Commission Reference: 2012/O002

PLANNING APPEALS COMMISSION

The Planning (Northern Ireland) Order 1991

Article 123

PUBLIC LOCAL INQUIRY INTO THE PROPOSED MODIFICATION OF THE PLANNING AGREEMENT BETWEEN GEORGE BEST BELFAST CITY AIRPORT AND THE DEPARTMENT OF THE ENVIRONMENT

Report

by

Commissioners

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Examination Dates: **18 May – 21 May 2015**

Date of Report: **30 October 2015**

CONTENTS

Introduction and Background

1. On the 22nd of January 1997 the Department of the Environment for Northern Ireland (DOE) entered into a planning agreement (the 1997 Planning Agreement) with Belfast City Airport Limited; Shorts Brothers PLC. On the 14th of October 2008 the 1997 Agreement was modified by what is known as the 2008 Planning Agreement between George Best Belfast City Airport (GBBCA) and the DOE. The modification to the 1997 agreement in 2008 followed an independent Examination in Public (EiP) held in June 2006.

2. The 1997 Agreement and the modified 2008 Agreement incorporated a number of operating restrictions on the airport. One of those restrictions was a limit on the number of seats that operators using the aerodrome could sell in any period of twelve months, (calculated by multiplying the number of aircraft by the average number of seats in each aircraft). In the 1997 Agreement the limit was 1.5 million seats for sale (SFS) and this was increased to 2 million SFS in the 2008 modified Agreement. Restrictions were also placed within the planning agreements on the total number of air traffic movements (ATMs) permitted within any period of twelve months. The cap in the 1997 Agreement was 45,000 ATMs, which was raised to 48,000 ATMs in the amended 2008 Agreement. Both agreements determined that the permitted hours of operation for the airport should be between the hours of 6.30a.m. and 9.30p.m.

3. On the 23rd of February 2012 GBBCA submitted a request to the DOE to modify the 2008 Agreement to allow for removal of the SFS limit, the introduction of a noise control contour cap placed on the area within the city falling within the 57db $L_{Aeq\ 16h}$ contour and for the introduction of other noise control measures.

4. On the 6th of July 2012 the DOE wrote to the Planning Appeals Commission (PAC) requesting the Commission to hold a public inquiry into the GBBCA request. Following several Pre-Inquiry meetings, the submission by GBBCA of information akin to an Environmental Statement in December 2013 and an addendum to that statement in May 2014, the Public Inquiry opened on the 18th of May 2015 and ran for four days, closing on the 21st of May 2015. Prior to the Inquiry an opportunity was provided for those parties who had expressed a desire to be involved in the public hearing process to submit statements of evidence. The submitted statements of evidence were exchanged between opposing parties and an opportunity was provided for the submission of statements rebutting the initial evidence. The Commission also received copies of letters of representation made by the general public and various bodies to the DOE in response to public advertisement of the GBBCA request to modify the planning agreement.

5. The report that follows sets out the Commission's assessment of the requested amendment to the Planning Agreement and its recommendation to the Department.

Policy Context

Planning Policy

6. At a strategic level the Regional Development Strategy 2035 (RDS) identifies Belfast as a 'Gateway' within Northern Ireland and refers to GBBCA as one of two elements in this role. The document refers to the desirability of enhancing connectivity and strengthening the 'Gateways'. Turning to operational planning policies, differing views were expressed about how and why a planning agreement came to be in place at GBBCA. Belfast City Airport Watch (BCAW) cited the content of the Belfast Harbour Local Plan (BHLP) Inquiry Adoption Statement as being of particular importance. Whilst this helps to 'set the scene' for the development of GBBCA over time, the BHLP no longer has a statutory function. The Belfast Harbour Area is now covered by the Belfast Metropolitan Area Plan (BMAP), which does not repeat the wording in the draft BHLP. BMAP states that "The Belfast Harbour Area Strategy objectives are to: facilitate further development of Belfast Port, protect and promote The George Best Belfast City Airport function and development of a new City Quarter at Titanic. All these are intended to help enhance the area's gateway role and continue riverside renewal". The Plan also states that "Provisions relating to the control of airport operations are set out in an existing Article 40 Agreement made under the Planning (NI) Order 1991. It comprises (sic) a cap on air transport movements and on the number of aircraft seats provided and limited operating hours. The Plan does not propose to alter the provisions set out in the Article 40 Agreement between the Department of the Environment (NI), Belfast City Airport Limited and Shorts Brothers". The

Noise Policy context

7. The Aviation Policy Framework (APF) sets out the Government's overall policy on aviation noise, which applies throughout the UK. We note the comment in evidence that whilst the APF advocates use of the 57dB $L_{Aeq\ 16h}$ contour as the average level of daytime aircraft noise marking the approximate onset of significant community annoyance, it also states that:

"Government encourages airport operators to use alternative measures which better reflect how aircraft noise is experienced in different localities, developing these measures in consultation with their consultative committee and local communities." (APF para 3.19). We deal with the APF standards in our section on Health.

8. The Noise Policy Statement for Northern Ireland (NPSNI) was published in September 2014. It refers in its policy objectives to the Significant Observed Adverse Effect Level (SOAEL) and Lowest Observed Adverse Effect Level (LOAEL) for noise. However, there are no SOAEL or LOAEL values in the

NPSNI pending the availability of further evidence and guidance on what may constitute a significant adverse impact on health and quality of life from noise. We recognise that an objective in the NPSNI relates to avoiding or mitigating significant adverse impacts on health and quality of life. However, the NPSNI clearly states that it “should be relied upon in situations where there is no guidance or standards on the particular noise situation”. Given the existence of the APF, which fills this latter role in respect of aviation noise, we are not persuaded that the provisions of the NPSNI are governing in respect of the proposal before us. They are, however, still material considerations. Importantly, both documents seek to prevent unacceptable impacts of noise on the public.

Legislation and Legal Submissions

The Planning Agreement

9. Section 76 of The Planning Act (Northern Ireland) 2011 has replaced Article 40 of the Planning (Northern Ireland) Order 1991 in respect of Planning Agreements. Section 77 of the Act refers to the modification and discharge of agreements. The Planning (Modification and Discharge of Planning Agreements) Regulations (Northern Ireland) 2015 came into operation on 22nd April 2015. Schedule 2 of the Regulations makes transitional provisions in respect of the Article 40 agreement between the Department and GBBCA and allows for modification or discharge of same under Section 77. We note that the Schedule refers only to the agreement dated 14th October 2008. Sections 1 and 3 of the 2008 Agreement make it clear that it constitutes a modification of the 1997 Agreement. Notwithstanding this, the 2008 Agreement exists in its own right. The 1997 Agreement also remains in force, and this was recognised at the 2015 Public Inquiry by the Department, which indicated that it was content to proceed with the process. In our opinion, the absence of reference to the 1997 agreement represents no obstacle to a modification or discharge of the 2008 agreement.

10. Under Article 40A of the Planning (Northern Ireland) Order 1991, the Department of the Environment was empowered to discharge or modify a planning agreement, either by agreement with the party against whom the agreement is enforceable, or pursuant to an application by such party once a period of five years had expired from the date on which the agreement was made. Article 40B of the Order conferred the right of appeal against the Department's failure to make a determination of an application for modification or discharge within the specified period.

11. For the objectors it was argued that the wording of Article 40B of the 1991 Order makes it clear that where an application for modification is made it must be granted or refused on the precise terms sought; it cannot be amended, nor can the Department decide to grant some lesser, partial or different modification. We note that Article 40B (now replaced by Section 78 of the 2011 Act) related to appeals against the Department either failing to give notice of its determination within the prescribed period, or determining that the Agreement shall not be modified. Neither of these circumstances applies in this case and the Public Inquiry held by the PAC under Article 123 of the 1991 Planning Order is distinguishable from an appeal under Section 78. The subject Public Inquiry was held under Article 123, at the request of the Department; this was the correct avenue for a proposed modification of a PA where a period of five years had not elapsed since it was made.

12. With regard to the validity of the proposed modification to the Agreement, we note that the Department is content to consider the case and is of the opinion

that its considerations are not confined to the precise matters stated in the application by GBBCA. Counsel for the Department took the view that Article 40A(1)(a) [replaced by Section 77(1)(a) of the 2011 Act] is a matter of agreement by the Department; there is no 5 year prohibition and alternative forms of modification can be examined as part of the process. Given that the Department will make the determination in this case, having taken into account our report, we do not propose to comment further on the matter.

13. We note that the not all of the recommendations of the 2006 EiP were reflected in the content of the 2008 Planning Agreement. This was a matter for the Department, which entered into the Agreement with GBBCA, and is not open to debate in the current process. The recommendations of the EiP were not legally binding in themselves. Notwithstanding the views of objectors, legislation exists to allow GBBCA to seek to modify the impact of constraints imposed by the 2008 Planning Agreement. The failure of GBBCA to agree an indicative noise control contour in line with the recommendation of the EiP does not derogate from such entitlement. The fact that the airport entered into the 2008 agreement willingly is not an obstacle to future change or modification. Neither does the report on the 2006 EiP fetter our consideration of submissions made, both in respect of the application to modify the 2008 Agreement, and to the subject Public Inquiry.

14. Section 77(7) of the 2011 Act has replaced Article 40A(7) of the 1991 Order. Section 77(7) states that "Where an application is made to the relevant authority under subsection (4), the authority may determine - (a) that the planning agreement shall continue to have effect without modification; (b) if the agreement no longer serves a useful purpose, that it shall be discharged; or (c) if the agreement continues to serve a useful purpose, but would serve that purpose equally well if it had effect subject to the modifications specified in the application, that it shall have effect subject to those modifications". We agree with Belfast International Airport's submission that Article 40A of the Planning (Northern Ireland) Order 1991 made substantially the same provisions in relation to Northern Ireland, as Section 106A of the Town and Country Planning Act 1990 makes in relation to England and Wales and that decisions of the Courts in England and Wales in respect of Section 106A are relevant to considerations to be taken into account under Article 40A [now Section 77].

15. We note the judgement in the case of *R (Batchelor Enterprises Limited) v North Dorset DC* [2003]. We note that this dealt with an application to modify an agreement within the 5 year period following it being made. Sullivan J distinguished between an application under section 106A(1)(a), made within the five year period, and an application under section 106A(3), made after five years had elapsed. In the latter case he judged that the local planning authority was bound to determine the application within a prescribed time and

a failure to do so, or a refusal of the application, could be appealed against. In the former case, however, the planning authority has a discretion.

16. We note that in the *Batchelor Enterprises* judgement, Sullivan J pointed out that the question to be considered by the planning authority in both Section 106A(1)(a) and 106A(3) cases is the same, namely, does the obligation still serve a useful planning purpose? We concur with the submission that the reference in legislation to a "useful purpose" should be interpreted in terms of useful planning purpose. We also agree that in considering whether an agreement would serve its purpose equally well if it had effect subject to modifications specified in an application, that regard should be had for all relevant material considerations, including any socio-economic or environmental consequences (beneficial and otherwise) of any decision. Clearly, the decision maker must act reasonably in accordance with *Wednesbury* principles. We note the Department's comment, based on the judgement in *R. (on the application of Renaissance Habitat Ltd) v West Berkshire DC* [2011], that there is no reason why the “useful purpose” of a modified agreement may not differ from the purpose of the original agreement.

17. We consider that the judgement in the case of *R (on the application of the Garden and Leisure Group Ltd) v North Somerset Council* [2003] provides useful guidance on the approach to be taken in assessing an application to modify a planning agreement, viz: to consider what the current obligation is, to establish what purpose it fulfils, to assess whether it is a useful purpose and, if it is, to determine whether the obligation serve that purpose equally well if it had effect subject to the proposed modification(s). We accept that these principles should apply in respect of cases falling within the ambit of Article 40A(1)(a)/Section 77(1)(a). We consider the purpose of the existing agreement and the efficacy of the proposed modifications in our section on noise. We note the comment of Richards J in the abovementioned case that the question of whether the statutory test in section 106A is met must be decided by reference to the entirety of the modifications specified; however, that case related to an application made after the 5 year period had elapsed, which does not apply here.

Appropriate Assessment

18. Under the Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995, as amended (the "Habitats Regulations"), Competent Authorities have a duty to ensure that all the activities they regulate have no adverse effect on the integrity of any of the Natura 2000 sites. We have addressed this issue in our section dealing with the natural environment.

EU Directive 2002/30/EC and the Aerodromes (Noise Restrictions) (Rules and Procedures) Regulation 2003

19. GBBCA is designated by EU Directive 2002/30/EC (the 2002 Directive) as being one of four 'City' airports within the European Union. It is one of two City airports in the UK, the other being London City Airport.

20. Article 5 of the 2002 Directive is entitled 'Rules on assessment' and states that **"**When a decision on operating restrictions is being considered, the information as specified in Annex II shall, as far as appropriate and possible, for the operating restrictions concerned and for the characteristics of the airport, be taken into account". The term 'operating restrictions' is defined as being "noise related action that limits or reduces access of civil subsonic jet airplanes to an airport".

21. The UK Government has transposed the 2002 Directive in the Aerodromes (Noise Restrictions) (Rules and Procedures) Regulations 2003. The Regulations define “operating restrictions” as "noise related action that limits or reduces access of civil subsonic jet aeroplanes to an airport, and includes actions which are aimed at the withdrawal from operations of marginally compliant aircraft at specific airports as well as limitations of a partial nature affecting the operation of civil subsonic aeroplanes according to time period". Regulation 6 mirrors the requirements of Article 5 of the 2002 Directive in stating that "When considering a decision on operating restrictions at a relevant airport the competent authority shall take into account the matters specified in Schedule 2 to these Regulations in so far as it is appropriate and possible to do so in respect of the operating restrictions concerned and of the characteristics of the airport." The 2003 Regulations define the 'competent authority' in relation to a relevant airport as the authority specified in Regulation 4. Regulation 4(2) states that "the competent authority for the purposes of these Regulations shall be the airport operator", which in this case is GBBCA.

22. Schedule 2 of the 2003 Regulations sets out the information to be taken into account in making a decision, including environmental information and information relating to aircraft noise. Belfast International Airport also pointed to the requirement in Schedule 2 for the decision maker to take into account "An overview of the possible ….. competitive effects of the proposed measures on other airports, operators and other interested parties", it being argued that a decision by the Department to agree modifications to the Planning Agreement would be a "decision on operating restrictions" within the meaning of the 2002 Directive and 2003 Regulations. It was submitted that a decision to vary the 2008 Planning Agreement without taking into account of all of the information required by Schedule 2 would be in breach of the 2003 Regulations and could be subject to legal challenge.

23. We acknowledge the submission from GBBCA that the 2002 Directive sought to restrict noisy aircraft from European airports in a manner that did not offend competition by restricting certain aircraft manufacturers. We note that the meaning of the term 'operating restriction' was considered by the European Court of Justice in the case of *European Air Transport SA v College D'environnement de la Region de Bruxelles: Case C-130/10*. The Court found an operating restriction to be a "prohibition, absolute or temporary, that prevents the access of a civil subsonic jet aeroplane to a European Union airport". It also judged that that national legislation imposing limits on maximum noise levels to be complied with by aircraft overflying areas does not in itself constitute an operating restriction unless it can have the same effect as prohibitions of access to the airport in question.

24. We accept that the seats for sale restriction, in limiting the number of passenger seats that may be offered for sale at GBBCA, together with the air transport movement restriction imposed by the Planning Agreement, indirectly limits the aircraft mix that operates from the airport. However, it does not specifically prohibit any particular aircraft make or size. We therefore agree with the submission of GBBCA that the proposed removal of the seats for sale restriction and modification of the Planning Agreement would not limit, reduce or prevent access of civil subsonic jet aeroplanes to GBBCA and nor would the proposed changes affect the operation of civil subsonic aeroplanes.

25. The replacement of the seats for sale restriction with a noise control contour-based restriction and/or a quota count system would not introduce a prohibition on access to GBBCA for particular aircraft types and, again, it could not thus be described as an operating restriction as envisaged by the 2002 Directive or the 2003 Regulations. We do not, therefore, agree with the objectors' submission that Schedule 2 to the 2003 Regulations or Annex II of the 2002 Directive are engaged in respect of the proposed modification before us. Neither do we need to consider the issue of 'competent authority' in that respect. We note that Directive 2002/30/EC is repealed by European Regulation 598/2014 dated 16 April 2014 with effect from 13 June 2016.

26. Arguments, related to the requirements of the Regulations and Directive, were put forward on behalf of Belfast International Airport (BIA), to the effect that the impact of modifying the SFSR could adversely affect the viability of that airport and would thus be unacceptable. As stated, we do not accept that the legislation requires an overview to be provided of the possible competitive effects of the proposed measures on other airports, operators and other interested parties. The regulatory regime in Northern Ireland does not favour BIA over other airports. There is no strategic policy or guidance in Northern Ireland to justify preferring Belfast International Airport over GBBCA and we do not propose to consider the impact of any modification of the Planning Agreement on competition between the two airports. We have, however, in adopting a balanced approach, taken into consideration the evidence

submitted in respect of the economic impact of the proposal and we comment on same later in this report.

