locations, and considered all of the dwellings and people associated with a given postcode to be exposed to the same noise level.

The above method provides a close estimate of the number of dwellings and population counts within a contour band (as opposed to the precise number) and is commonly used in planning environmental noise assessments of this type when assessing the significance of effects.

3.12 Air noise – examples of prior use of Significant Observed Adverse Effect Level (SOAEL) and impact classification

3.12.1 Jacobs comment:

"The air noise assessment criteria set out from paragraph 7.9.17 onwards, would benefit from additional justification. Specifically, the selected SOAEL level of 63 dB $L_{Aeq\ 16\ hrs}$ is cited as a commonly used value. Examples of where this noise level has been accepted as a SOAEL should be provided.

Table 7.21 presents the potential impact classification based on the change in noise levels. The preceding paragraph states a scale of this type has been accepted in various airport Public Inquiries. Examples where this scale has been accepted at Public Inquiry should be provided."

3.12.2 BAP response:

63 dB $L_{Aeq,16h}$ has been used as the SOAEL in the following, as an example:

- London City Airport CADP Environmental Statement and subsequent Public Inquiry (planning application ref 13/01228/FUL)
- Stansted Environmental Statement (planning application ref UTT/18/0460/FUL)
- Heathrow Cranford Inquiry Proofs of Evidence (appeal ref APP/R5510/A/14/2225774).

3.13 Air noise – noise insulation scheme

3.13.1 Jacobs comment:

"At paragraph 7.9.18, the report states that following the Government's response to the UK airspace change consultation in 2017, a level of 54dB $L_{Aeq\ 16\ hrs}$ now represents the onset of significant community annoyance, and replaces the previously used value of 57dB $L_{Aeq\ 16\ hrs}$. As the existing and proposed enhanced noise insulation schemes are based on the 57dB $L_{Aeq\ 16\ hrs}$ air noise contour, consideration should be given to the expansion of the noise insulation scheme to provide support to those living in the 54-57 dB contour band."

"Paragraph 7D.8.36 onwards set out proposals for an enhanced noise insulation scheme. Additional details regarding these proposals are requested:

- *How many receptors are eligible under the current scheme, and how many have had measures installed?*

- *The enhanced scheme has increased the grant per dwelling available, however will the annual limit on funding grant applications be increased proportionally?*
- *Consideration should be given to supporting those within the 54 dB $L_{Aeq\ 16\ hrs}$ contour band (as suggested above).*
- *As noise insulation is provided to those with exposure below the declared daytime SOAEL, consideration should be given to applying the same principles to night-time exposure. At present, night-time qualifying criteria have not been adopted since the SOAEL of 55dB $L_{Aeq\ 8hr}$ contour falls within the 57dB $L_{Aeq\ 16\ hr}$ contour. In view of the predicted increase in number of people experiencing sleep disturbance over time (irrespective of the development), mitigation informed by night-time assessment parameters should be considered.*
- *In addition to the publicity measures proposed, the scheme should be publicised to new residents moving into the area, in order to encourage uptake. Details of changes in ownership of houses are readily available from the land registry and other sources."*

3.13.2 BAP response:

There are approximately 450 dwellings currently eligible for the existing noise insulation scheme, as per Table 7D.21 of the ES. See 2.6.2 of this memo for details of the number of treated properties.

The annual limit on funding grant applications will be increased proportionally. In addition, the fund will be higher in the initial two years of the scheme.

BAP find no justification to suggest that BAL should extend its sound insulation scheme down to 54 dB $L_{Aeq,16h}$ as the noise assessment finds no significant effects for receptors exposed to this level of noise as a result of the proposed development. BAL already offers treatment to protect dwellings exposed to 57 dB $L_{Aeq,16h}$ even though current Government guidance[6,7] is for airports to offer (as a minimum) sound insulation down to a level of 63 dB $L_{Aeq,16h}$. BAL is already enhancing its existing sound insulation schemes as part of the proposed development so providing those exposed to levels of 57 dB $L_{Aeq,16h}$ and above with greater funding than currently exists.

It is of relevance to note that no airports in the UK currently offer sound insulation down to a level of 54 dB $L_{Aeq,16h}$.

[6] Aviation Policy Framework, CM8584, March 2013
[7] Consultation Response on UK Airspace Policy: A framework for balanced decisions on the design and use of airspace, Department for Transport, October 2017

The Government, in their recent consultation for Aviation 2050, have sought views on a suggestion that assistance with sound insulation could be offered for those exposed to 54 dB $L_{Aeq,16h}$ or more as a result of a significant increase in overflights resulting from an airspace change but only if this is accompanied by a 3 dB or more change in noise level. This situation does not arise here at Bristol Airport (and the proposed development does not constitute an airspace change).

However, BAL are considering improving the sound insulation offering for dwellings exposed to significant levels of noise at night, i.e. those within the 55 dB $L_{Aeq,8h}$ contour.

The scheme will be publicised to new residents moving into the area as well as existing residents. However, once an eligible property has been treated it will not be subsequently treated as part of this enhanced scheme and therefore communication to the property will cease.

3.14 Air noise – selection of scenario

3.14.1 Jacobs comment:

"The assessment of the 2026 12mppa development case has primarily been undertaken by comparison with the 2021 10mppa. A 2017 baseline case is also provided, along with a 'sensitivity scenario' of 2026 10mppa. It is normal practice in EIA to undertake a comparison of what would happen in the absence of the development, with a scenario of 'with development'. This is usually best achieved by using the same assessment years, i.e. 2026. The 2021 baseline is higher than the 2026 baseline, which may potentially mean that levels of change in air noise due to the development have been underestimated."

"An assessment of the proposed development against the 2026 10 mppa baseline should be clearly presented for all indicators, and form the primary basis of the identification of potentially significant effects."

3.14.2 BAP response:

See section 2.1.2 of this memo for justification of comparison scenarios. All of the key assessments undertaken for the 10 mppa 2021 scenario were also undertaken for the 10 mppa 2026 scenario.

3.15 Air noise – annoyance

3.15.1 Jacobs comment:

"Table 1 indicates that more people are likely to be highly annoyed by air noise (currently, in future without the development, and in future with the proposed development) than envisaged when the current planning permission was granted in 2011. The assessment does not fully

address this issue. No significance criteria are presented in the noise assessment for changes in the number of people highly annoyed by air noise."

3.15.2 BAP response:

There are no commonly accepted significance criteria for the number of people highly annoyed. The assessment in the ES has been carried out using the latest available research, i.e. the SoNA[8] study. This provides annoyance ratings down to 51 dB $L_{Aeq,16h}$, whereas the previous ES (in respect of the 2011 consent for expansion of Bristol Airport to 10 mppa) used the annoyance ratings given in CAP725, which provides annoyance ratings down to 54 dB $L_{Aeq,16h}$.

More than half of the people assessed as highly annoyed are exposed to noise levels of 51-54 dB $L_{Aeq,16h}$. If this band was excluded (for ease of comparison with the previous assessment), then the number of people highly annoyed would be lower than under the 10 mppa (2009) scenario presented in Table 5.1 of the Jacobs report. What this table also shows is that in all scenarios of the current ES, the air noise effects are lower than under the 10 mppa (2009) scenario from the previous assessment. In order to demonstrate this effect, Table 7 compares the various scenarios from the two applications, and the number of people highly annoyed who are exposed to at least 54 dB $L_{Aeq,16h}$ under both the CAP725 and SoNA annoyance ratings. A comparison of 51-54 dB $L_{Aeq,16h}$ is not possible as these values were not presented in the 2009 application.

Application	Scenario	Number of people highly annoyed and ≥54 dB $L_{Aeq,16h}$	
		CAP725	SoNA
2009 Application (Results from Jacobs Report Table 5.1)	2007 Actual	138	195
	2007 Standard	149	211
	7.3 mppa 2019	200	271
	10 mppa 2019	331	448
2018 Application	2017	228	319
	10 mppa 2021	220	306
	10 mppa 2026	178	248
	12 mppa 2026	223	307

Table 7: Comparison of Annoyance Rating Methodology

[8] Survey of Noise Attitudes (2014), CAP 1506, Civil Aviation Authority, Feb 2017

3.16 Air noise – daily flight numbers

3.16.1 Jacobs comment:

"It is requested that daily flight numbers are provided (comparable with those published in the 2009 ES), to enable a full comparison of the current and 2009 assessments."