27. Regulation 6(2) of the 2003 Regulations refers to **"**an airport project ... subject to an environmental impact assessment under Council Directive 85/337 of 27th June 1985 on the assessment of the effects of certain public and private projects on the environment....". Directive 85/337 has been codified in Directive 2011/92/EU, which states that:

"For the purposes of this Directive, the following definitions shall apply:

(a) 'project' means:

- the execution of construction works or of other installations or schemes,

- other interventions in the natural surroundings and landscape including those involving the extraction of mineral resources;"

28. The Annexes to the Directive list projects where environmental assessment is deemed necessary and we note that none of these refers to the introduction of measures to control noise at an airport. We do not consider that the modification to the 2008 Article 40 Agreement proposed by GBBCA can be described as a 'project' in the context of the 2011 Directive, and as such, Regulation 6(2) of the 2003 Regulations is not engaged. As stated elsewhere in this report, the proposed modification of the 2008 Agreement is not EIA development within the terms of the Planning (Environmental Impact Assessment) Regulations (NI) 2012; we have, however, considered its possible environmental effects.

29. It was submitted by objectors that the position at GBBCA is similar to the position in relation to the night noise restrictions set by Government at Heathrow, Gatwick and Stansted Airports under section 78 of the Civil Aviation Act 1982; those restrictions were not associated with 'physical' EIA development and their imposition needs, therefore, to comply with the 2002 Directions. We do not accept this assertion and do not discern any indication in the 1982 Act that resembles the requirements of Article 5 of EU Directive 2002/30/EC or Regulation 6(1) of the Aerodromes (Noise Restrictions) (Rules and Procedures) Regulations 2003. We accept that the 'General rules' set out in Regulation 5 of the 2003 Regulations are relevant to the case in hand; however, these rules do not contain the same provisions as Regulation 6.

30. We note the objector's submission that the relationship between the SFSR and the 2003 Regulations was recognised by the EiP Panel in its report at paragraph 4.3.5 where it refers, inter alia, to "the costs and benefits of various measures including costs to airline operators, socio-economic and competitive effects". However, we note that the report, in paragraph 4.1.5, states "Our role

does not include competitiveness issues between BCA and BIA". In any event, we are not fettered by comments made in the EiP report.

The baseline for the purposes of environmental assessment

31. We acknowledge that the concept of a 'baseline' is important in the context of environmental impact assessment and in properly establishing the likely environmental effects of a development proposal. We accept that proposition is equally valid where environmental information is being taken into account in the context of amending the 2008 Agreement between the DOE and GBBCA. We will comment on the effects of the proposed modification on the natural environment in due course. In terms of the natural environment, the baseline is largely an irrelevancy since the 2025 scenario without the SFSR was not predicted to have any significant detrimental impacts on nature conservation interests.

32. We recognise that establishing a 'baseline' in respect of the issue of noise is an important, and largely discrete, issue in itself. In this respect, the objectors have argued that the correct 'baseline' for any consideration of the effects of varying the 2008 Planning Agreement should include the 'indicative control contour' recommended by the EiP and referred to in the 2008 Planning Agreement. We deal with the noise 'baseline' in subsequent parts of this report and our consideration here is largely confined to legal submissions in respect thereof.

33. We are cognisant of the judgement in *Mooreland and Owenvarragh Residents' Association Application [2014] NIQB 130*. That case differed from the subject proposal in that it related to EIA development. However, we accept that the principle established by the court is relevant. We consider that the baseline for noise related to aircraft operations at GBBCA could not be represented by circumstances that were not lawfully sanctioned or that represented a breach of a legal agreement, enforceable by the courts. In our opinion, the baseline should be taken as the noise environment that would have pertained within the parameters set by the 2008 Planning Agreement. We consider that an appropriate baseline can be identified and discuss this further in our section on noise, including the GBBCA submissions on enforceability.

Ability of DRD to impose noise controls

34. For BIA it was argued that it is inappropriate to, once again, go through a public inquiry process into noise and other controls at GBBCA that would allow the airport operator to determine whether or not they were actually implemented. Reference was made to the statutory powers of DRD in the regulation of noise at Northern Ireland airports, pursuant to the Airports (Northern Ireland) Order 1994 as amended (the Airports Order). Article 21 of

the Airports Order requires an airport operator to take such measures as the DRD may direct for limiting noise and vibration or mitigating their effect, and in particular, for restricting the use of the airport to aircraft and persons complying with such requirements as may be specified in the DRD's directions. BIA submitted that, irrespective of any modified planning agreement, DRD should use its statutory powers to enforce those noise control measures that are directed by the Department as a result of this process.

35. We accept that operating in breach of the 2008 Planning Agreement would not be a factor that could favour the case for GBBCA. Enforcement of the Planning Agreement is a matter for the DOE and would involve seeking an injunction in the courts. We consider that Part III of the 2008 Planning Agreement is flawed in terms of the status of the 'indicative' contour that was to be agreed between the DOE and GBBCA. An objector took the view that the meaning and significance of the expression 'indicative control contour' was clear in the context of the EiP report; he stated that "It means a contour which delineates the area outside of which noise caused by the airport's activities and equaling or exceeding 57Leq is not permitted". The objector's interpretation goes beyond what is stated in the Agreement. The latter should be capable of being accurately interpreted on its own wording, given the need for clarity and in view of significant implications of the Department resorting to legal enforcement.

36. The role of DRD in the events leading up to the Public Inquiry and in controlling noise at GBBCA is a matter outwith the remit of this forum; however, we appreciate the current difficulty in enforcement, given the existence of the Planning Agreement and the absence of an agreed noise control contour. DRD was represented at the Public Inquiry and we see reason in its comment that enforcement of noise control has been held in abeyance pending the outcome of the GBBCA application. DRD has stated that it will consider any recommendations that arise from this current process to establish how best to use its statutory powers under Article 21 of the Airports Order, if required.

<u>Miscellaneous</u>

37. It was submitted by the objectors that the public are confused and should have been notified individually if potentially affected by the proposed modification. At the time of the submission of the proposal to the Department, Regulation 4 of the The Planning (Modification and Discharge of Planning Agreements) Regulations (Northern Ireland) 2005 made provisions for publicity in respect of applications for modification of planning agreements [now Regulation 4 of the Planning (Modification and Discharge of Planning Agreements) Regulations (Northern Ireland) 2015]. The regulations did not require notification of individual householders. Given the significant publicity in

the various media, the involvement of several community groups, and the level of written representations in connection with the proposal we consider it very unlikely that any concerned member of the public would be unaware of the proposal.

PURPOSE OF THE SEATS FOR SALE RESTRICTION (SFSR)

38. We have already set out the legislative context for the proposal. Case law identifies the approach to be taken in assessing an application to modify a planning agreement. The purpose of the 2008 Agreement and, particularly, the SFSR is a matter that is crucial to the PAC's consideration of the current proposal.

39. As a starting point, we note that the 2008 Planning Agreement states that *"the principal purpose of this agreement is to promote preservation of amenity".* Specifically, in respect of the SFSR, it states that the purpose of the restriction is *"regulation of environmental impact".* The 48,000 ATM restriction, similarly, refers to limiting environmental impact. Notably, in the Explanatory Document, under the heading 'obligations', the Agreement document states:-

(d) to maintain a noise control monitoring system (which meets certain specified requirements). Noise contours are to be generated from data relating to air traffic movements occurring during the period from 15th June to 14th September in each year;

Purpose: Monitoring of noise levels.

(e) to agree an indicative control contour with DOE (in accordance with the recommendations of the EiP Panel) and install an integrated noise and track keeping system as soon as possible and at the latest by 31st December 2008.

Purpose: Facilitating noise monitoring."

There is no mention of enforcing a noise control contour.

40. At the Public Inquiry the Department explained that the PA was made in order to regulate environmental impact, particularly noise affecting residential amenity. It also considered that the 1997 PA was designed to control environmental impact, whilst allowing growth of the airport, and that the 2008 agreement's principal purpose was to protect residential amenity. In its written evidence, the Department stated that "the purpose of the SFS limit is to act in conjunction with the other measures to indirectly control the noise environment around the airport".

41. Examining the entirety of the document, we consider that it is clear from the content of the EiP Report that the SFSR was seen as a 'stop gap' noise control mechanism that could be reviewed once a noise management system was operational at GBBCA. We see no evidence that the SFSR was intended for any other purpose, even if it would act as such by restricting throughput of passengers. If the original SFSR had been designed to restrict passenger numbers due to lack of adequate terminal building capacity, this was not the

reason for its appearance in the 2008 Agreement. Where the 2008 Agreement's Explanatory document refers to the 'environment', we consider that this relates to the issue of noise. For the objectors it was argued that the purpose of the Agreement had to be to restrict or limit operations at the airport but we see no evidence that the intent was anything other than to preserve residents' amenity by limiting aircraft noise. In the objectors' view, the 2008 agreement is adequate in controlling noise if the airport complies with it.

42. GBBCA furnishes the Department, on a bimonthly basis, with departing SFS information and details of aerodrome extensions log explanations. The SFS information allows for a rolling historical and forecast check against the scheduled 2,000,000 seats limit. The explanations provide details of extensions outside the limits on the hours of operation. It was the Department's view that the PA has fulfilled its purpose and that the proposed replacement of the SFSR with a noise control contour would improve matters, the SFSR being seen as an indirect control mechanism. We would agree with the Department that in assessing the 'useful planning purpose', the Agreement needs to be considered in its totality.

43. For BIA it was submitted that the SFSR clearly serves a useful purpose now. We would not disagree with that. The predicted noise contours for 2025 with and without the SFSR are different and we concur with the objectors that this demonstrates how the restriction effectively controls noise. It does this indirectly; by restricting seats sold, air carriers will limit the size of airplanes and the frequencies of flights. The question in terms of the proposed modification of the PA is whether, with the proposed changes, its useful purpose would be maintained.

44. We note the evidence of BCC that international aviation regulations will require quieter aircraft in the future. We note that the SFSR does not differentiate between noisier and quieter aircraft. We disagree with the view of an objector that the purpose of the SFSR was to limit the size of aircraft using GBBCA; there is no evidence to suggest that this was the intention of the restriction.

45. In terms of enforceability, we note the Department's reticence in advocating the use of a court injunction to ensure compliance with the SFSR. We agree that an injunction might seriously adversely affect travellers and businesses and it would be hard to predict whether or not a court would be willing to proceed with same. The Department also pointed out that the SFSR is a retrospective mechanism; enforcement could only take place if a breach has already happened. If this is the case, the noise impacts on amenity would already have occurred. In our view, this could only be seen as a flawed approach. We note the Department's view that the SFSR is unique in the United Kingdom and is not supported by aviation policy.

46. GBBCA pointed out that SFSR prevents the airport using its permitted capacity. As we have stated elsewhere, the 48000 ATM limit cannot be seen as a standalone element in an Agreement that needs to be read as a whole. We agree with BIA that GBBCA cannot be free to do what it likes within the ATM limit. We do, however, see how the SFSR and the ATM restrictions could be interpreted as contradictory.

47. We note the evidence of GBBCA which refers to the 2003 Department for Transport White Paper 'The Future of Air Transport', and the statement therein that "there may be scope to devise controls that would limit the local environmental disbenefits of Belfast City Airport without severely constraining the potential economic benefits which the airport could provide." Reference was also made to the April 2005 House of Commons Northern Ireland Affairs Committee report on Air Transport Services in Northern Ireland which stated that "a "seats for sale" restriction is not a valid or suitable way to manage the environmental impact of airport activity".

Natural Environment and Air Quality

48. The impact of air traffic on the natural environment was not an issue addressed by the previous EiP report. However, the panel considered the issue of air quality and indicated that it should be a matter for consideration when the Planning Agreement was next reviewed. We recognise that removal of the SFSR and its replacement with an alternative noise control mechanism would be likely to result in increased numbers of aircraft movements and that this could potentially affect the natural environment. This is a planning issue, and for this reason it is necessary for the Commission to consider the matter. The Planning (Environmental Impact Assessment) Regulations (NI) 2012 do not indicate that the proposal to amend the Article 40 agreement is EIA (Environmental Impact Assessment) development. However, an environmental statement (ES) was prepared on the Airport's behalf and this has assisted us in considering the potential impacts on the natural environment.

49. GBBCA lies within 400m of Belfast Lough Special Protection (SPA) and the Belfast Lough Open Water SPA. Belfast Lough has been designated as an SPA due to the presence of a Redshank wintering population. Belfast Lough Open Water SPA has been designated due to the presence of a wintering population of Great Crested Grebe. Belfast Lough contains a range of inter-tidal habitats including extensive mud and sand flats, mussel beds, boulder shores and rock platforms. Adjoining habitat includes beaches and limited maritime heath and grasslands notably on the outer southern shore. The lagoons at Belfast Harbour and Victoria Park are also included. The areas of foreshore and open lough have also been designated as Areas of Special Scientific Interest (ASSI) and a Ramsar site. There are a significant number of features for which the ASSI designations were made, including flora, fauna and important habitats. They support nationally important numbers of Shelduck, Oystercatcher, Purple Sandpiper, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew and Turnstone.

Ecology

50. As stated by the Department in its evidence, the proposed removal of the limit on the number of seats for sale and its replacement with a noise cap would be likely to lead to an increased number of flights and, in all probability, an increase in the use of larger aircraft. These changes to operations, it was stated, would in turn be likely to lead to increases in refuelling activities, application of runway de-icer and aircraft de-icer, as well as greater use of car park facilities; more intensive use of the site would be likely to increase the volume of contaminated discharge emanating from it.

51. The impact of the proposal modification to the planning agreement upon nature conservation interests within the site and surrounding area was

examined as part of the environmental assessment process. This included impact on habitats and species and impacts on designated nature conservation sites through deposition, pollution, and disturbance to species, particularly birds. Whilst the initial submission from BIA called into question the validity of the environmental assessment, on the basis that the ATM forecasts on which it was based were flawed, we are satisfied that an increase in operations at the airport has been adequately considered and that any variance in forecast ATMs would not be so great as to be fatal to the conclusions on environmental impacts.

52. We were advised that the Environment Agency's Air Pollution Information System (APIS) provides a source of information on the effects of air pollution on habitats and species. In this case the potential worst-case impacts of nitrogen deposition were examined using the APIS database to source critical (and current) loads for the SPA designation. We note the undisputed conclusion that in terms of the cumulative impact of the nitrogen deposition, there was no predicted exceedance and deposition due to GBBCA emissions as a proportion of the critical load on the environmental designations would be insignificant, both alone and in combination with other projects.

53. We note the Department's comment that bird populations within Belfast Lough are habituated to the industrial nature of the harbour area and the airport operations. We accept that any increase in aircraft movements due to removal of the SFS limit would be unlikely to have any significant adverse impact on bird populations in the area.

54. There are hydrological connections between the airport lands and their surroundings. We note that the Department was satisfied that the drainage system currently in operation at the airport would be capable of dealing with the predicted additional loading due to: the existence of automated analysis equipment; the ability to divert run-off to the Kinnegar waste water treatment works (WWTW) when required; and the existence of a holding lagoon to deal with periods of excessive run-off. We also note that the Department is satisfied that run off from any additional areas of parking created to deal with increased demand, would be capable of being accommodated, subject to necessary works. Due to the drainage system maintaining a connection with the nearby WWTW, available mitigation measures and tidal flows, the Department accepted that increased contaminated run-off would not result in significant impacts on the habitats of the environmental designations. We are satisfied that the modification sought to the Planning Agreement would not, in itself, result in any unacceptable ground contamination.

55. The Environmental Statement and its Addendum considered the impact of the proposed amendment on various aspects of the natural environment including species and habitats within the adjacent environmental designations. We note that no significant impact on the environment was predicted as a result of the

modification to remove the SFS limit. The findings were examined and accepted by the relevant arms of the Northern Ireland Environment Agency. We note that the Natural Environment Division of NIEA carried out a screening assessment (in the context of the Habitats Regulations) and concluded that the modification to the agreement would have no likely significant effects on the features of nearby designated sites. None of the rebuttal submissions from the objectors to the modification disputed the conclusions of NIEA or of the environmental assessments undertaken for GBBCA. We conclude that there is no justification, on grounds of protecting the natural environment, to reject the removal of the SFS limit.