3.16.2 BAP response:

Table 7.1 of the ES provides the aircraft movement numbers in the summer daytime, summer night-time, and annual periods for each scenario. These totals can be divided by 92 or 365 as appropriate to get the average number of flights per day. This has been done to give the values in Table 8 below.

Scenario	No. aircraft movements per average summer day	
	16-hour day (07:00-23:00)	8-hour night (23:00-07:00)
2017	206	30
10 mppa	210	44
12 mppa	245	50

Table 8: Average Daily Aircraft Movements in 92-day Summer Period

It is noted that the values in Table 5.1 of the Jacobs response appear to be significantly too low. For example, in 2007 Bristol Airport had 76,428 aircraft movements, according to the CAA statistics. This would correspond to 209 flights per 24 hour day over the year, so it seems infeasible that there were only 83 per 16 hour day as per the Jacobs response. It is unclear where these values are derived from.

3.17 Air noise – 'salami slicing'

3.17.1 Jacobs comment:

"As the level of change in air noise forms the main basis of assessment, reference to the 2009 ES is important to address potential cumulative noise change over time, and so-called 'salami slicing' of development."

3.17.2 BAP response:

As highlighted by Table 5.1 of the Jacobs response, the air noise effects now predicted under the future scenarios are less than the effects predicted under 10 mppa (as a forecast for 2019) in the 2009 application. Therefore the so-called 'salami slicing' effect of incremental increasing of effects is not apparent in this case.

3.18 Air noise – clarifications

3.18.1 Jacobs comment:

"The assessment of air noise effects is presented in section 7.10. Clarification of, or additional information is requested for the following points:

- *Counts for a particular noise contour include all relevant areas/properties/population exposed to that noise level or a higher noise level. (Last sentence of 7.10.2 appears to contain a typographical error).*
- *Tables 7.32 and 7.33 should provide information on noise contour bands in between the LOAEL and SOAEL. In particular, the key parameter of 54 dB $L_{Aeq\ 16\ hrs}$ should be represented in this table. It is acknowledged that this information is provided in appendix 7D, but it is considered of sufficient importance to be included in the main chapter."*

3.18.2 BAP response:

There is a typographical error in 7.10.2, which should end "within a 51 dB contour as well".

54 dB $L_{Aeq,16h}$ is not considered to be a key parameter in this assessment, as it is not a threshold for a change in the interpretation of the effects, e.g. a LOAEL or SOAEL. 54 dB $L_{Aeq,16h}$ could potentially be considered to be to the LOAEL, however BAP considered that 51 dB $L_{Aeq,16h}$ was more appropriate as discussed in the ES. As acknowledged, information for the 54 dB $L_{Aeq,16h}$ index has been provided in Appendix 7D of the ES.

3.19 Air noise – schools

3.19.1 Jacobs comment:

"Noise levels in excess of the adopted 55dB $L_{Aeq\ 30\ mins}$ assessment criterion have been predicted at Winford Primary School. A significant effect has not been identified since noise levels are not predicted to change due to the proposed development. Paragraph 7B.3.33 cites the Aviation Policy Framework and identifies that 'The Government also expects airport operators to offer acoustic insulation to noise sensitive buildings, such as schools and hospitals, exposed to levels of noise of 63 dB $L_{Aeq,16h}$ or more'. Whilst predicted air noise levels are below this threshold, consideration should be given to adopting mitigation measures at this school, in view of the fact that noise levels exceed the thresholds set out by BB93. As a minimum, site specific predictions of internal noise levels in teaching areas (including those for pupils with special communication needs) should be presented."

"It is noted that St Katharine's School, Felton is included as a receptor in Table 7D.78; however it is understood that this school has closed."

3.19.2 BAP response:

BB93 sets out thresholds that apply to the design of new or refurbished schools and also should have been adopted in those built recently since the standards have been in place. It is not a requirement to retro-fit existing schools to meet these standards. As stated in the Jacobs response, the Government expects insulation to be provided to schools at a level of 63 dB $L_{Aeq,16h}$.

The Bristol Airport Environmental Improvement Fund (also known as the Local Community Fund) invests in a range of local projects which benefit the local community and the environment. Its main purpose is to mitigate the environmental and social impacts of the airport's operations. Winford Primary School has benefitted from this fund recently and insulation works could be applied for under this fund.

St Katharine's School should have been removed from Table 7D.78, as Jacobs correctly identify in their response, it has closed. It was removed from the main chapter of the ES.

3.20 Air noise – helicopters

3.20.1 Jacobs comment:

"It is understood that some helicopter movements occur at the airport. No assessment of change in helicopter noise has been provided; however, neither has this issue been scoped out. Assessment or justification for scoping out of helicopter noise is requested."

3.20.2 BAP response:

Helicopters have been effectively scoped out of the assessment. They comprised 3% of the total aircraft movements in 2017, and are quieter than typical aircraft using Bristol Airport. Therefore they are not considered to have an effect on the overall noise produced by the airport.

3.21 Ground noise – BS4142

3.21.1 Jacobs comment:

"An assessment using the principles of BS4142:2014 is considered appropriate for this type of noise, but no comparison of predicted ground noise with the existing ambient or background levels is presented in the assessment. BS4142:2014 encourages the consideration of contextual factors which could be used to put the likely large difference between rating and background levels into the context of the existing development. Without the use of BS4142:2014, there is no consideration of the character/tonality of the noise on the environment, which is considered a significant factor, given the tonal issues associated with APUs.

The assessment of ground noise levels and character should be put into context of the character and context of the existing noise climate, using the principles set out in BS4142:2014."

3.21.2 BAP response:

See response in section 3.1.2 of this memo.

3.22 Ground noise – SOAEL selection

3.22.1 Jacobs comment:

"Instead, the assessment is based on a numerical comparison of predicted ground noise solely with fixed thresholds. The following SOAELs have been adopted for the assessment of ground noise in isolation: Day = 60 dB $L_{Aeq,16h}$ and Night = 55 dB $L_{Aeq,8h}$.

For daytime noise, the assessment identifies that the WHO has recommended a guideline value of 50 dB $L_{Aeq,16h}$ to prevent 'moderate' community annoyance and 55 dB $L_{Aeq,16h}$ for 'serious' community annoyance. These types of community response are typically considered as 'significant'. In this context, the adoption of an even higher SOAEL of 60 dB $L_{Aeq,16h}$ for the onset of significant effects for ground noise in isolation during the day is not considered to be justified.

Part of the justification for the adoption of the adopted daytime SOAEL of 60 dB $L_{Aeq,16h}$ appears to be that existing ambient daytime values are in the range 50 - 60 dB $L_{Aeq,16h}$. As noted in the baseline noise report, this is largely due to existing airport operations. The proposition that high existing airport noise should justify even higher assessment thresholds does not reflect a precautionary health-based approach.

Similarly, the adopted SOAEL of 55 dB $L_{Aeq,8h}$ for ground noise at night does not appear to reflect a precautionary health-based approach. According to the WHO in their Night Noise Guidelines, an $L_{night,outside}$ of 55 dB is described as "..increasingly dangerous for public health. Adverse health effects occur frequently, a sizeable proportion of the population is highly annoyed and sleep-disturbed. There is evidence that the risk of cardiovascular disease increases". Using this level to describe the onset of significant effects for ground noise in isolation during the night is not considered to be justified.

The adopted SOAELs should instead be selected based on recognized thresholds for the onset of significant health effects, where sufficient evidence exists."

3.22.2 BAP response:

The justification for the selected levels are set out in Appendix 7B of the ES (paragraphs 7B.6.69 and following). It accords with the following general concept:

- The LOAEL should correspond to an outdoor level below which the internal levels recommended in BS 8233 (35 dB $L_{Aeq,16h}$ and 30 dB $L_{Aeq,8h}$) are met with windows open.

- The SOAEL should correspond to an outdoor level below which the internal levels recommended in BS 8233 are met with windows closed.
- The UAEL should correspond to an outdoor level below which the internal levels recommended in BS 8233 are met with high-acoustic-performance windows closed.

With an assumption of a 15 dB(A) reduction from outside to inside for partially open windows, 25 dB(A) for closed windows, and 35 dB(A) for high-acoustic-performance closed windows, this results in the levels selected.

3.23 Ground noise – clarifications

3.23.1 Jacobs comment:

"7.11.5 makes reference to only one residential receptor exceeding the SOAEL of 65 dB $L_{Aeq,16h}$. The assessment criteria section makes reference to a SOAEL of 60 dB $L_{Aeq,16h}$. Similarly for the night time levels reference is made in 7.11.9 to a SOAEL of 60 dB $L_{Aeq,8h}$. The assessment criteria section makes reference to a SOAEL of 55 dB $L_{Aeq,16h}$. Property counts for the adopted assessment criteria should be provided."