56. Regulation 43 of the Conservation (Natural Habitats etc.) Regulations (Northern Ireland) 1995 requires that a competent authority, before deciding to give any consent for a plan or project which (a) is likely to have a significant effect on a European site in Northern Ireland (either alone or in combination with other plans or projects), and (b) is not directly connected with or necessary to the management of the site, shall make an appropriate assessment of the implications for the site in view of that site's conservation objectives. Irrespective of whether the legislation would apply in the case of the proposal before us, it is evident that Regulation 43 does not require appropriate assessment of plans or projects which are not likely to have a significant effect on a European site. Given that there is no persuasive evidence to suggest that a significant impact on the natural environment would result from the proposal, the Commission need not, in any event, undertake an Appropriate Assessment. This conclusion does not conflict with the judgement in the Waddenzee case, which was raised by Belfast International Airport.

Air Quality

57. Belfast City Council is responsible for local air quality management in the city. Local Air Quality Management guidance documents confirm that aircraft are a potentially significant source of nitrogen oxides, which are an air pollutant. We note that the Environmental Statement included an assessment of the impact of removing the SFS limit, including associated additional road traffic emissions, upon concentrations of, inter alia, nitrogen dioxide and particulate matter for both the chosen 2013 baseline and 2025, with and without the restriction in place.

58. The evidence submitted indicates that local air quality data was obtained from the Department and pollutant concentrations were available from air quality monitoring stations in Belfast city centre and in Holywood. We note that air quality in the airport area is considered to be good and accords with the Air Quality Standards Regulations (Northern Ireland) 2010. The effects of the proposal on local air quality were assessed through the use of air dispersion

modelling. It was predicted that there would be a negligible or insignificant impact on local air quality between the 2013 baseline and 2025, with the proposed modification in place, and that there would be no measurable effect on local community health. The conclusion in the evidence submitted on behalf of GBBCA was that ambient air quality around the airport would remain well within air quality standards set to protect health, and would be lower than ambient levels in Belfast City Centre.

59. The impact of the proposed modification on climate change was also considered; the conclusion was that, in the context of UK total aviation emissions and the national emissions trading scheme, any additional impacts would be insignificant. With regard to the predicted changes in traffic flows on surrounding access roads as a result of the proposed modification, it was concluded that there would be a negligible impact on air quality in the vicinity of GBBCA.

60. With regard to the issue of odours associated with the airport, we note the evidence that these can derive from incomplete combustion of aviation fuel or from fuelling operations and storage. We were advised that odour complaints had been received by Belfast City Council from residents in the area and that a monitoring exercise had been undertaken in 2010 to determine ambient kerosene concentrations in proximity to the GBBCA site. Given that the values were found to be 7,000 times lower than the suggested occupational exposure level, we are not persuaded that this issue would be so exacerbated by the modification to the agreement, such as to warrant its rejection. We consider it significant that, under the DEFRA Local Air Quality Management Technical Guidance, only a limited number of airports in the UK operate at capacities above 10 million passengers per annum, which is the level at which there is a requirement to produce air quality assessment reports.

61. All evidence points to a negligible adverse impact on ambient air pollution with the SFS limit removed. We recognise that no exceedances of relevant air quality standards were predicted and that both the Department and Belfast City Council, having reviewed the assessment methodology, concurred with the findings in the Environmental Statement. We conclude that, in terms of impact on air quality, there is no substantive evidence to justify rejection of the SFS limit.

62. It was argued that the 'baseline' for examining the environmental impacts of the proposed modification should be linked to the recommendations of the EiP report. We note that the baseline used in respect of air quality assessment was 2013. Given the level of passenger activity in 2013 was similar to that pertaining at the time the EiP report was published, we do not consider that the use of the later baseline is a flawed approach; if there is no predicted adverse or unacceptable impact on air quality in 2025 *with* removal of SFS, the baseline date is largely irrelevant in any case.

Traffic and Transport

63. We can find no indication in the EiP report that the purpose of the Seats for Sale restriction was intended specifically to control traffic or parking at George Best Belfast City Airport. Indeed, traffic and parking were not issues that the panel appear to have considered. Notwithstanding this, we recognise that removal of the SFSR and its replacement with an alternative noise control mechanism would be likely to result in increased traffic flows on the Sydenham bypass, through the city airport site, and increased demand for parking for travellers/staff. This is a planning issue, that would be directly related to a change in passenger numbers and for this reason it is encumbent upon the PAC to consider the transportation impacts of the proposed amendment to the 2008 Planning Agreement. It is notable that, even without removal of the Seats for Sale restriction, traffic and parking demand are predicted to increase in the next 10 to 20 years.

64. There is no actual development proposal before us and we cannot agree with the suggestion by objectors that a transport assessment is required by dint of Planning Policy Statement 3. We note, however, that the Environmental Statement and its Addendum, submitted on behalf of GBBCA, addressed the issues of increase in vehicular traffic to and from the airport, and parking at the site.

65. We note that Transport NI has considered the information submitted for GBBCA in respect of traffic and transport and is satisfied with both the methodology and the finding that the predicted increases in passenger numbers, both with and without the Seats for Sale restriction, would not unacceptably affect traffic movements through the airport or along the A2. Satisfaction was also expressed regarding the capability of GBBCA to cope with on-site parking demand into the future.

66. The evidence submitted on behalf of BIA criticised the traffic and transport assessment undertaken for GBBCA for a number of reasons. These can be summarised as follows:-

- The information upon which the conclusions were based, was insufficient;
- The methodology used to arrive at the conclusions was flawed;
- The ‘baseline’ used to measure traffic flows was defective;
- There are road safety issues that have not been adequately assessed; and
- Parking requirements have been underestimated.

67. We accept the submission made by the traffic consultant for GBBCA that a critical consideration is whether the local road network is capable of dealing with airport-related traffic at peak times. In this respect we are satisfied that

the traffic measurements used for the assessment were representative of peak periods. We consider that the traffic data used in the 2013 ES, the 2014 ES Addendum, and that gathered by actual traffic counts between June and December 2014 (and referred to in the statement of case submitted by Turley Associates) provides a more than adequate sample to allow for acceptably accurate conclusions to be drawn. As stated by Amey in its report to Transport NI, the April 2013 traffic flow survey results bore close comparison with counted flows on the A2 in April and July 2014, and were actually higher than the flows measured in July 2013. We therefore do not concur with the assertion of the consultants for BIA that the absence of survey information for July 2013 is fatal to the veracity of the conclusions drawn on behalf of GBBCA. We see no need for a 2008 baseline to be used; in the interests of accuracy, the more recent survey information is to be preferred. With regard to methodology, we note that the assessments made on behalf of GBBCA were based on the widely used and accepted PARAMICS model, which was advocated by Transport NI.

68. For BIA it was argued that the capacity and operation of the junction at the entrance to GBBCA was problematic. We note that a 5% threshold was considered acceptable by Transport NI in assessing the impact of the proposal on the operation of the A2; this is a threshold normally used in development management decisions relating to development proposals. The impact of airport-related traffic on the operation of the A2 would not exceed 2% at peak periods and, given this, it is clear that the road network, including the junction at the entrance to the airport, has capacity to accommodate the predicted increase in usage due to airport growth. There is no convincing evidence that the operation of the right turn lane off the Belfast-bound A2 or the 'hurry call loop' is a significant problem at present. Its peak use is between 5am and 6am when traffic flows on the A2 are very low. GBBCA has indicated that a number of measures are available in order to address any potential problems emanating from queuing at the right turn lane. These include: re-examining the internal road layout within the airport site, including use of problematic pedestrian crossing points and speed bumps; relocating staff car parking; the creation of an additional right turn lane on the A2; and re-examining signal timing at the early morning period. We were advised that relocated staff parking would be available from June 2015. It is hoped that the A2 widening scheme will have been implemented by 2025 and the scheme would certainly address any queuing problems; if not, the additional right turn lane can be provided. We were advised by the Department's counsel at the Inquiry that Article 49 of the Roads Order would permit Transport NI to seek a remedy at any time if a problem became apparent in respect of tail-backs onto the A2 at the right turn lane. This would appear to render it unnecessary for any amended Planning Agreement to deal with the issue. If this approach is adopted, the 'trigger' point for improvements would be a matter of discussion between Transport NI and GBBCA, outside the forum of this Inquiry.

69. We acknowledge that an increase of vehicle movements due to removal of the SFSR could lead to an increase in the risk of road traffic accidents occurring. What must be considered, however, is whether that increased risk is significant. We have difficulty in accepting that vehicles exiting the airport, and merging into the Holywood bound traffic, create an unacceptable hazard. We consider it very significant that the merge arrangement at the junction has been operating for a good number of years with only one minor accident recorded in a 6 year period, and notwithstanding around 3 million vehicle movements during that time. We were advised that the egress was laid out in accordance with the nationally applied Design Manual for Roads and Bridges. Whilst the risk may increase with the predicted additional usage, it would remain very small, and Transport NI has recognised this. We are not persuaded that there is a valid reason to question the operation of the exit arrangements even with the predicted increases in traffic with, and without, the removal of the SFSR.

70. A significant portion of the case submitted for BIA concentrated on the capacity for car parking at GBBCA and criticisms were levelled at the analysis and conclusions in the submissions for GBBCA in respect of the matter. In the absence of an actual development proposal, it would be inappropriate to apply any parking standards contained in the Department's development management documents. Notwithstanding this, we accept that parking provision needs to be considered.

71. We do not consider that underprovision of parking within the GBBCA site would be likely to lead to a significant increase in illegal parking in the locality. The airport is relatively inaccessible to pedestrian traffic and the likelihood of travellers parking their cars nearby and walking to the airport is low. In any event, illegal parking is a matter that can be readily dealt with by the authorities. We do not accept that the analysis provided on behalf of GBBCA is unacceptably flawed. There may be some disagreement over figures for existing and future numbers of public parking spaces; however, it is clear that there would appear to be physical capacity for a large increase in car parking provision within the site and consideration could be given to multi-level parking facilities, subject to any necessary consents being sought and granted.

72. We see no reason why GBBCA should seek to provide parking, on demand, for every passenger or member of staff, even if it is physically possible. Travellers seeking to rely on parking at the airport would be likely to ascertain availability before arriving at the airport. Public transport services to the City Airport are not widely used at present; they do exist on a regular basis, however, and represent another option for travellers and staff, rather than parking their private vehicles at the airport. The proximity of the airport to the city centre renders it more accessible in terms of the range of available travel options, particularly taxis. Pricing of parking is a matter for GBBCA and is

inevitably part of their business strategy. If parking is priced or limited, such that it makes pick-up and drop-off (PUDO) more attractive, it would have implications for overall traffic flows; however, there is no convincing evidence to suggest that this would exceed the capacity of the road network. We were advised that around 80% of vehicles visiting the airport at present relate to PUDO. In conclusion, we are not persuaded that vehicle parking within the airport site is an issue that, in itself, would be an obstacle to an increase in passenger numbers or warrants retention of the SFSR.

Forecasting

73. A central plank of GBBCA's case for removing the existing SFS limitation is that the airport could and should be allowed to expand its business to the point where it could reach the 48,000 upper limit placed on annual air traffic movements (ATMs) to and from the airport. The argument is that the SFSR of not more than 2 million departing seats, in any period of twelve months, effectively prohibits the airport from making full use of the permitted maximum movements. To support that line of reasoning forecasts of likely growth up to 2025 have been provided both in respect of the proposed removal of the SFSR and in the event of its retention (described as a 'fallback position'). The veracity of those forecasts was a much debated and contentious issue throughout the inquiry process.

74. As with any form of forecasting, predicting in advance likely air traffic movements and air passenger levels, even over a period as short as ten years, is fraught with uncertainties. As GBBCA feely acknowledged, a degree of volatility is inevitable and especially so at smaller regional airports like Belfast City. As BCC point out, there have been significant fluctuations in traffic over the years. This is evident in the information provided in Table 5.1 in GBBCA Technical Report 3 on Noise (p17), which shows that over the last five years the annual ATMs have been of a level well below the maximum permissible figure. In 2010 there were 40,324 ATMs and in 2011 the figure rose to 41,844 movements. However, in 2012, 2013 and 2014 the ATM level was lower and hovered around 37-38,000. It is also evident from submissions made at the inquiry (PAC 2 and PAC 3) that SFS levels have varied from year to year. In 2010 2.25 millions seats were sold (exceeding the 2 million threshold) but in the following years (2011 -2014) the figures respectively were 1.94, 1.70, 1.88 and 1.7million.

75. BCC attribute these ATM fluctuations to airlines having either started services to new destinations, abandoned particular routes, or even transferred operations from or to Belfast International. The Department also acknowledges the uncertainties inherent in future forecasts. BIA is particularly sceptical of GBBCA's underlying growth predictions over the next ten years, claiming that the forecasts are based on route development targets that are aspirations and do not take account of, among other things, the potential strategies of incumbent airlines. The importance of the accuracy of the forecasts cannot be understated as it is the anticipated growth of the business and increase of future aircraft movements that will largely determine the likely size of the future noise control contour cap that GBBCA is proposing to replace the SFSR with.

76. We acknowledge that there is an underlying tension between the SFS limit and a permissible ATM limit of up to 48,000. In theory the airport and operators could restrict aircraft movements to smaller passenger carrying

aircraft. Such a move would permit a higher number of air traffic movements than presently evidenced, while still complying with the SFSR (the SFS limit being based on the simple equation of number of aircraft x average size of aircraft). We recognise, though, that different operators have different fleet mixes and that not all of them would wish to use the type of smaller planes that would facilitate an increasing number of flights balanced against the SFSR. The objectors understandably argue that the SFSR serves a useful purpose in that it indirectly controls the number and size of aircraft using the airport and encourages a fleet mix appropriate to the mainly UK domestic market it serves. We note that the 2008 Agreement resulted in an increase in the ATM limit from 45,000 to 48,000. It is not clear why such an increase was made in the amended agreement as the EiP panel did not recommend any change to the previous limit. However, we recognise that the recommendations of the Panel were not binding on the Department.

77. BCC adopted what could be described as a generic trend based approach to estimates of future air traffic. We find such an approach, and the resulting analysis made by BCC, to be more plausible than the single scenario method favoured by GBBCA. We find surprising the Department's reluctance to question the forecasting assumptions made by GBBCA, given the implications these have for the future noise environment of the city. The argument that *"...the airport was best placed to understand their own business"* is not a convincing one. Somewhat tellingly the Department's noise consultant accepted that a range of forecast options would normally be assessed to account for any sensitivity in forecast data.

78. There is no specific limitation placed on aircraft types using the airport and historically there has been a mixture of types and sizes. However, the limited length and width of the single runway means that larger capacity, wide bodied. jets cannot be accommodated. The airport can, though, accommodate narrow bodied twin engine jets as well as turbo prop planes. GBBCA argue that the SFSR places an unnecessary limitation on use of jet planes, which tend to have larger passenger carrying capacities. We accept that this has implications for the flexibility of operators who are seeking to meet growing demand on what are described as high volume routes such as London, Manchester and Birmingham or are seeking to develop new routes to European destinations.

79. In appendices 3.1 and 4.1 of the 2013 ES, GBBCA set out anticipated scenarios of aircraft types and numbers for 2025 with and without the SFSR in place. We have considerable difficulty in reconciling the assumption that by 2025 the fleet mix is likely to be in the order of 90% jet planes. The 2011 and 2014 Annual Contour Reports prepared by Bickerdike Allen Partners (Appendix 4 of Statement of Case) provide a detailed breakdown of plane types and usage in 2010, 2011, 2013 and 2014 over the 92 day summer period. While these indicate variations year on year it is very clear that the

Bombardier Dash 8 Q400 turbo prop, flown by Flybe, was responsible for at least half of the total ATMs over those four years (21,231 out of 42,290). The GBBCA forecasts indicate that by 2025 Flybe would be relying, almost exclusively, on Embraer 175 jet planes. Such an assumption is not consistent with the more recent evidence that in 2014 Flybe announced that it was planning to phase out its larger Embraer 195 jet fleet, to defer deliveries of the smaller Embraer 175 jets that had been on order and to instead sub-lease additional Dash 8-Q400 turboprop planes. Flybe's letter of support in appendix 1 of Technical Report 1 & 2 confirms the company's decision to focus on their turboprop fleet and we note that in 2014 there were very few flights using the Embraer 195 to and from the airport.

80. Various forecasts and arguments were advanced by the participating parties in respect of the likely rate of passenger growth over the next ten years and the effect or otherwise of Dublin Airport on the growth of GBBCA and BIA. The table of comparison drawn up by BCC in its rebuttal statement (P7) indicates that there is very little difference between the parties in assumed passenger levels in 2025 if SFS is retained. The differences in the anticipated passenger levels without SFS are greater and can in part be attributed to the differing assumptions about fleet mix and size of planes that could be in operation. To our mind it is the likely composition of the aircraft fleet over that period that will largely determine the impact of noise generation on the residents of Belfast, especially those in most immediate proximity to the airport.