3.23.2 BAP response:

This is a typographical error. 7.11.5 should refer to one residential receptor above 60 dB $L_{Aeq,16h}$ and 7.11.9 should refer to a night-time SOAEL of 55 dB $L_{Aeq,8h}$, as per the tables preceding these paragraphs.

3.24 Ground noise – non-aircraft sources (e.g. reversing beepers)

3.24.1 Jacobs comment:

"By excluding non-aircraft noise sources from the scope of the ground noise assessment, there is no consideration of the proposals on other sources, e.g. reversing beepers. Assessment or justification for scoping out of non-aircraft ground noise sources should be provided."

3.24.2 BAP response:

Non-aircraft noise sources are not usually considered as they have a relatively insignificant effect on the overall noise environment.

As discussed at the meeting of 11th February, BAP has agreed to provide indicative noise levels of reversing beepers at properties on Downside Road, in response to specific complaints.

The closest properties on Downside Road are approximately 200m from the airport apron. Taking a reference level of 97 dB(A) at 1m for a reversing alarm, this would equate to an outdoor level of 51 dB L_{Amax} at the properties, assuming no screening. This would be likely to be audible

and potentially annoying, although it equates to an indoor level below the 45 dB L_{Amax} that is usually considered to be associated with sleep disturbance. However, given the low background noise levels, a BS 4142 assessment would likely give rise to a conclusion of an adverse impact, and possibly a significant one. This would depend on the noise level of the reversing beepers being used and the frequency of use. BAP does not currently have this information.

Although this effect is not due to the proposed development, and is unlikely to change significantly as a result of it (noise levels may reduce in some areas due to additional screening, but where this does not apply they could occur more frequently), this will be mitigated by encouraging the use of broadband reversing alarms rather than "beepers" which are tonal. Broadband alarms have been found to be less annoying at the same sound level than tonal alarms.

3.25 Road traffic noise – change in level at high absolute levels

3.25.1 Jacobs comment:

"The impact scale adopted is shown in Table 7F.3. This scale is adopted for all receptors, irrespective of the existing noise level. The advice given in Planning Practice Guidance Noise is that "In cases where existing noise sensitive locations already experience high noise levels, a development that is expected to cause even a small increase in the overall noise level may result in a significant adverse effect occurring even though little to no change in behaviour would be likely to occur". This planning advice has not been taken into consideration for the road traffic noise assessment, despite being acknowledged in 7.965 where it states "These are indicative as the impact of a relative change in level also depends on the absolute level associated with it and the noise conditions prior to the change". It is considered that a scale should have been considered which takes account of this aspect of planning guidance."

3.25.2 BAP response:

The advice in PPGN was taken into account when setting the change criteria for other noise sources. However, for road traffic noise, specific guidance relating to change in noise level exists in the form of the Design Manual for Roads and Bridges (DMRB) and therefore this Government recognised and commonly used guidance was considered more appropriate.

In any case, the change in noise level for receptors above the LOAEL was assessed to be at most 0.5 dB and BAP consider this would not be assessed as significant under either approach.

3.26 Road traffic noise – study area

3.26.1 Jacobs comment:

"No explanation is provided on how the study area has been derived. From Figure 7F.2 the study area appears too small to examine possible impacts, as these could be quite widespread and the issue of noise traffic is known to be a concern for local residents. It is considered that residential areas such as Potters Hill and Felton should be considered in the assessment of road traffic noise impacts."

3.26.2 BAP response:

See section 3.2.2 of this memo.

3.27 Road traffic noise – insulation scheme

3.27.1 Jacobs comment:

"No specific mitigation is proposed for road traffic noise. Paragraph 7F.7.4 states that "Bristol Airport are proposing to enhance their existing noise insulation grants. Although eligibility for these grants are not based on road traffic noise criteria, some of the dwellings exposed to significant levels of road traffic noise are eligible for grants, for example Lulsgate Bottom". It is unclear to which grants this is referring. Presumably these are the enhanced noise insulation scheme provided by the airport, and this is then saying that some dwellings in Lulsgate Bottom are exposed to both high levels of noise from air and noise. This again raises the issue of cumulative effects"

3.27.2 BAP response:

This is referring to the grants via the noise insulation scheme. Cumulative effects are covered in section 3.6.2 on this memo.

3.28 Construction noise – road traffic during construction phase

3.28.1 Jacobs comment:

"Road traffic noise during the construction phase does not appear to have been assessed in either the road traffic noise or construction noise assessments. Justification should be provided if this potential impact has been scoped out."

3.28.2 BAP response:

It is unclear exactly what is being referred to in this comment. Road traffic noise from construction vehicles using public roads or construction workers travelling to the site has not been assessed as the number of vehicles involved is insignificant. For example, the A38 had

approx. 22,500 vehicles using it per 18-hour day in 2018, and even the quieter roads assessed had thousands of vehicles per day. The noise of vehicles on construction sites and haul roads has been assessed as part of the construction noise assessment.

3.29 Construction noise – reasonable worst case

3.29.1 Jacobs comment:

"The construction noise predictions presented give 'an indication of the typical long-term average noise level likely to arise at a given receptor, plant activities have been assumed to take place towards the centre of a given site.' This is at odds with the commitment provided in the scoping report: 'The effects of construction noise will be assessed for those areas in proximity to construction works based both on worse case (closest) activities and a more typical case activity, where appropriate to do so'. At paragraph 7G.4.14, it is argued that other conservative assumptions offset the less than conservative plant positioning assumptions; however no evidence is provided to support this and it is acknowledged than noise levels could be higher than predicted at times. Predictions of construction noise associated with a reasonable worst case are requested."

3.29.2 BAP response:

When the Scoping Report was written, the construction site details were unknown. Therefore, the Scoping Report was worded with the appreciation that the entire area of construction may potentially be designated as a single site or a series of large sites comprising multiple activities. In practice, the assessment of construction noise has been largely broken down into small zones of focused construction where the assumption of locating plant at the centre of an individual site is reasonable, particularly when considered in the context of the distance to the receptors and the detailed construction assessment undertaken as a whole and the worst case assumptions concerning cumulative effects.

There are two clear exceptions to this, which are the new gyratory road works and the silver zone parking extension works. For both of these locations, the worst-case situation in terms of noise level at receptors would mean the distance being approximately half that assumed in BAP's assessment.

In the case of the silver zone parking extension works, the reduced distance would result in higher noise levels at the receptors in the worst case situation, but still does not result in a significant noise level at any of the assessed receptors.

In the case of the new gyratory road works, this reduced distance would result in increased noise levels. However, it is not reasonable to assume that all equipment would operate simultaneously at the closest location. Calculations for the centre of site assumptions (i.e. those relating to the ES) are presented in Figure 2 for the two phases producing the highest noise

levels from this construction site. Calculations using worst-case assumptions are presented in Figure 3. These show an increase of approximately 4 dB(A) for the worst-case situation. However, if the mitigation recommendations are followed (i.e. 2.4m high hoarding at the site perimeter), then the barrier effect of the perimeter hoarding would increase when works are closer to it, which would reduce this difference.

It is noted that these levels presented are before mitigation. The resulting noise level at receptors after mitigation is still predicted to be below the adopted threshold for significance of 65 dB $L_{Aeq,12h}$, even in this worst case situation.

Construction Noise Prediction
BS 5228-1:2009+A1:2014
Job No: *A11172*
Job Name *Bristol Airport*