81. GBBCA placed considerable weight on the argument that routes from the airport could be developed outside the UK domestic market if the SFSR was lifted and postulated that trade lost to Dublin airport in more recent years could be clawed back. While we accept that the convenience of travel to European locations from Belfast City would be an attraction, particularly for the business community, we are not quite so convinced that the flow of Northern Ireland based residents using Dublin airport can not only be stemmed but re-directed towards GBBCA. The SFSR has not in itself precluded the opening up of European routes as evidenced by the new services this year to Amsterdam and Barcelona. We would, though, accept that the SFSR makes it difficult to operate new routes without potentially having to cease others. However, GBBCA is not alone in having to make such balancing decisions. Other airports also have to deal with restrictions and limitations on services and routes.

82. In conclusion, we find that circumstances with airline operators and passenger demands can change relatively quickly. The changing emphasis in fleet composition and strategy by Flybe demonstrates this all too readily. Flybe has made a conscious decision to primarily rely on turbo prop planes at GBBCA over the short to medium term and in doing so has accepted that the Dash 8-Q400 can carry a maximum of 78 seats compared to the 88 seat

capacity of the Embraer 175, thereby providing additional headroom in respect of the current SFSR. Given that Flybe is the largest operator at GBBCA, we do not accept that by 2025 at least 90% of planes operating at the airport, with or without the SFSR in place will be jets. Indeed we are not even convinced that the proportion of jet planes by 2025 will necessarily be as high as the 72% ratio postulated by BCC in its second scenario. Even with SFS removed we think it is more likely that the ratio will evenly split or at best 60/40 in favour of jet operations. Notwithstanding possible growth in markets outside the UK for new services it follows that if turboprop flights continue to make up a sizeable element of UK regional flights then the size of the noise control contour is likely to be much smaller than is assumed by the GGBBCA analysis. We will return to the implications of this again in our consideration of noise and the proposed control contour.

Economic Benefits of the Proposal

The need for a balanced approach.

83. GBBCA is designated by EU Directive 2002/30/EC (the Directive) as being one of four 'City' airports within the European Union. It is one of only two City airports in the UK, the other being London City Airport. City Airport status is applied only to those airports within the EU that are particularly constrained as a result of noise implications for significant numbers of people; they are airports "where any incremental increase in aircraft movements represents a particularly high annoyance in the light of the extreme noise situation..." (Article 2(b) of the Directive). The Directive refers to the need for the adoption of a balanced approach when dealing with the control of noise around airports. This approach is also advocated in the Aerodromes (Noise Restrictions) (Rules and Procedures) Regulations 2003 (the Regulations), which defines 'balanced approach' as " an approach under which there is consideration of the available measures to address the noise problem at an airport, namely the foreseeable effect of a reduction of aircraft noise at source, land-use planning and management, noise abatement operational procedures and operating restrictions". Regulation 5(1) states, inter alia, that "The competent authority for a relevant airport — (a) shall for the purposes of dealing with noise problems at that airport adopt a balanced approach; (b) may consider economic incentives as a noise management measure; (c) shall not impose a measure or a combination of measures which are more restrictive than is necessary to achieve the environmental objective established for the airport by that authority in accordance with paragraph (4)".

84. The Aviation Policy Framework recognises the importance of aviation to the UK economy. Notably, it states that "Aviation in the UK is largely privatised and operates in a competitive international market. The Government supports competition as an effective way to meet the interests of air passengers and other users". As stated by the Department, the APF contains strategic policy and guidance for the aviation industry within the whole of the UK. The APF supports the growth of airports in Northern Ireland, at the same time recognising that the development of airports can have negative as well as positive local impacts, including on noise levels. It goes on to say that "We therefore consider that proposals for expansion at these airports should be judged on their individual merits, taking careful account of all relevant considerations, particularly economic and environmental impacts". Whilst the APF strongly recognises the benefits of aviation to the UK economy, it also acknowledges that such benefits do not override environmental considerations.

85. Evidence of past Ministerial support for the proposed modification was provided in submissions. Reference was made to several Government publications which support growth of the aviation sector and the contribution it makes to tourism, businesses and the economy generally. The importance of

connectivity is highlighted. The Northern Ireland Assembly's Programme for Government 2011-2015 has prioritised growth of the economy. The Department considers that the proposed modification of the Planning Agreement could allow GBBCA to make a more significant contribution to the Assembly's goal. Belfast is identified in the 2035 Regional Development Strategy as a gateway. Policy SFG15 aims to strengthen the gateways for regional competitiveness by providing high quality connections to meet the demand from the business, tourist and freight markets and by enhancing their image and environmental record.

86. The Department was generally supportive of the conclusions of York Aviation in respect of forecasting and economic benefits. It pointed to the potential of GBBCA to contribute to economic infrastructure development by delivering strategic improvements in external and internal communications. However, one of the Department's aims in requesting the Public Inquiry was for the PAC to make recommendations on the correct balance between the socio-economic benefits of airport growth and the need to protect the quality of life of the population affected by aircraft noise. We note Belfast City Council's support for growth at GBBCA and its citing of various Council initiatives for same; however, this must be weighed in the context of the balanced approach where environmental impacts of growth must be taken into account. The City Council submissions to the Inquiry have recognised this.

Assessing economic benefit

87. Historically the two main NI airports have provided relatively different operating environments for airlines, and their customers. BIA can provide facilities for larger aircraft serving both short and long haul international and domestic destinations. Whilst there are a few non-domestic destinations, GBBCA has tended to focus on serving smaller aircraft offering fights to UK destinations. We note from the York Aviation evidence that UK destinations accounted for almost 95% of all passengers using GBBCA in 2014.

88. The large variations in conclusions reached by the consultants engaged by the participants in this process demonstrate the vagaries of both forecasting and assessing the economic benefits of removing the SFSR. We note that the Department accepted that any forecasts of future growth at GBBCA will carry an element of uncertainty and that the recent announcements of new routes for 2015 and changes in aircraft fleets are illustrative of the inability to accurately predict future changes. In our experience, the more uncertainties factored into production of forecasts, the less reliable they will be.

89. For GBBCA, the economic benefits have been calculated by relying on the forecasts of passenger numbers that would be likely to use the airport. Basically, it is argued that the removal of the SFSR, and the growth in passenger numbers that this would permit, would benefit both Belfast and

Northern Ireland as a whole. As stated elsewhere in this report, we have misgivings about the forecasts for GBBCA; these are based on a significant increase in the use of jet aircraft, which is unlikely to occur.

90. In considering the proposed modification, we accept the argument from GBBCA that the SFSR limits the airport's opportunities to add new destinations or increase flight frequencies to current destinations. It could also result in fare increases as carriers attempt to restrict passenger numbers. It is clear that removing the SFSR would allow increased flexibility to 'manage' the flight mix, in order to permit fuller use of the 48000 ATM limit. If the latter occurs, it is highly likely that this would result in an increase in passenger numbers. At the opposite end of the scale, the consultants for BIA have argued that the proposed modification of the Agreement would result in net economic disbenefits for the province. As stated in the evidence for GBBCA, with the growth anticipated, the Airport is expecting to reach the SFS limit in the very near future, possibly as early as next year. This would appear to be a valid statement. We accept that the airport's ability to grow would be markedly constrained from this point, should the SFSR be retained.

91. It is our view that the analysis by York Aviation has attempted to maximise the apparent economic benefits that removal of the SFSR could potentially provide. It is also obvious that the stance taken by GBBCA is that optimum growth of the airport should be the determining factor in deciding upon the level of aircraft noise that the population of Belfast should have to endure. This is demonstrated in the 57dB noise contour advocated by GBBCA as a replacement for the SFSR. We consider that taking a balanced approach in assessing the issue of noise impact does not automatically equate to allowing maximum possible growth at the expense of citizens' living conditions. Whilst the SFSR may deter the airport from reaching its 48000 ATM limit, the latter cannot be regarded as the determining factor in assessing the appropriate level of expansion. Should the number of turbo-prop flights increase, for example, the ATM limit could be approached without the large increases in passenger numbers predicted under a regime where the proportion of larger jets grew significantly.

'Clawback' from Dublin Airport

92. Clearly, GBBCA management is confident that removal of the SFSR would result in growth of business; the modification to the agreement would not have been sought had this not been the case. York Aviation predicted that the modification would allow passenger numbers using GBBCA to increase by over 700k per annum. In terms of clawback from Dublin, it was estimated that anything between 10% and 50% of the passenger 'leakage' to Dublin could be redirected to GBBCA, without airlines relocating services from the former to the latter.

93. There were coherent arguments from all quarters regarding the issue of 'clawback' of business from Dublin Airport. Having considered this, we are unconvinced regarding the quantum of 'clawback' predicted by York Aviation. We reach this conclusion for a number of reasons. No detailed analysis has been provided to show which markets can be clawed back from Dublin. We note that in terms of clawback of UK domestic routes, several of these are already on offer at GBBCA as well as at Dublin. Dublin enjoys a significantly larger population catchment than any of the Northern Ireland airports and has a much greater inflow of tourist and non-domestic business travellers. This allows airlines to reliably plan ahead and provides high level of dependable demand. It makes Dublin attractive to carriers. Dublin's short-haul network benefits greatly from connecting traffic generated by long-haul flights, especially those arriving from several airports in Canada and the USA. Given this, Dublin offers a significantly greater number of options for connectivity for airlines. Travellers to the USA also benefit (uniquely in Europe) from being able to clear US immigration formalities before departure and this represents a considerable benefit in both time and convenience. Carriers in the Republic of Ireland are not fettered by the Air Passenger Duty regime present in NI and this permits the offer of cheaper short and long haul flights. Finally, the relatively short journey times from many parts of Northern Ireland to Dublin do not act as a significant impediment to travellers. If they did, Northern Ireland's airports have had the capacity for some time to recapture business from Dublin, but this has not happened.

94. We note the view of Belfast City Council that a business traveller to a continental European airport would preferentially choose to fly from GBBCA and save the journey time to Dublin Airport if that destination was available from Belfast. However, we are not persuaded that sufficient demand would exist to make many of such routes viable for carriers. We note that, of the 'top ten' Dublin routes used by NI passengers in 2013, none of the foreign destinations is offered from GBBCA. Whilst it would be desirable to provide as many different destinations in Europe as possible, this cannot be achieved if such routes are not profitable or viable. We do accept that there could be some redirection of air passenger traffic from Dublin if flights to a greater number of destinations was on offer in NI and at GBBCA. However, we judge it unlikely that airlines would choose to relocate services from Dublin to GBBCA to any significant extent. We doubt that the NI market could provide sufficient passenger numbers to render viable a significant number of longer haul routes involving direct competition with Dublin-based carriers.

Additionality and displacement within Northern Ireland

95. It was posited for GBBCA that removal of SFSR would permit growth in carriers' business within the Northern Ireland market itself. We recognise the importance of air connectivity to growing a successful economy. We note the predictions for air passenger traffic growth, generally, within aviation in the UK

and, particularly, within Northern Ireland, which has a relatively small population and is served by 3 airports. Although there was disagreement on the figures, all growth forecasts for the years up to 2025 were modest (minimum around 1% and maximum just over 2%). The forecast higher growth figures for GBBCA would appear to us to be largely dependent either upon diversion of business from other airports in the island of Ireland, or by GBBCA offering completely new destinations unavailable from other airports. GBBCA referred to the example of a new route from Belfast City to Frankfurt, but having considered the opposing arguments we are not entirely convinced with regard to the viability of this. Capacity for this route has existed at GBBCA in the recent past but the destination has not been brought on stream. Notwithstanding this, we would not rule out the possibility that some additional new destinations might become available from GBBCA to the European mainland if sufficient demand existed within NI or externally. We note that flights to both Barcelona and Amsterdam commenced from GBBCA in 2015, notwithstanding that these routes are already available from BIA. It remains to be seen if this situation will pertain. As stated on behalf of BIA, there may be a risk inherent in dividing aviation markets across several airports: theoretically, it might reduce the viability of individual routes for airline operators.

96. We accept that capacity currently exists at BIA in terms of facilities, to accommodate a significant level of growth in both domestic and international flights. That this has not happened at the expense of Dublin Airport could be seen as significant. BIA is not constrained by noise to the same extent as GBBCA. Whilst GBBCA is convenient to the city centre, BIA is also relatively proximate to Belfast, roughly 30-40 minutes journey at off peak periods, and we find it difficult to accept that the absence of some direct routes into GBBCA has discouraged foreign investment, or business or tourist travellers to any great degree.

97. Having stated the above, we acknowledge the Department's view that whilst there is spare capacity at BIA, this does not necessarily mean the growth in passengers estimated by GBBCA would automatically transfer to BIA if the SFSR was retained. There is no doubt that proximity to Belfast City Centre is a unique selling point for GBBCA. We accept that GBBCA may be more attractive to some airlines and passengers, particularly short-stay business people, and that carriers currently operating from GBBCA have particular reasons for doing so. As stated by DOE, those carriers may not choose to operate from BIA if they cannot do so from GBBCA. In such circumstances, we recognise that retaining the SFSR could possibly result in loss of some passenger trade to the aviation sector in Northern Ireland; the Department calculated that this could be up to 252,000 passengers, based on GBBCA's figures. However, in our opinion, this is likely to be a worst-case estimate.

98. Taking Northern Ireland as a whole, we are not convinced that the failure of GBBCA to grow its business to the limit of the ATM restriction would be detrimental to the aviation sector to the extent argued by supporters of the proposal. We consider it probable that growth at GBBCA would be achieved mainly by displacement within Northern Ireland, plus a small amount of addittionality, rather than through recapturing leakage to Dublin. We are not persuaded that the net economic benefit to Northern Ireland, resulting from the removal of the SFSR, would be as considerable as that posited by York Aviation. This is not to say, however, that resulting benefit would be insignificant. We accept that there could be wider 'catalytic' benefits that no attempt has been made to quantify. We acknowledge that keeping fares as low as possible at GBBCA would promote additionality in a NI context; this would be made more difficulty if the SFSR is retained.

99. Belfast City Council pointed to the benefits to Belfast City in allowing growth at GBBCA. This stance was supported by several business organisations. We note the Council's evidence on the success in attracting foreign investment into the city; much of this has occurred with the SFSR in place. Government encourages competition and, purely in terms of business, there is no reason to prevent passenger diversion from City of Derry and BIA to GBBCA. We note that this has occurred with the relocation of Aer Lingus from BIA to GBBCA in recent years. There is also competition on destinations offered from both BIA and GBBCA, many in GB and a few in Europe. Although there is considerable disagreement over figures, including those relating to Gross Value Added (GVA), it is clear that growth at GBBCA would create additional jobs and result in economic benefit to Belfast and its hinterland. The extent of the benefit is the subject of disagreement, but we accept that it could potentially be significant if favourable circumstances prevailed.

100. The stance of the City Council is understandable given its role; however, in terms of displacement of airport business, we do not consider that there is any policy basis to prefer Belfast over the rest of Northern Ireland. To favour GBBCA and Belfast would be contrary to the Government's position on competition. Having examined the evidence before us, we consider it likely that growth of GBBCA would rely to a large extent on displacement from BIA. The estimate presented by York Aviation is that around 350k - 462k passengers would be likely to be diverted from BIA and City of Derry by 2025. If this scenario were to occur it would mean the share of passengers assumed displaced from other airports in NI would be between 50% and 90% of the total increase predicted for GBBCA. In our view, displacement of jobs and GVA from BIA and Derry to GBBCA does not sit easily with GBBCA's argument regarding net economic benefit. Given our conclusions regarding clawback from Dublin, we are not persuaded that the extent of economic benefit to Northern Ireland as a whole would approach that envisaged by York Aviation.

Possible negative economic consequences of the proposed modification

101. As Belfast City Council states, it is theoretically correct that splitting air traffic between two NI airports could be disadvantageous as this approach could lead to a loss of economy of scale. For BIA it was argued that NI is over-supplied with airport capacity and that, notwithstanding this, NI actually has worse connectivity than other equivalent regions; connectivity from GBBCA and BIA combined is relatively low compared to similar-sized single airports. It was submitted that this demonstrates the risk inherent in dividing aviation markets across too many airports: it may actually reduce the viability of individual routes for airline operators. As BCC has stated, an equally, plausible scenario, would be that one route would stop operating, leaving the other airport free to meet the entire demand.

102. BIA and GBBCA have significant overlap in their catchment areas and compete for business in a relatively small market. Government encourages competition and it is thus the markets that will determine the success, or otherwise, of air carriers. To accept an argument that the SFSR should be retained in order to constrain competition between airports would run counter to national aviation policy and we cannot support such a stance, even if it did result in loss to NI of carriers or air routes. To adopt an alternative approach would require a change in the Government's strategic position. We do not propose to further consider the issue of competition between BIA and GBBCA.

Conclusions

103. Paragraph 3.55 of the York Aviation statement of case indicates that it is estimated that removal of the SFSR would result in increased employment in the local area of between 190 and 240 FTE (full time equivalent) jobs or between 140 and 280 FTE jobs across NI at 2025 due to the operation of GBBCA. It states that "The precise figure depends on the level of additional growth allowed by the removal of the SFS Limit is considered as displaced from the other airports, having regard to GB BCA's 'natural' market share and the extent to which the additional growth will be clawed back from Dublin or considered as displaced from BIA. The equivalent GVA impacts in 2025 are £9.2 to £11.6 million in the local (Study) area or £7.2 to £12.8 million across NI as a whole". Given our conclusions on clawback from Dublin, we consider that the lower estimates are likely to be the more accurate. It should also be borne in mind that the York Aviation estimates have been produced in the context of attempting to paint the rosiest picture possible in terms of economic benefits.

104. The fundamental issue for us to consider is whether the economic benefits of the proposed modification to the 2008 Planning Agreement outweigh the need

to protect the amenity of the population living close to GBBCA. In terms of the noise contour sought by GBBCA, the population brought within the 57dB L_{Aeq16h} contour would be likely to increase to over 18,000 whereas in the base year of 2013 it is 7,200. The question to be asked is thus, is it acceptable that a significant additional number of residents should be permitted to be adversely affected by aircraft noise in order to allow growth and economic benefits to be provided? In our opinion the growth of the airport, whilst very highly desirable from an economic viewpoint, should not dictate the size of population falling within a 57dB $L_{Aeq,16h}$ contour, which marks the approximate onset of significant community annoyance. The SFSR was not put in place to restrict competition or profitability, nor to prevent GBBCA contributing to the economy; it was adopted as a measure to curb noise impacts. The 'headroom' of up to 48000ATMs cited by GBBCA is not a standalone entitlement and needs to be considered in the context of the entire Planning Agreement. GBBCA is not on a 'level playing field' with other airports in Northern Ireland; it has been identified as a City Airport, where noise will clearly be a constraint to growth. Given this, the management of GBBCA could not justifiably expect the impacts of noise to be set aside on the basis that the economy would benefit from the airport's growth.

Health Issues

105. In this section of the report we consider the evidence submitted in connection with the impact of the removal of the SFSR on human health. We do not propose to deal with the extent of noise contours or measures to control noise at this stage; merely to consider what the potential impacts on persons could be, if an increase in passenger numbers occurs, and how the extent of the noise impacts is assessed. Our section on the natural environment has addressed the evidence in respect of potential for air, ground, and water pollution. There is convincing evidence that ground noise at the airport, and that generated by additional road traffic, would not be significant, and, in the absence of any compelling arguments to the contrary, we accept this conclusion.

Socio Economic Factors and Health

106. The ES submitted for GBBCA states that employment and income are potentially the most significant determinants of long-term health, influencing a range of factors, including the quality of housing, education, diet, lifestyle, coping skills, access to services and social networks.

107. We accept that poor economic circumstances can adversely affect community health and that economic deprivation can increase the likelihood of individuals suffering from morbidity, injury, mental anxiety, and depression. We acknowledge that higher rates of premature death can also result from deprivation. These generalised statements do not assist in determining whether the proposal before us is likely to result in an adverse impact on community health in the vicinity of the airport.

Impacts of Noise on Health

108. We were provided with convincing evidence, based on scientific research, that inappropriate levels of noise can result in increased incidence in the population of hypertension, cardiovascular disease (especially myocardial infarction, coronary heart disease, heart failure, and stroke) and also of dementia and kidney failure. Whilst there may be disagreement between the parties as to how comparable studies in other countries and populations are to Belfast, there seems to be little dispute that human health can be adversely affected by aircraft noise both during the day and at night-time. As stated in the Airport's ES, the non-auditory health effects of environmental noise also include: annoyance, mental health effects, sleep disturbance and impacts on performance (academic and tasks).

109. For BCAW, it was submitted that research demonstrates that children exposed to aircraft noise show delayed reading comprehension and development of their essential cognitive abilities. In addition, studies have indicated that children with short or disturbed sleep - as a consequence of night-time aircraft noise - are more likely to become overweight, and develop pre-hypertension and full-blown arterial hypertension.

Measurement of Noise Impacts

110. Whilst the methodology used in the survey conducted by 'Perceptive Insight' has been called into question, the results do demonstrate a level of public concern regarding aircraft noise. It is clear to us that there are perceptions of serious nuisance and annoyance on the part of some citizens, even if these are not quantified in terms of noise measurements. We are cognisant that perceptions vary from person to person; some residents are less sensitive to aircraft noise, others are more so. It is evident, however, that some noise thresholds need to be used to measure the effects of noise on residents.

111. The expert witness for BCAW argued that recent epidemiologic studies indicate that aircraft noise levels can be harmful to human health from a noise level as low as 40 dB L_{Aeq}; as such, the noise 'triggers' used in determining the noise impact of GBBCA vastly underestimate the population of Belfast city exposed to harmful noise levels. In addition, risk coefficients for major diseases, derived from a large case control study in the vicinity of Cologne-Bonn Airport, Germany, were applied to the exposed population in Belfast city. This predicted that removal of the SFSR would result in additional deaths due to cardiovascular and kidney disease by 2025.

112. The Aviation Policy Framework (APF) sets out the UK Government's current policy in relation to civil air transport. It applies in respect of the entire UK. Paragraph 3.17 of the document states that the 57dB $L_{Aeq,16h}$ contour will continue to be taken as the average level of daytime aircraft noise that marks the approximate onset of significant community annoyance. Paragraph 3.36 indicates that the "Government continues to expect airport operators to offer households exposed to levels of noise of 69 dB $L_{Aeq,16h}$ or more, assistance with the costs of moving". Paragraph 3.37 advises that airport operators should 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. This is clearly not intended as a definitive list of noise-sensitive buildings. Paragraph 3.39 goes on to state that, "as a minimum, the Government would expect airport operators to offer financial assistance towards acoustic insulation to residential properties which experience an increase in noise of 3dB or more which leaves them exposed to levels of noise of 63 dB $L_{Aeq,16h}$ or more. This would also apply to schools.

113. We note that Civil Aviation Authority (CAA) guidance was used by GBBCA in calculating the impacts of noise on the population and CAP 725 - the 'Airspace Change Process Guidance Document' - states that "Contours **must** be portrayed from 57 dBA $L_{eq,16h}$ at 3 dB intervals", and "Change Sponsors **may** include the 54 dBA $L_{eq,16h}$ contour as a sensitivity analysis but this level has no particular relevance in policy making". It is significant that the document goes on to say that "Contours **should not** be produced at levels below 54 dBA $L_{eq,16h}$ because this corresponds to generally low disturbance to most people, and indeed aircraft noise modelling at such levels is unlikely to generate accurate and reliable results" (Appendix B, paragraph 48).

114. Whilst we appreciate that the expert witness utilised by BCAW may disagree with the research, which the UK government relied upon in determining what noise contour thresholds or 'triggers' are, and what noise levels should be used in assessing health impacts, we cannot set these aside. Notwithstanding that some research seems to indicate health effects at noise levels below 57 dBA $L_{eq,16h}$, the latter is the threshold of significant community annoyance adopted by the UK government. This stance must have been based, inter alia, on health considerations. We do not accept that another figure should be used as the threshold for predicting the extent of the adverse impact of aircraft noise. We agree with the Department's comment at the Public Inquiry that it is not for this forum to rewrite government policy or guidance.

115. In terms of measuring night-time noise, we note that no UK guidance exists. However, in a report to the World Health Organisation, a criterion of 55 dB L_{night} is taken as representing the threshold at which significant night-time noise occurs. The CAA ERCD REPORT 1208 - Aircraft Noise, Sleep Disturbance and Health Effects: A Review, published in January 2013, refers to an interim target of 55 dB $L_{night,outside}$. Additionally, CAP 725 suggests the use of the 90 dB(A) SEL footprint to determine night-time noise impact and this measure has been used by the UK Government to derive night flight restrictions at Heathrow, Gatwick and Stansted airports. CAP 1164, Aircraft noise, sleep disturbance and health effects published in June 2014 did not introduce or suggest alternative thresholds. We note that both the 55dB and 90dB contours are provided in the evidence submitted for GBBCA. We consider these measures of night-time noise to be an acceptable means to determine the effects of the proposed modification on the local populace and we are not persuaded that an alternative and arbitrary measure should be used, at odds with established practice elsewhere in the UK, based solely on the evidence provided on behalf of BCAW.

116. We note that both BCAW and GBBCA refer to the 'RANCH' study, which examined the effects of, inter alia, aircraft noise on cognitive performance and health in children. This determined that a 5 dB(A) increase in noise was associated with a 2 month impairment in reading age in UK children aged 9 to

10. We understand that this 5 dB(A) increase is now applied in assessing the impact of aircraft noise on schools throughout the UK. It has been used in the analysis prepared for GBBCA and we consider this to be a logical approach.

117. Notwithstanding our comments above, it remains for us to consider whether removal of the SFSR would change the existing noise environment to the extent that it would have an adverse impact on human health. We will consider that issue further in the section dealing with noise and noise control.

Noise and Noise Control

118. It is stating the obvious but it was noise levels, current, past and most particularly in the future, that attracted the most attention and contention amongst those involved in the inquiry process. The APF recognises that whilst the aviation industry brings significant benefits to a local economy, there are costs associated with its local environmental impacts and that these are borne primarily by those living in and around an airport. Accordingly the APF sets out the Government's overall policy on aviation noise as being:

".. to limit and, where possible, reduce the number of people in the UK significantly affected by aircraft noise." (paragraph 3.2).

119. While there is no firm consensus on how best to control and regulate the noise impact of aviation, the APF identifies average noise exposure contours as a well established means of measuring levels of aircraft noise. A noise contour is a map showing predicted noise levels at different positions around an airport, with all points having the same predicted noise levels being joined together to produce a contour line. Arising from this it is possible to calculate the size of the area and the extent of the population falling within a given noise level contour area. The shape of each contour surrounding the city airport reflects the north-east to south-west orientation of the single runway and takes account of the required 6 degree left turn after take-off over Belfast Lough and the predominant left turn that traffic departing over the city executes after take-off and on reaching an agreed altitude.

120. Various noise exposure contour maps have been generated for GBBCA over the years. These show historic trends and are helpful in building up a picture of how use of the airport has evolved over time and the impact that this has had on the noise environment of the city. Caution is required, though, when drawing direct comparisons between these contour maps as they have been generated using different computer software, different versions of the same software system and in some cases using different parameters. As the 2006 EiP report highlighted (paragraph 5.7.9), when the 1997 PA was drawn up the airport was using an Alan Stratford and Associates computer model. However, in 1998 the airport started using the Integrated Noise Model (INM) produced by the US Federal Aviation Authority (FAA). According to the EiP Panel this change in computer model resulted in much smaller contours than for those produced before 1998, including the indicative contours produced by the Department.

121. The 1997 PA required the airport to produce annual contours at levels of 60 L_{eq} and above and it was built into the agreement that these would be compared against the indicative contours at 60 and 63 L_{eq} prepared by the Department.. The EiP Panel, however, concluded that the lower figure of 57 dB L_{eq} should be the basis for an indicative control contour and this was

incorporated into obligation 4.2.3 of the 2008 Agreement, requiring the provision of annual contours at 57, 60 and 63 dB $L_{Aeq,16h}$. We note that the APF treats the 57 dB $L_{Aeq,16h}$ contour as *"..the average level of daytime noise marking the approximate onset of significant community annoyance".* (paragraph 3.17). The APF acknowledges that not all people within the 57dB $L_{Aeq,16h}$ contour will experience significant adverse effects from aircraft noise. Nor does it mean that no-one outside of this contour will consider themselves annoyed by aircraft noise as some people will be disturbed by noise at lower levels. Clearly people do not experience noise in an averaged manner and thus the value of the L_{Aeq} indicator does not necessarily reflect all aspects of the perception of aircraft noise. This may partly explain why several of the BCAW witnesses, who gave oral evidence to the inquiry of the effects and disturbance caused by overhead aircraft noise, live in parts of South Belfast that lie well beyond existing and projected 57 dB $L_{Aeq,16h}$ contour areas.

122. The EiP Panel also recommended that an indicative control contour should be set at what it described as *"15% greater than the current 57 L_{eq} area".* Contrary to the impression given by BIA and BCAW, neither DRD nor the EiP Panel (in paragraph 5.7.50) stated that this recommended 57 dB L_{Aeq} plus 15% contour represented the *"maximum extent of tolerable noise footprint".* That comment was made in respect of the existing 60 L_{eq} control contour previously defined by the Department.

123. The INM model has been used by the airport ever since 1998 and is acknowledged to be the most widely used method worldwide. Like most computer models the modelling software has been updated over time. Given that there are a number of data inputs into noise contour modelling, changes to these inputs can then result in both increases and decreases in predicted exposure levels. This in turn has implications for the definition of the noise contours and associated population statistics. The latest 57 dB L_{Aeq} contour that was available to the EiP (from the Airport Masterplan of 2005) equated to an area of 2.77km^2. Adding 15% to that figure, as recommended by the Panel, gave an area of 3.2km^2. The accuracy of that contour area has, however, been challenged by GBBCA. It was claimed, for example, that the initial contour figure was based on the 2004/05 winter schedule rather than the 92 day summer period while subsequent results, showing a much larger 57 L_{Aeq} contour area, were attributed to updates in the INM computer software.

124. GBBCA advanced the argument, through Appendix D of the February 2012 Noise Control Report (p24) as submitted under Annex B of the request to vary the terms of the PA, that the equivalent 57 L_{Aeq} contour in 1997 was 6.6km^2, albeit acknowledging that this was an approximate figure as it had been estimated from the relationship of contour areas at different values. The Civil Aviation Authority (CAA), in its report of 16 November 2009 on the air noise aspects of the then proposed runway extension (tab 11 of BIA Statement of

Case), queried the basis on which the airport's consultants found the 2005 contour area to be larger than the Panel's analysis. The CAA highlighted, for example, how the use of an 'acoustically hard setting' was one of the factors responsible for a larger contour area. These disagreements over contour definition highlight all too readily just some of the difficulties that can arise from different interpretations of the appropriate input data that should be fed into the software models and the impact that this potentially has on subsequent results.

125. The objectors and BIA have consistently argued that the correct 'baseline' for assessing the environmental effects of varying the 2008 PA is the 2005 plus 15% indicative control contour recommended by the EiP Panel. Obligation 4.3 of the 2008 agreement states that: *"An indicative control contour shall be agreed by the Company and the Department in line with the recommendations of the EiP."* In our opinion the meaning of the phrase *"in line with the recommendations of the EiP"* is open to interpretation. While the then Minister publically stated that the report formed a good basis for further review it was an advisory report and one that had no statutory basis. In its evidence, the Department made clear to us that it considered the 2005 plus 15% contour had no status *"...other than as a recommendation and as a recommendation that was not adopted".* While we agree that the 2005 plus 15% contour is not directly referred to in the 2008 PA wet consider it most unsatisfactory that it incorporated an obligation that required further agreement between the signatory parties. As events transpired no such agreement on an indicative control contour was ever reached.

126. While not accepting that the 2005 plus 15% contour should form the baseline for assessing the proposal to remove the SFSR, GBBCA provided, in Appendix 2 of Technical Report 3 on Noise, what it considered to be a more accurate assessment of the 2005 summer movements factoring in a 15% increase. Using INM Version 7.0d and assuming that the ground around the airport is acoustically soft , the 2005 plus 15% 57 dB $L_{Aeq,16h}$ contour was calculated as being 4.1km^2 (INM Version 7.0b having previously produced a figure of 4.2km^2). We discern no major criticisms from the other noise consultants involved in the inquiry process as to how the figure of 4.1km^2 was derived and note that that it was calculated using the same methodology used for other more recent contour maps.

127. In recognising the need for a baseline against which to assess the environment effects of the request to modify the agreement, GBBCA sought to rely on the 57 dB $L_{Aeq,16h}$ contour for the year 2013. We note that since the installation of the Noise Monitoring Terminals (NMTs) and track keeping system in 2008/09 the accuracy of predicted contours can be subsequently validated. With an area of 4.4km^2 the 2013 daytime noise contour (table 5.2 of Technical Report 3 on Noise) is larger than the 2005 plus 15% figure of 4.1km^2. In 2013 the airport had just over 38,000 ATMs (10,000 less than the

ATM ceiling) and 1.88 million departing seats for sale, (112,000 below the permitted threshold of 2 million). The plain fact of the matter is that the way that the 2008 PA was drawn up means that even with the SFSR and ATM ceiling in place the potential exists for noise levels to exceed those represented by operations in 2005, even with an addition of 15%. Accordingly, we agree with the Department and GBBCA that the 2005 plus 15% contour cannot be held to be the only correct baseline from which to assess the impacts of the proposed modification.