O	**Gyratory Road**									Receptor B		
Phase	**Description**	**Plant**	**Ref.**	**L_{Aeq} @10m** (dB)	**L_{WA}** (dB)	**%-On Time**	**Q** (#/hr)	**Speed** (km/h)	Dist to Receptor (m)		dB(A)	Energy
2	Earthworks and Fill	Dozer	C.5.13	82		100			150		55	288252
Oct-20		Dump Truck	C.5.17	81		100			150		54	228966
Nov-20		Dump Truck	C.5.17	81		100			150		54	228966
		Dump Truck	C.5.17	81		100			150		54	228966
		Dump Truck	C.5.17	81		100			150		54	228966
		Lorry	C.2.34		108	100	3	30	230		41	13749
		Tracked Excavator	C.5.18	80		100			150		53	181875
		Tracked Excavator	C.5.18	80		100			150		53	181875
		Tracked Excavator	C.5.18	80		100			150		53	181875
		Tracked Excavator	C.5.18	80		100			150		53	181875
		Vibratory Roller	C.5.20	75		100			150		48	57514
		Vibratory Roller	C.5.20	75		100			150		48	57514
										TOTAL	63	
3	Access Roads and Parking Bays	Dozer	C.5.13	82		100			150		55	288252
Dec-20		Dozer	C.5.13	82		100			150		55	288252
Mar-21		Dump Truck	C.5.17	81		100			150		54	228966
		Dump Truck	C.5.17	81		100			150		54	228966
		Dump Truck	C.5.17	81		100			150		54	228966
		Lorry	C.2.34		108	100	3	30	230		41	13749
		Tracked Excavator	C.5.18	80		100			150		53	181875
		Tracked Excavator	C.5.18	80		100			150		53	181875
		Vibratory Roller	C.5.20	75		100			150		48	57514
		Vibratory Roller	C.5.20	75		100			150		48	57514
		Vibratory Roller	C.5.20	75		100			150		48	57514
										TOTAL	63	

Figure 2: Construction noise calculation details - gyratory road, receptor B – centre of site assumption

Construction Noise Prediction BS 5228-1:2009+A1:2014													
Job No:	A11172												
Job Name	Bristol Airport												
											Receptor		
O	Gyratory Road										B		
Phase	Description	Plant	Ref.	L_{Aeq} @10m (dB)	L_{WA} (dB)	%-On Time	Q (#/hr)	Speed (km/h)	Dist to Receptor (m)		dB(A)	Energy
2	Earthworks and Fill	Dozer	C.5.13	82		100			75		62	1630598
Oct-20		Dump Truck	C.5.17	81		100			75		61	1295230
Nov-20		Dump Truck	C.5.17	81		100			150		54	228966
		Dump Truck	C.5.17	81		100			150		54	228966
		Dump Truck	C.5.17	81		100			225		49	83089
		Lorry	C.2.34		108	100	3	30	230		41	13749
		Tracked Excavator	C.5.18	80		100			75		60	1028838
		Tracked Excavator	C.5.18	80		100			150		53	181875
		Tracked Excavator	C.5.18	80		100			150		53	181875
		Tracked Excavator	C.5.18	80		100			225		48	66000
		Vibratory Roller	C.5.20	75		100			75		55	325347
		Vibratory Roller	C.5.20	75		100			150		48	57514
										TOTAL	67	
3	Access Roads and Parking Bays	Dozer	C.5.13	82		100			75		62	1630598
Dec-20		Dozer	C.5.13	82		100			225		50	104603
Mar-21		Dump Truck	C.5.17	81		100			75		61	1295230
		Dump Truck	C.5.17	81		100			150		54	228966
		Dump Truck	C.5.17	81		100			225		49	83089
		Lorry	C.2.34		108	100	3	30	230		41	13749
		Tracked Excavator	C.5.18	80		100			75		60	1028838
		Tracked Excavator	C.5.18	80		100			225		48	66000
		Vibratory Roller	C.5.20	75		100			75		55	325347
		Vibratory Roller	C.5.20	75		100			150		48	57514
		Vibratory Roller	C.5.20	75		100			225		43	20871
										TOTAL	67	

Figure 3: Construction noise calculation details - gyratory road, receptor B – worst case assumption

3.30 Construction noise – BS5228

3.30.1 Jacobs comment:

"Appendix 7G presents the construction plant noise emission data used and references it to BS5228:2009+A1:2014. This data needs to be reviewed as the plant description, BS5228 reference number and noise emission data do not fully correspond to that presented in BS5228. For example, Table 7G.5 cites a hand-held saw being listed as 85dB LAeq 10m at Table C.4.71 within BS5228. This entry within BS5228 is actually for a circular bench saw."

3.30.2 BAP response:

On review, it was found that the following plant items had incorrect references:

- Core drill (electric) – should be C.4.69 rather than C.4.70. The noise level used was correct.
- Hand held saw – should be C.4.72 rather than C.4.71. The reference noise level should have been 79 dB(A) rather than 85 dB(A).

This led to a slight over-estimation of the noise level for some sites. However, the two sites giving rise to potentially significant effects (without mitigation) did not involve these activities and are therefore unaffected.