128. We have previously observed, as readily acknowledged by the noise consultant for GBBCA, that it is the fleet mix of aircraft operating in any given year that largely determines the noise environment around the airport and the surrounding area. Table 5.1 in GBBCA's Technical Report 3 on Noise reinforces that view. The table summaries GBBCA Annual Contours from 2010-2014 and shows considerable variation in the extent of the 57 dB L_{Aeq} contour area (it should be noted that annual contours are based on all movements irrespective of when they occur whereas the daytime period represented by $L_{Aeq,16h}$ in table 5.2 only covers the period 7am to 11 pm). In 2010 the area covered by the contour was 6.10 km^2, a much larger area than evident in the following years. Examining the summer 2011 airborne aircraft noise contours report (Appendix 4 of GBBCA Statement of Case) it can be seen that more than 50% of ATMs in 2010 were carried out by jet planes, with almost 22% attributable to Boeing 737 variants, flown mostly by Ryanair until its withdrawal of services in October 2010. The main turbo prop aircraft, the Flybe Dash 8 Q400 was responsible for just under 40% of ATMs. In 2010 there was slightly in excess of 40,000 ATMs and with a higher proportion of larger jet planes being flown the SFSR was exceeded, 2.25 million seats being available for sale.

129. The 2014 Annual contour report (Appendix 4 of GBBCA Statement of Case) paints a very different picture from 2010 in that the 57 dB $L_{Aeq,16h}$ contour area was only 3.58km^2. The reduction in contour area can in part be attributed to a reduction in SFS to 1.7 million and of ATMs to just over 37,000. However, it is also significant that the proportion of flights attributable to jet planes was much lower than in 2010 (just over 30% while the Dash 8 Q400 turbo-prop was responsible for some 57.4% of total movements). The higher proportion of turbo prop ATMs in 2014 also explains the smaller 57 dB $L_{Aeq,16h}$ contour area in 2014 compared to 2013 (the Flybe EMB 195 jet flights of 2013 having been largely replaced with more Dash 8-Q400 flights).

130. What is particularly striking about the yearly variations in the size of the 57 dB $L_{Aeq,16h}$ contour areas are the implications this has for the number of people whose residence falls within the contour. This is largely due to the high concentration of dwellings in East Belfast that lie to the south-west of the runway and fall within the flight path of planes landing on runway 04 and taking off, over the city, via runway 22. We acknowledge that the population

near the 57 dB $L_{Aeq,16h}$ contour is already experiencing a similar level of aircraft noise, e.g. 56 dB $L_{Aeq,16h}$, but it is the 57dB $L_{Aeq,16h}$ contour that the APF recognises as the average level of daytime aircraft noise marking the approximate onset of significant community annoyance. Accordingly our focus is on the size and shape of the 57 dB $L_{Aeq,16h}$ contour.

131. Tables 5.3 and 5.4 in Technical Report 3-Noise of GBBCA's Statement of Case (p21) indicates that 7,200 people (3,400 dwellings) fell within the 57 dB $L_{Aeq,16h}$ contour in the baseline year of 2013 but that the number would rise to 18,800 (9,000 dwellings allowing for committed developments) in the year 2025, assuming that the SFSR was lifted. Such a scenario would mean that 11,600 more people (5,600 extra dwellings) would lie within the contour that is defined as the level where the onset of community annoyance is experienced. We find that to be a very significant increase and one that does not rest easily with the APF policy to limit and where possible reduce the number of people affected by aircraft noise.

132. GBBCA sought to play down the significance of the number of people that would fall within the 57 dB $L_{Aeq,16h}$ contour without SFS by comparing it with what it terms a 2025 fallback. However, we have already concluded that the 2025 fallback figure is premised on overly optimistic forecasts of 90% jet movements resulting in a contour area of 6.5km^2 and a population of 15,200 (7,300 dwellings). The fact that the 2010 57 dB $L_{Aeq,16h}$ contour was smaller, at 6.1km^2 (11, 422 people), in a year when the SFSR was exceeded and when jet movements were not much in excess of 50% reinforces our assessment that the fallback scenario is not a very likely one. We do not, therefore, accept the GBBCA argument that the increase in the number of people inside the 57 dB $L_{Aeq,16h}$ contour with SFS removed falls into a minor impact category.

133. Likely daytime noise levels were provided for 6 locations close to the airport in table 5.5 of Technical Report 3-Noise, comparing those of the base year of 2013 with forecasted levels in 2025. While GBBCA argued that the differences between 2013 and 2025 with SFS removed would be less than the 3 dB(A) level deemed to be perceptible under normal circumstances we find it significant that the properties at Holywood West, Sydenham North and Sydenham West would be in excess of 60 dB(A), falling within the next contour band. Again we find comparison between 2025 without SFS and the projected 2025 fallback level not to be particularly meaningful as we do not accept that the level of forecast increases will occur irrespective of the proposed modification.

134. Daytime noise levels have an effect not only on residential properties but also on sensitive buildings such as schools and hospitals. While there are no hospitals within the proposed 57 dB $L_{Aeq,16h}$ contour in 2025 without SFS there would be 11 schools (table 5.6 of Technical Report 3-Noise). That is 8 more

than in the 2013 base year. None of the schools would reach the 63 dB $L_{Aeq\ 16h}$ contour level at which the APF recommends eligibility for sound insulation and unlike London City Airport (LCA) there is no offer on the table from GBBCA for insulation at the 57 dB $L_{Aeq,16h}$ level. In this context we can but find it significant that the proposed amendment would result in so many additional schools falling within the contour level where the onset of significant community annoyance is judged to occur.

135. Due to the restriction on operating hours (no scheduled flights except delayed or diverted aircraft between the hours of 21.31 and 06.29) there is only a small amount of activity during the night time. This takes the form of delayed flights in the late evening and those flights scheduled for departure between 06.30 and 07.00 in the morning. The World Health Organisation (WHO) guidance of 55 dB L_{night} formula is used in the absence of UK guidance. We accept that the projected population falling within Night-time contours (based on 55dB L_{night}) without SFS is low at 370 people. Nevertheless it is 370 people more than in the base year of 2013. There is no limitation in the number of flights that could depart between 06.30 and 07.00 or on the type of planes. Jet planes would clearly have more impact on the night time noise levels. While not all flights scheduled for departure within this half hour period may leave on time, and therefore depart after 07.00, it is nevertheless a potential early morning disturbance to the residents in Sydenham that would fall within the 55dB L_{night} contour. Both of the Sydenham residents who gave evidence before us complained specifically about the level of noise they experienced in the early morning period and how their lives were adversely impacted when the Ryanair fleet of jet planes was operating in the period 2007 -2010.

136. As opponents of the SFSR have repeatedly pointed out, the existing agreement places no specific restriction on aircraft type and does not directly control the level of noise produced. As a control mechanism it is complicated to operate, is inflexible and has proved difficult to enforce, requiring an effective forecasting and scrutiny system. It provides no incentive for GBBCA to only allow quieter aircraft to use the airport. In general it has not generated the level of trust between the operator and local resident groups that should ideally exist. From the airport operator's point of view it is commercially constraining and for airlines there is an element of uncertainty and inflexibility in respect of the size of planes they can choose to operate. SFS is not therefore an optimal noise control tool, a criticism repeatedly expressed over a number of years by a diversity of organisations, political groups and even government departments, as highlighted in GBBCA's Statement of Case.

137. There are also other weaknesses with the current agreement. As highlighted above, the wording of obligation 4.3 of the 2008 PA has failed to achieve the EiP Panel objective of putting in place an agreed indicative contour. In the absence of an agreed definitive limit there is no effective enforcement mechanism or a means of seeking remedial action. We agree with those

supporting the removal of the SFSR that there are clear benefits from having an agreement that provides a coherent noise control mechanism, one that is transparent and one that is enforceable. In that respect removal of the SFSR could serve a useful planning purpose but only provided that the suggested alternative control mechanism is demonstrated to serve the purpose of the SFSR equally well.

138. Notwithstanding the criticisms of the SFSR, it does effectively prevent a significant number of larger aircraft from flying out of the airport. In doing so SFS indirectly places a limitation on the proportion of the larger jet planes that can operate from the airport, thereby reducing the level of noise associated with all ATMs. If the SFSR is to be removed it should, in our opinion be replaced with a control mechanism that enables the airport to grow to meet future passenger demand but one that also encourages carriers to operate a fleet mix of aircraft that will minimise the impact of any growth in ATMs. The underlying objective of any replacement agreement should, in line with the APF, seek to limit the number of people within the city significantly affected by aircraft noise. Only in that way could the proposed removal of the SFSR, serve as equally a planning purpose as equally useful as the existing Planning Agreement.

139. The noise mechanism proposed by GBBCA is a noise control cap based on the predicted 57 dB $L_{Aeq,16h}$ contour in 2025 without SFS in place. It was claimed that the noise monitoring system already in place since 2008/09 would allow comparison of the annually reported 57 dB $L_{Aeq,16h}$ contour with the proposed noise control cap. Where the results of this comparison show that 90% (reduced to 80% at the Inquiry at the suggestion of GBBCA) of the agreed area is likely to be exceeded in the year ahead or the following year, the airport would be required to submit to the Department and implement an Action Plan to avoid the possibility of exceeding the control contour area. Because airlines are required to provide flight schedule details, including aircraft type at least one season ahead, GBBCA claim that in December of each year the airport would have a good understanding of the forecast movements for the following summer period (April to October). The argument is that this information could then be modelled to check whether the control contour would be exceeded and would, it was claimed, allow for the breaking off of any contractual negotiations over services that could place the contour limit in jeopardy.

140. We acknowledge that noise envelopes are suggested in the APF and that they are used for daytime noise control at main airports such as Manchester, London Luton, London Stansted and London Heathrow. However, the APF also recognises that proposals for the expansion of regional airports can have negative as well as positive impacts, including on noise levels and should therefore be judged on their individual merits (paragraph 1.24). Our concern with the control system proposed by GBBCA is that there is no sanction or

penalty proposed if the noise cap is found to be exceeded other than that the airport would be required to submit to the Department and implement an Action Plan to avoid the possibility of exceeding the control contour area. At the very least there should be some form of mechanism requiring any breach to require a financial contribution to the community fund.

141. We have major concerns, as previously expressed, that the proposed contour control cap of 7.5km^2 is too generous in extent and would allow noise levels of 57 dB $L_{Aeq,16h}$ or more to affect many more people than is presently the case. It is widely accepted that there is a typical uncertainty of +/- 1dB in predicting noise levels and that this in turn would result in an uncertainty of +/- 20% in contour area. In the worst case scenario that would mean that the contour control cap could be as large as 9km^2. While we do not presuppose that there is likely to be such a margin of error it reinforces our view that very careful consideration needs to be given to the extent of any control contour.

142. While we acknowledge the longevity of aircraft usage and slow rate of fleet evolution at smaller regional airports, GBBCA's noise modelling to 2025 makes no allowance for future aircraft being quieter, notwithstanding continuing improvements in engine designs. As BCC pointed out, the Airbus A320 neo is due in service from 2016 and is expected to be 2dB quieter than the current A320s. BCC also demonstrated that if all jets included in the 2025 forecast were 2dB quieter the contour area would be reduced to approximately 4.5km^2. We therefore believe that the contour cap must be drawn sufficiently tightly to encourage existing carriers to operate quieter aircraft and to minimise future airborne noise levels.

143. GBBCA is one of only two airports in the UK designated by EU Directive 2002/30/EC as a 'City' airport. Within that context, the objectors and BIA argued that noise control mechanisms akin to those employed at London City Airport (LCA) would be more appropriate than a simple noise cap based on a contour area. LCA has a noise categorisation scheme which is broadly similar to the quota count systems employed for night flights at Heathrow and Gatwick airports. As we understand it, aircraft authorised to use LCA are grouped into one of five categories, A to E, based on their average noise levels during departure as measured by the airport's noise monitoring system. Each aircraft type is assigned a 'noise classification' according to its noise performance. The numbers of movements of each aircraft type, over a given period, are multiplied by the corresponding noise factors, and these 'noise factored movements' are counted against an overall noise quota for the airport. Thus there is an incentive for airlines and the airport operator to use less noisy aircraft in the knowledge that there would be greater scope for growth in movement numbers and for larger aircraft. Equally the local community can be assured that overall airport noise exposure levels will not increase beyond the agreed quota count limit. As CAP 1129 points out, the

benefits of operating quieter aircraft can be shared between the airport, airline operators and the local community.

144. The potential role for a quota count system was discussed at some length at the Inquiry. While GBBCA expressed a willingness to consider use of such a system as a means of oversight/verification it was on the understanding that it would be subordinate to the noise contour control cap that formed the basis of the request to amend the PA. At the outset of this process the Department asked the Commission to consider any reasonable options placed before it, a position endorsed by GBBCA and BCC. Former Minister Attwood, in announcing in September 2011 the initiation of a public inquiry process into the proposed amendment, stated that *"The ultimate aim is to achieve the right balance between the social and economic benefits of airport expansion with the need to protect the quality of life for local residents and the environment".* Within that context we consider it appropriate to fully consider the merits of a quota count system and also other mitigation measures put forward, in particular those by BCC.

145. It is our view that there is considerable merit in combining the principle of a control contour cap with a noise quota system in a manner not dissimilar to that adopted at LCA. The INM modelling system could be used to produce various possible 57 dB $L_{Aeq,16h}$ contour maps that would have the agreed control contour area. Predictions for various fleet mix options conforming to this contour area cap could be produced and used to determine a quota count which would then become the condition for determining compliance. To our mind the advantage of the quota count system, as a means of determining compliance, is that it does away with the need to consider measurement and prediction uncertainties at the point of verifying compliance. It has the further and very important advantage of providing an incentive to keep aircraft noise levels at the lowest optimum level.

146. The critical question that remains to be determined is the maximum size at which the 57 dB $L_{Aeq,16h}$ control contour cap should be set. We do not accept that the contour control cap should be set as wide as the 7.5km^2 requested by GBBCA as we are not convinced that the forecasted fleet mix based on of 90% jet movements is realistic. In any event, we have also concluded that the growth aspirations of the airport should not dictate the size of population falling within the 57 dB $L_{Aeq,16h}$ contour and that account must be taken of the planning purpose of the existing agreement. That said, the 2015 +15% contour of 4.1km^2 is not part of the 2008 PA and cannot therefore be determined as a justified and enforceable control cap. The 2013 annual figure of 4.68km^2 (table 5.1 in Technical Report 3-Noise) occurred during a year when the SFS limit was not exceeded, demonstrating that there remains scope within the existing agreement for the contour area to be larger than that. The question then is what more likely could that figure be?

147. GBBCA predict that a 57 dB $L_{Aeq,16h}$ contour area of 6.5km^2 is the fallback figure, should the SFSR be retained. Given that this forecast is predicated on an unlikely fleet ratio of 90% jet movements we do not accept that it is a realistic fallback. The BCC modelled forecast for 2025 (Table A4.2 in Appendix 3 of BCC's SoC) with SFS remaining in place suggests that an area of 5.2km^2 is likely. That forecast is predicated on a 72% jet fleet, a proportion that may still be on the high side, if existing and past fleet mix trends were to continue. However, we acknowledge that the existing Agreement does not specifically limit the proportion of jet planes that can operate from the airport. It is also likely that future jet planes will be less noisy than in the past. We conclude that a contour area of 5.2km^2, as predicted by BCC, represents the most plausible fallback position, with the SFSR remaining in place.

148. If the SFSR were to be removed it would seem inevitable that the 57 dB $L_{Aeq,16h}$ contour would exceed the 5.2km^2 area we have concluded could be reached by 2025 with SFS remaining in place. The largest historical contour area we can detect was that in 2010 when it was 6.1 km^2 (Table 5.1 of GBBCA Technical Report 3-Noise). The SFS level was exceeded that year and there were more complaints (135) to GBBCA in 2010 than any other year since then. It is difficult to see how a proposed contour control cap that would increase the 57 dB $L_{Aeq,16h}$ contour area to the extent that the proposed request envisages (some 60% more than the base year of 2013) and would more than double the number of residents falling within that contour area (comparing 2013 with the projected 2025 level) could be justified, bearing in mind that any amendment to the Planning Agreement should serve an equally useful purpose as the existing agreement.

149. We recognise the difficulties in predicting future air traffic demands or trends. However, we strongly believe that while the growth of the airport is desirable from an economic perspective, a balance must be struck with the noise impact that such growth would have on those communities living most immediate to the airport. The planning agreement in 2008 was drawn up with the principal purpose of protecting residential amenity. In that context we conclude that putting in place an amended agreement that incorporates a quota count system, as explained in the preceding paragraphs and based on a 57 dB $L_{Aeq,16h}$ control contour cap not in excess of 5.2km^{2,} would justify removal of the existing SFSR.

150. In reaching our conclusion we have fully taken into account the environmental information provided with the amendment request and subsequent submissions and the economic arguments for and against the request. We have also taken account of all representations and submissions made prior to and during the inquiry process. We are satisfied there are no overriding environmental or transport issues that preclude us from determining that the SFSR should be removed. In determining that the alternative noise control system we are recommending would serve an equally useful planning

purpose as the existing obligation, we are satisfied that any health issues put before us do not alter that conclusion.