3.31 Construction noise – calculation details

3.31.1 Jacobs comment:

"Appendix 7G also presents the plant on-times assumed; however assumptions regarding calculation inputs such as source height, receptor height and ground effect are not detailed. All calculation inputs should be presented, along with an example calculation sheet for a selected receptor. Construction working areas and assumed plant locations should also be presented on a figure within Appendix 7G._Text within Appendix 7G refers to Figure 2.3 however, this figure is not clearly labelled in the file containing figures from chapter 1 and 2."

3.31.2 BAP response:

The calculation procedure in BS5228-1:2009+A1:2014 has been followed. An assumption of soft ground has been made and distances between source and receiver are greater than 25m. No allowance has been made for reflections or screening, other than for mitigation measures. Source and receiver height are not part of the calculations; effectively it has been assumed that they are at the same height and the ground is flat.

An example calculation is presented below:

Construction Noise Prediction					
BS 5228-1:2009+A1:2014					
Job No:	*A11172*				
Job Name	*Bristol Airport*				
KK	**Proposed Roadworks (A38)**				
Phase	**Description**	**Plant**	**Ref.**	**L_{Aeq} @10m (dB)**	**%-On Time**
1	Site Set Up	Wheeled Excavator	C.5.11	73	50
	Receptor	I			
	Distance (m)	50			
	Distance Correction				
	-(25*LOG(dist/10)-2)	-15.5			
	On-time Correction				
	10*log(on-time/100)	-3.0			
	Level at Receptor	54.5			

3.32 Construction noise – significant effects

3.32.1 Jacobs comment:

"The construction noise predictions have been undertaken for selected receptors. Potentially significant effects have been identified at four of the eleven selected receptors. Clarification on the spatial extent of these potentially significant effects and the total number of receptors affected is requested. Information on whether these receptors are eligible for noise insulation grants (now or in the future) would also be useful."

3.32.2 BAP response:

The receptors identified as having potentially significant effects in the absence of mitigation are those close to two of the construction sites:

- The A38 highway improvements. This site affects receptors C and I, which represent around 30 dwellings, although not all are as close to the site.
- The new gyratory road. This site affects receptors B and H, which represent approximately 10 dwellings on the south side of Downside Road at the eastern end of the road.

Calculations for each individual receptor have not been carried out and therefore the precise number exposed to a given noise level is not known. The assessed receptors are among those worst affected of the dwellings they represent.

3.33 Construction noise – mitigation details

3.33.1 Jacobs comment:

"Mitigation in the form of a 2.4m high site timber hoarding is recommended on the northern edge of the gyratory road site. Information on the proposed lateral extent of this barrier should be provided. Similarly, additional information on the mitigation measures proposed for works on the A38 should be provided, to include:

- *Identification of plant items require temporary barriers*
- *Location, height and extent of site hoarding*
- *Confirmation of calculation method if attenuation has been assumed to be provided by both temporary barriers and site hoarding."*

3.33.2 BAP response:

The lateral extent of the barrier for the gyratory road site should be such that the plant/vehicles generating the noise should not have a direct line of sight from the dwellings on Downside Road that are closest to the works.

For the A38 works, the noise barriers (either temporary or site hoarding) should be such that the noise sources are not visible from the nearby dwellings. This is expected to provide a 10 dB reduction based on the guidance in BS5228. The dimensions of the barriers required will depend on the exact nature of the works.

3.34 Construction noise – Section 61

3.34.1 Jacobs comment:

"The prior consent process of Section 61 of the Control of Pollution Act 1974 is cited in paragraph 7B.3.2; however, no commitment has been made by the Applicant to engage in this process. Given the uncertainty around construction plant and programme that exists at this stage of an application, the S61 process offers the opportunity to re-visit the construction noise assessment when this uncertainty has been reduced. It is also a method of the applicant (or their contractor) demonstrating the mechanisms that constitute best practical means, which they have committed to employing at 7G.7.7. Consideration should be given by the Applicant to engaging in the S61 process, should planning permission be obtained."

3.34.2 BAP response:

BAP support the use of the Section 61 process for construction works that have the potential to cause a significant noise impact.

Nick Williams
for Bickerdike Allen Partners LLP

Peter Henson
Partner

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