151. There are, as BCC argued, additional ways in which noise levels can be mitigated. It has always been recognised that there are major noise advantages in flying over Belfast Lough rather than the city as this avoids the more populated areas. There is an existing obligation to maintain a bias favour of approaches and climb-outs over Belfast Lough and given safety requirements and the influence of prevailing winds we do not see how the matter could be addressed any more effectively.

152. We agree with BCC that with the Noise Track keeping system in place it should be possible to enforce departure noise limits on all aircraft. We recommend that a single maximum limit value is agreed rather than trying to set different maximum levels for different aircraft types. Fines should be imposed on any aircraft exceeding the agreed noise limit, made payable to the Community Fund. We also agree that a continuous descent approach should be incorporated into any amended agreement. A continuous descent requires planes to join the 3 degree slope for the Instrument Landing System (ILS) further out from the airport and from a greater height than the more usual practice of horizontal flight before joining the ILS. While there would be no noise benefit for those living close to the airport there could be a noise reduction of up to 5dB for those living further away i.e. 10-25 miles.

153. We note the commitment by GBBCA to use fixed electrical ground power (FEGP) at Stands 1 to 19 and to avoid where possible the use of noisier diesel ground units. This commitment should be incorporated into any revised agreement.

154. The APF requires 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 and similarly to residential properties which experience an increase in noise of 3dB or more which leaves them exposed to levels of noise of 63 dB $L_{Aeq,16h}$ or greater. While we agree with BCC that it would be desirable to have acoustic insulation offered at a level below 63 dB $L_{Aeq,16h}$ or greater, we do not consider that it can be insisted upon. We do, however, agree that the requirement for insulation above 63 dB $L_{Aeq,16h}$ should be formally incorporated into any revised agreement.

155. The number of delayed flights landing after 9.30 pm and the reason for those delays continues to be an issue of contention with the local community. Fines on flights outside the scheduled operating hours are currently paid into a community fund. We believe this laudable commitment should be formally incorporated into any revised planning agreement with a graduated level of fine clearly set out, incrementally increasing over every 15 minute period of

lateness. The airport should publish, on their website, the number of instances when flights land or take off after the permitted operating hours.

Recommendations

156. We have set out below our main recommendations for an amended agreement. We have not commented on restrictions and obligations not brought before the Public Inquiry. It will be for the Department and GBBCA to agree the finer legal wording of any amended agreement.

The Restrictions

157. Restriction 3, in respect of a seats for sale limitation, should be removed.

Obligations

158. The wording of Obligation 1 (Hours) should set out clearly a levy of fines to be imposed on flights landing after 9.30 p.m. with fines increasing incrementally every 15 minutes. All fines should be directed to the Airport Community Fund.

159. Obligation 4 should make clear that the area enclosed by the 57 dB $_{LAeq,16h}$ contour shall not exceed 5.2km^2. It should also incorporate the requirements set out in paragraph 144 above in respect of establishing a Quota Count system of control for noise contour monitoring in tandem with use of the latest version of the INM contour forecasting model.

160. An obligation should be added requiring the introduction of a departure noise control system setting out a specified maximum limit value measured at the existing permanent monitoring sites. Suitable fines should be established and clearly set out in the amended agreement with all fines payable to the Community Fund.

161. An obligation should be added requiring the adoption of a continuous descent approach for all aircraft landing at the airport.

162. An obligation should be added in respect of ensuring the availability and use of fixed electrical ground power at all aircraft stands.

163. An obligation should be added requiring the establishment of a Noise Insulation Scheme applicable to residential and noise sensitive properties with noise levels at or above 63 dB $_{LAeq,16h}$.

Appendix 1

List of Submissions to Public Inquiry

Statements of Case:

Department of the Environment (Including submissions from other Departments)

George Best Belfast City Airport

Belfast City Council

Belfast International Airport

Belfast City Airport Watch

Sir Liam McCollum

Cultra Residents Association

Northern Ireland Independent Retail Trade Association

Federation of Small Businesses

Dr Chris Lundy

Rebuttals:

Department of the Environment (Including submissions from other Departments)

George Best Belfast City Airport

Belfast City Council

Belfast International Airport

Belfast City Airport Watch

Sir Liam McCollum

Documents Submitted at the Public Inquiry:

Department - PAC 1 – DRD Note of meeting with DOE and GBBCA on 19th January.2008 to discuss revised Planning Agreement

BCAW - PAC2 - Graph showing Correlation between Seats for Sale and 57dB Contour Area at GBBCA (2007-2014)

GBBCA - PAC3 - Graph showing SFS against 57dB contour between 2007 and 2014

GBBCA - PAC4 - Copy of Mott MacDonald Critique of Report from NI Centre for Economic Policy on the Economic Impact of changes in APD in Northern Ireland (April 2015)

Appendix 2

Attendances at Public Inquiry

Day 1

Department:

Mr D Elvin QC
Mr R Moules Junior Counsel
Mr S Symington, DOE Planning
Ms N Thompson, DOE Planning
Mr D Humpheson, AECOM
Mr D Kennedy, DOE Environmental Policy
Mr M Gillespie, DRD

GBBCA:

Mr S Beattie QC
Ms K Blair, Cleaver Fulton Rankin instructing Solicitors
Dr M Gordon, Turley Associates
Ms L Congdon, York Aviation
Mr D Charles, Bickerdike Allen Partnership
Dr A Buroni, RPS
Mr M Beattie, GBBCA

Belfast City Council:

Mr J Walsh, Solicitor
Mr L McGovern, Solicitor
Mr S Mitchell, ERM
Mr S Leonard, Environmental Health Department

Belfast International Airport:

Mr M Humphries, QC
Mr G McGhee, Carson McDowell instructing Solicitors
Mr P Kenworthy, Mott MacDonald
Mr R Thornely Taylor, Noise Expert
Mr J Bradley, Mouchel
Mr D Elliott, Frontier Economics

Belfast City Airport Watch and Objectors:

Mr Liam McCollum QC
Ms H McGinley, Johnsons Solicitors
Mr H McCracken, Johnsons Solicitors
Sir Liam McCollum

Day 2

Department:

Mr D Elvin QC
Mr R Moules Junior Counsel
Mr S Symington, DOE Planning
Ms N Thompson, DOE Planning
Mr D Humpheson, AECOM
Mr Mr J Simms, DETI

GBBCA:

Mr S Beattie QC
Ms K Blair, Cleaver Fulton Rankin instructing Solicitors
Dr M Gordon, Turley Associates
Ms L Congdon, York Aviation
Mr D Charles, Bickerdike Allen Partnership
Dr A Buroni, RPS

Belfast City Council:

Mr J Walsh, Solicitor
Mr L McGovern, Solicitor
Mr S Mitchell, ERM
Mr J Carr

Belfast International Airport:

Mr M Humphries, QC
Mr G McGhee, Carson McDowell instructing Solicitors
Mr P Kenworthy, Mott MacDonald
Mr R Thornely Taylor, Noise Expert

Belfast City Airport Watch and Objectors:

Mr Liam McCollum QC
Ms H McGinley, Johnsons Solicitors
Mr H McCracken, Johnsons Solicitors
Sir Liam McCollum

Day 3

Department:

Mr D Elvin QC
Mr R Moules Junior Counsel
Mr D Humpheson, AECOM
Mr J Simms, DETI

GBBCA:

Mr S Beattie QC
Ms K Blair, Cleaver Fulton Rankin instructing Solicitors
Dr M Gordon, Turley Assoc.s
Mr D Charles, Bickerdike Allen Partnership
Dr A Buroni, RPS

Belfast City Council:

Mr J Walsh, Solicitor
Mr S Mitchell, ERM
Mr J Carr

Belfast International Airport:

Mr M Humphries, QC
Mr G McGhee, Carson McDowell instructing Solicitors
Mr R Thornley Taylor, Noise Expert

Belfast City Airport Watch and Objectors:

Mr Liam McCollum QC
Ms H McGinley, BCAW
Mr H McCracken, Johnsons Solicitors
Professor E Greiser, Health Expert
Ms M Treacey, Perceptive Insight
Dr L Fawcett, BCAW Chairperson
Ms D McGowan, Resident - North Parade, South Belfast
Ms M Fitzduff, Resident and Holwood Action Group Chairperson - The Esplanade, Holywood
Mr K Burns, Resident - Haypark Avenue, South Belfast
Mr R Moffatt, Resident - Larkfield Gardens, East Belfast
Ms E Bennett, Resident - Larkfield Road, East Belfast
Mr C Durning, Resident - Sharman Drive, South Belfast
Mr J Wright, Resident - Woodstock Road, East Belfast

Day 4

Department:

Mr D Elvin QC
Mr R Moules Junior Counsel
Mr G Vance, DOE Economics Branch
Mr J Simms, DETI

GBBCA:

Mr S Beattie QC
Ms K Blair, Cleaver Fulton Rankin instructing Solicitors
Ms L Congdon, York Aviation
Dr M Gordon, Turley Assoc.s
Mr M Keegan, Envest
Mr K Clarke, JMP

Belfast City Council:

Mr J Walsh, Solicitor
Ms L Toland, BCC Economic Initiatives
Mr J Carr

Belfast International Airport:

Mr M Humphries, QC
Mr D Elliott, Frontier Economics
Mr J Bradley, Mouchel

Belfast City Airport Watch and Objectors:

Ms H McGinley, Johnsons Solicitors
Mr H McCracken, Johnsons Solicitors
Sir Liam McCollum

Appendix 3

Abbreviations

The following abbreviations are used in this Report –

ASSI	Area of Special Scientific Interest
ATMs	Air transport movements
APF	Aviation Policy Framework
APIS	Air Pollution Information System of Environment Agency
BAP	Bickerdike Allen Partners (Noise Consultants)
BCAW	Belfast City Airport Watch
BCC	Belfast City Council
BHLP	Belfast Harbour Local Plan
BIA	Belfast International Airport
BMAP	Belfast Metropolitan Area Plan
CAA	Civil Aviation Authority
CBI	Confederation of British Industry
dBa	Decibel
DEFRA	Department for Environment Food & Rural Affairs
DOE	Department of the Environment
DRD/AB	Department for Regional Development's Airports Branch
EiP	Examination in Public (2006)
ERCD	Environmental Research & Consultancy Department of Civil Aviation Authority
EIA	Environmental Impact Assessment
ES	Environmental Statement
FAA	Federal Aviation Administration`
FEGP	Fixed Electrical Ground Power (
FTE	Full Time Equivalent
GBBCA	George Best Belfast City Airport
ILS	Instrument Landing System
INM	Integrated Noise Model
LCA	London City Airport
LOAEL	Lowest Observed Adverse Effect Level
Km	Kilometre
Mppa	millions of passengers per annum
NDBC	North Down Borough Council
NIEA	Northern Ireland Environment Agency
NMTs	Noise Monitoring Terminals (
PA	Planning Agreement
PAC	Planning Appeals Commission
PPS	Planning Policy Statement
PUDO	Pick-up Drop-off

RDS	Regional Development Strategy 2035
SFS	Seats For Sale
SFSR	Seats For Sale Restriction
SoC	Statement of Case
SOAEL	Significant Observed Adverse Effect Level
SPA	Special Protection Area
WWTW	Waste Water Treatment Works
WHO	World Health Organisation

Appendix 4

Technical advice and comments proffered by Noise Assessor to PAC

Q1. If, as agreed by parties, the control contour is set by a reputable firm e.g. BAP and calibration is verified by an independent party, is there any need for an additional control system, such as the Quota Count system put forward by BIA?

If all parties are agreed then my short answer has to be NO there is no need - but much depending on the 'IF'. I recollect that three of the parties (GBBCA, BCC and DOE) seemed happy with use of INM with independent party verification. Even with agreement there would still be issues of uncertainty to be dealt with.

Other points:

The Quota Count has much to commend it. In particular that it a relatively simple idea – it's a matter of numbers so easy for everyone to understand and check – In this sense it is like the ATM and SFS numbers, but unlike both of these it has built into it an incentive for the airport (and /or the airlines) to fly quieter aircraft. It also completely does away with need to consider measurement and prediction uncertainties at the point of verifying compliance – in my view this is a big advantage.

It seems to me that there could be merit in a QC system operating in tandem with or as a supplement / support / backup to the contour cap

A QC system can be designed to meet a particular contour area (e.g. 57 dB 7.5 km2) but it will not produce a sound level map telling you the shape of the contours, or the sound levels at particular points (e.g. where the schools and hospitals are located, or the number of dwellings or people exposed at a certain noise exposure level) – predicted noise level contours would be needed for this.

QC type systems have mainly been used by airports at night-time – usually there is some other measure such as contour area cap for daytime and a QC at night-time but a similar QC type system is being used by London City Airport in the daytime.

London City Airport currently operates both a daytime quota system as well as a contour system, with both systems currently being operated by Bickerdike Allen and Partners who produce the contours using the INM software.

<u>Further information</u>

London City Airport (LCA) operates a Noise Categorisation scheme which although different in detail from the QC schemes in night-time operation at other airports is broadly similar in principle. Aircraft authorised to use LCA are grouped into one of five categories A to E (broadly equivalent to assigning them a QC number) based on their average noise levels during departure as measured by the airports noise monitoring system. The number and average noise level of each departure is measured over each 12 month period.

The scheme has been in operation for 20 years, and it seems to also contain within it a maximum departure noise limit for aircraft within the noisiest category.

The LCA scheme is referred to in ERCD Report CAP1129 on Noise Envelopes, page 20: 'A noise quota or noise budget scheme could also be used to control daytime noise. A daytime scheme is already used at London City Airport, whereby an annual noise quota limit applies over a calendar year.'

Luton Airport operates a noise contour cap system based on contour predictions using INM. Mr Thornley Taylor (for BIA), commented at the inquiry that there were several additional noise control measures at Luton to support the contour cap system, which is not the case at GBBCA.

Q2. How does the noise control contour actually work? Is it a combination of forecasting and making use of actual monitored noise measurements?

Short answer is YES. The contour is entirely predicted, based on a database of known information about each type of aircraft and its flight into or out of the airport. Noise measurements (of noise from a particular type of aircraft) at a limited number of points around the airport can be compared with predictions and used to tweak or calibrate the predictions to make them more accurate.

More information:

A noise contour is a map showing predicted noise levels at different positions around the airport arising from a certain number of aircraft movements (departures and arrivals). Noise prediction software primarily predicts noise levels, not contour areas. Noise levels are predicted at each point at a grid of points surrounding the airports. Then a different part of the software 'joins the dots' so to speak, (i.e. joins all the points having the same predicted noise level) to produce contours of different noise levels (57, 60, 63 dB etc.). It is then possible to calculate the area of each contour.

Q3. How would any margin of error in setting a control contour be factored in? If seeking to achieve a 7.5 square km contour would you need to aim for a 6.5 square km for example (or less or more?) to ensure compliance/allow for error?

Short answer is YES (you would need to aim for a lower value). With an estimated uncertainty of +/- 20%** and with a contour limit of 7.5 sq km, in direct answer to your Q, if we are to be absolutely sure of compliance, then the predicted contour area would need to be 6.2 km2 or below.

**[The estimated uncertainty of +/- 20% in predicted contour area was stated by Mr Charles at the Inquiry, and is statement of the widely accepted view that an uncertainty of +/- 1 dB in predicting noise levels will result in an uncertainty of +/- 20% in contour area. Confirmation of this 'rule of thumb' can be found in Appendix A of CAA Report on Air Noise Aspects of GBBCA Planning Application for Runway Extension dated 16 Nov 09, paragraph 16, page A-5.]

Illustrative example:

A contour cap of 10 sq km has been imposed (number chosen for ease of arithmetic)

The airport submits a contour prediction of 9 square km. in January for the forthcoming summer period.

It is generally agreed that the uncertainty in predicting contour area is +/- 20%. In this case this means that the best, and most likely estimate of contour area is 9 sq. Km, but it could possibly be as large as 12 sq km or as small as 8 sq km.

What might happen?

Question A

If the appeal was simply on the basis of uncertainty (i.e. without any detailed criticism of the way the model was built.) then :

it is more likely that it could be below 10 sq km than that it would be above 10 sq km (in fact it is 3 times more likely to be below than above the limit).

I have to admit that others might argue differently, i.e. that for any predicted contour greater than 8.3 sq km there is a chance that the limit of 10 sq km could be exceeded

Question B

The appeal is based on the argument about uncertainty and also about the way the model is built (assuming that this information is in the public domain as a published contour prediction report).

In my view the challenge would have to show that alternative equally reasonable decisions about input to the model would lead to a significantly different prediction outcome, and one which could exceed the contour limit.

This where the role of an independent assessor or verifier would come in to decide upon the validity of the criticism, and on the competence of the prediction put forward by the airport.

Question C

Should the limit be raised, say to 12 sq km, to take into account arguments about uncertainty?

In my view NO, definitely not. The limit will have been based on considerations of the balance between the benefit to the community as a whole against the increases noise exposure falling on the community around the airport. Increasing the limit simply to accommodate uncertainty would add an unjustifiable burden of increased noise exposure on to the community.

Question D

Should the airport and those making the contour predictions take into account the uncertainties in the predictions. YES in my view they should, and it would unwise of them NOT to do so. They should seek to demonstrate that the proposed programme of aircraft movements for the forthcoming summer months will meet the contour limit, taking into account uncertainties in their predictions.

Other points re. Q3

The complication of dealing with uncertainty in contour areas is one reason why the alternative of using a Quota Count system has attractions – using a QC system would simply bea matter of looking up and comparing numbers.

The magnitude of the uncertainty in contour area.

The prediction models (such as INM and ANCON) predict sound levels over a grid of points. This grid is then used to produce sound level contours. Estimates of uncertainty usually relate to the accuracy of the sound level predictions and an uncertainty of +/- 1 dB is commonly quoted, and it can be shown that this results in an uncertainty of about +/- 20% in contour area (as used in the above illustration). It is however impossible in practice to measure the contour area to compare with the estimated values, although the sound levels can be measured and compared. I think it could be argued the +/- 1 dB and the +/- 20% in area might be conservative and that there could be higher levels of uncertainty.

In his evidence to the Inquiry Mr Charles (for GBBCA) quoted the +/- 1 dB and the +/- 20% in response to our question. Mr Mitchell (for BCC) in his evidence stated that his contour prediction were in 'good agreement' with those of Mr Charles, and in response to my Q about what he meant by good agreement he stated 'within 1 dB'.

Expressing the magnitudes of uncertainties:

In other areas of science and engineering where uncertainties in measurement are used they are sometimes stated in statistical terms, commonly as a 95 percentile limit*, but, so far I have only come across the more crude estimate of within 1 dB or 20% contour area. [*this would mean that if a noise level was quoted as having an uncertainty of +/- 1 dB, expressed as a 95 percentile limit, that any one measurement stands a 95 % chance of being within the +/- 1 dB range].

For example ERCD Report 0506 'Precision of Aircraft Noise Measurements at the London Airports' shows that the uncertainty in noise monitors at the airport is +/- 1.5 dB with a 95% confidence level.

Q4. What are the merits of seeking a 80% trigger point for exceeding the noise control cap, as put forward by GBBCA at Inquiry, rather than the 90% trigger originally suggested in para 5.2 of the GBBCA SoC?

Reducing from 90% to 80% can only be a good thing because it gives an earlier alert to potential problems with exceeding the contour limit, and I can see no disadvantage.

There are however a number of points that I find puzzling about para. 5.2.

1. The noise monitoring system serves to fine tune the contour prediction by comparing predicted noise levels at two points in the contour with the predicted values. It is the modelling of the predicted contours which allows comparison with the contour cap limit.

2. Paragraph 5.2 implies to me that contours will be produced sequentially in time to see how the contour size is building up as the summer period progresses, but this is not the case – they are produced during the previous winter on the basis of forecasting the summer schedule of aircraft movements and types, at the convenient time of a scheduling conference so that adjustments can be made if contour modelling shows that there is a danger of the contour limit area being exceeded.

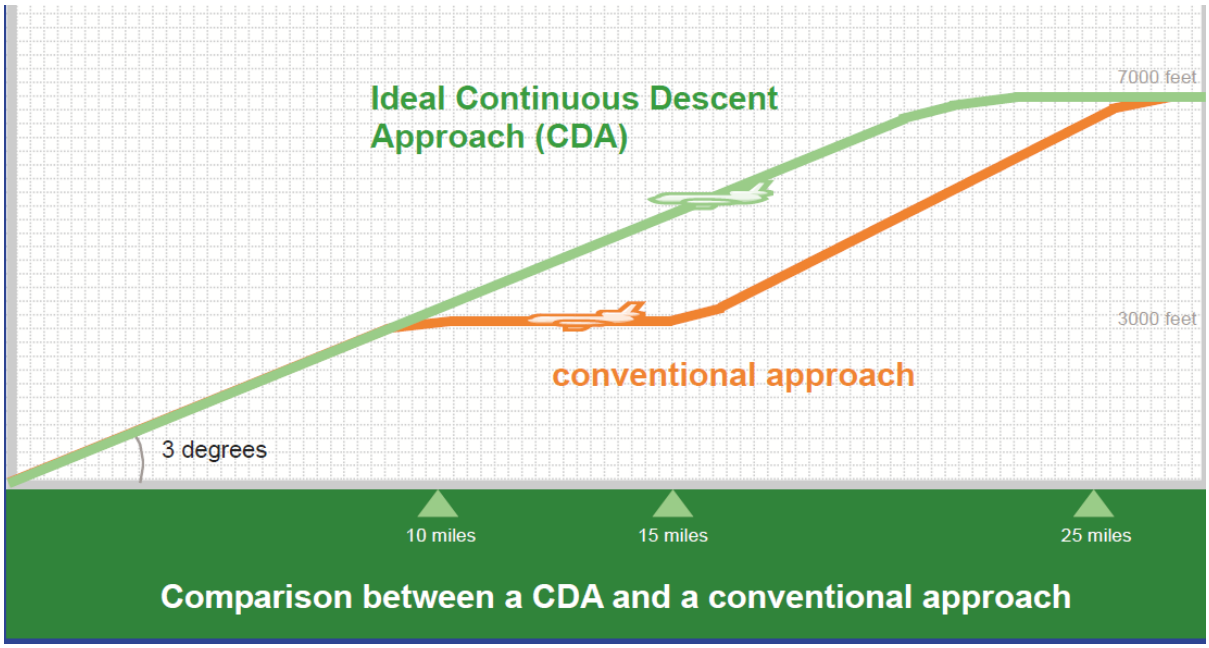
3. It is assumed that the airport will be taking into account the uncertainties in the predicted contour area, as discussed earlier.

Q5. How practical/advantageous is it to seek a continuous descent approach for all aircraft? Who would benefit from this? Presumably not those living most immediately to the airport?

I think that it is practical enough and it also saves fuel for the airlines.

It is true that there will be no noise benefit for those close to the airport, and probably no change in noise contours, but noise reductions of up to 5 dB could occur for those living further away from the airport (10 to 25 miles away).

The idea of CDA is to adopt a continuous descent aimed at joining the 3 degree slope ILS (Instrument Landing System) further out from the airport and from a greater height than the more usual practice which includes period of horizontal fuel burning flight before joining the ILS. The idea is to fly ‘higher for longer’ because higher above ground means lower noise levels at ground level.



The noise benefits that a CDA offers are restricted to locations typically around 10 to 25 miles from the runway. There is no difference between a CDA and a conventional approach, once the aircraft using the latter joins the final 3 degree glidepath.

The Diagram is taken from the ERCD document Basic Principles of CDA, which also includes all the points made above.

Q6. Should Departure Noise Limits be based on a fixed single maximum level as suggested by Mr Mitchell of Belfast City Council or on differing aircraft types as suggested by Mr Humpheson on behalf of the Department? If latter how would that work i.e. does it have to be a fixed limit for each specific aircraft type i.e. something like a quota table or should it be more general e.g. turbo prop or jet?

Short answer is that I would suggest the single maximum limit value approach (which could always be refined later if necessary) for two reasons.

The first reason is that the main objective is to reduce the noise levels of the noisiest aircraft types being operated in an unreasonably noisy way. This might mean that a much quieter type of aircraft (much smaller for example) might easily comply with the limit even if it was a noisy example of its class, or perhaps flown in a way that was produced more noise than necessary – but the main overall objective would have been achieved in the simplest possible way.

The second reason is that that is the way it is done at the designated airports under UK government direct control (Heathrow, Gatwick, Stansted etc.), and also at Birmingham and Luton.

Further information:

I have more questions about how such a system could be introduced, both from the legal/ administrative side (discussions, consultations, permissions, regulations etc.) and from the technical side of things.

There is much information available from CAA / ERCD about the introduction of noise limits at the London Airports and how those limits have been updated over time. Originally the limits were specified in perceived noise level units (PNdB) – a very complicated noise measure which is now only used for aircraft noise certification purposes, and has now been replaced by noise limits expressed in terms of the much simpler dBA (A-weighted decibels) units. The limits have to be set at a level which is fair and reasonable i.e. so that they are capable of being met by a aircraft in good order taking off in the prescribed way, and it is for this reason that the levels have to be set based on the noise certification values for each type of aircraft .

I think that it is for this reason that the monitoring points for the London Airports and for Birmingham and Luton are at very specific positions - 8.5 km from the end of the runway. At GBBCA the NMTs are located approximately 4.5 km from the start of roll location of runway 22 and 3.9 km from the start of roll location of runway 04.

I do not know if the departure noise limits at GBBCA could be specifically adjusted to these existing noise monitor positions, or if the positions would have to be changed, or new noise monitors installed at these different positions.

The setting of limits would, anyway, I suspect (but don't know for sure) need to involve the CAA either as adviser or in direct control.

The limit at London (Heathrow, Gatwick and Stansted) are 94 dBA in the daytime and 89 dBA at night; at Birmingham 92 dBA (daytime only) and at Luton (94 dBA day and 82 dBA at night). An allowance is made for wind speed which affects the propagation od sound for aircraft to noise monitor.

Differential limits have been considered (i.e. a different limit for different classes of aircraft, but, as far as I am aware, have not yet been introduced).

Q7. In potentially widening the 57dB contour, with removal of SFS, from 4.2 square km (2015+15%) to the suggested 7.5km^2 would there be a significant change in spike levels of noise (as opposed to the 16hr LAeq average level) throughout the full extent of the contour area or would such spikes be concentrated more noticeably closer to the airport?

Background

The spikes that you refer to are the maximum noise levels which occur for a few seconds when an aircraft passes overhead - usually referred to as LAmax values (L for level, max for maximum, and 'A' because the sound level is measured in A-

weighted decibels, dBA). Wherever you are in the contour you will hear one spike (one LAmax event) every time an aircraft passes over.

Bear in mind that the level will depend where you are in the contour, with levels being higher at the heart or centre of the contour, closer to the airport, than at the contour edge or boundary – the 57 dBA contour for example defines an area where the LAeq,16h value will be 57 dBA or more – it is NOT an area where the level will be 57 dBA everywhere inside the contour. Thus the 57 dBA contour area contains within it the 60, 63, 66 etc. dBA contours. We must not make too much of this , however, because at GBBCA the higher contours are fairly small and contained within the boundaries of the airport itself – but there will certainly be houses between the 57 and 60 contour

Answer

It is impossible to give a definitive answer because the increase contour size would be caused by a combination of more aircraft and maybe quieter or noisier aircraft.

An increase in contour area from 4.2 to 7.5 sq. km. represents an increase in LAeq, 16h of just over 2.5 dBA. This could be due to the number of aircraft movement remaining the same but each movement being 2.5 dBA noisier (unlikely) or the level of each event being the same (on average) but the number of movements increasing by 79% (more likely), or something in between the two.

In case it is of interest a more detailed explanation about LAmax, some typical values, and their relation to the 'averaged out' LAeq,16 hour values, are given on the next two pages.

MORE DETAILED EXPLANATION and INFORMATION

To help explain the typical noise climate around an airport the first chart (top) on the following page shows a graphical representation of the moment by moment variation in noise over an hour at a site some miles from an airport near to London (taken from my own work).

It can be seen that the noise is dominated by peaks in noise level when an aircraft passes overhead. There are eleven of these occurring within the hour with highest levels (the LAmax values) ranging between 60 and 70 dBA. There is one burst of noise in between the fifth and sixth aircraft which is cockerel crowing (this is a rural site). In between aircraft the noise level falls, usually to between 40 and 50 dBA from general background noise.

The average noise level over the one hour period, LAeq,1h, (not shown on the chart) was about 53 dBA, i.e. much lower than the LAmax values of between 60 and 70 dBA.

At GBBCA:

At the fixed noise monitors at GBBCA the maximum noise levels are much higher, between 70 and 80 dBA as explained below.

The second chart on the next page (the lower one) shows a typical expanded version of the noise time history from just one aircraft passing overhead. It is taken from the Airports Commission document paper 05: Aviation Noise, published in July 2013. It shows how the noise level from an aircraft builds up, second by second, from a level of about 58 dBA to a highest level, the LAmax value, of 82.5 dBA, before reducing as the aircraft recedes into the distance. This particular event takes place over a period of about 1 minute. From this information the average level over the 1 minute period can be calculated for this particular event,, but because different aircraft might take different times (i.e. shorter or longer than one minute) to pass overhead, it is conventional to calculate the average level as if all the sound energy from the event was compressed into one second. This one second LAeq, containing all the energy in the 60 second event, is called the single event noise level, or SEL.

It is the SEL for each aircraft that is measured by the noise monitors at GBBCA, and from these values the LAeq,16 hour average level is calculated (using the equation or formula given in the SoC of the DOE (Appendix 10 URS Noise Review Report, Table 4.3 Clause 4.1 (proposed revision), page 14).

The SEL value is also shown on the second chart on the next page as 92.4 dBA, almost exactly 10 dB higher than the LAmax value. This relationship of about 10 dBA between the SEL value and the maximum level of an aircraft noise event is a fairly reliable rule of thumb, and although maximum noise levels were not mentioned in the evidence at the Inquiry we can get a good idea of their magnitude from Tables 3.1 of the Statement of Case for GBBCA (P8) presented by Mr Charles, which is based on Tables A3.3 and A3.4 in Appendix 3 of Appendix 7.1 (Noise Report), of the DEC 2013 Environmental Statement

Tables 3.3 and 3.4 present average SEL values for different aircraft types measured at the two fixed noise monitors at GBBCA. It can be seen that SEL values range between about 80 and 90 dBA, and this means that maximum noise levels (LAmax) from individual aircraft passing overhead were in the range 70 to 80 dBA. We heard a couple of example outside the school at Nettlefield. This compares with the average (LAeq,16hour) value of between 57 and 60 dBA .

To help put the noise levels into some context the following are taken from Table 3.1 of the Discussion paper 05, Aviation Noise: Approximate sound pressure, level (LpA) for different activities or situations:

Conversational speech 1m away	60 dBA
Vacuum cleaner at 1m	70 dBA
Kerbside of busy road 5 m away	80 dBA

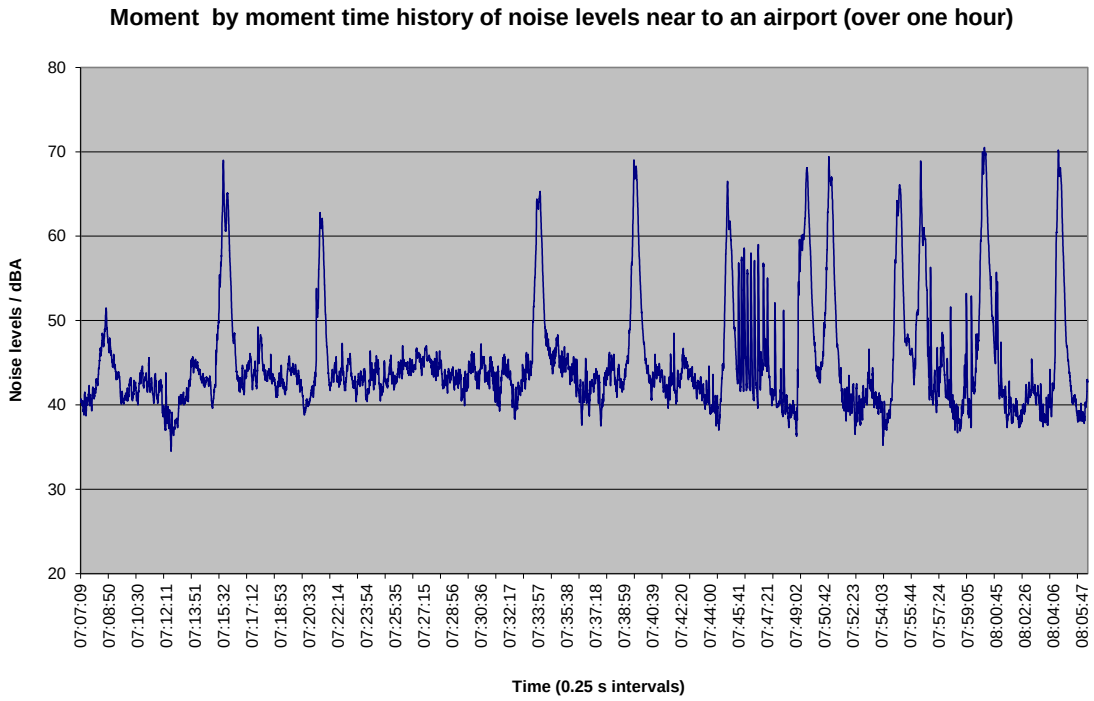
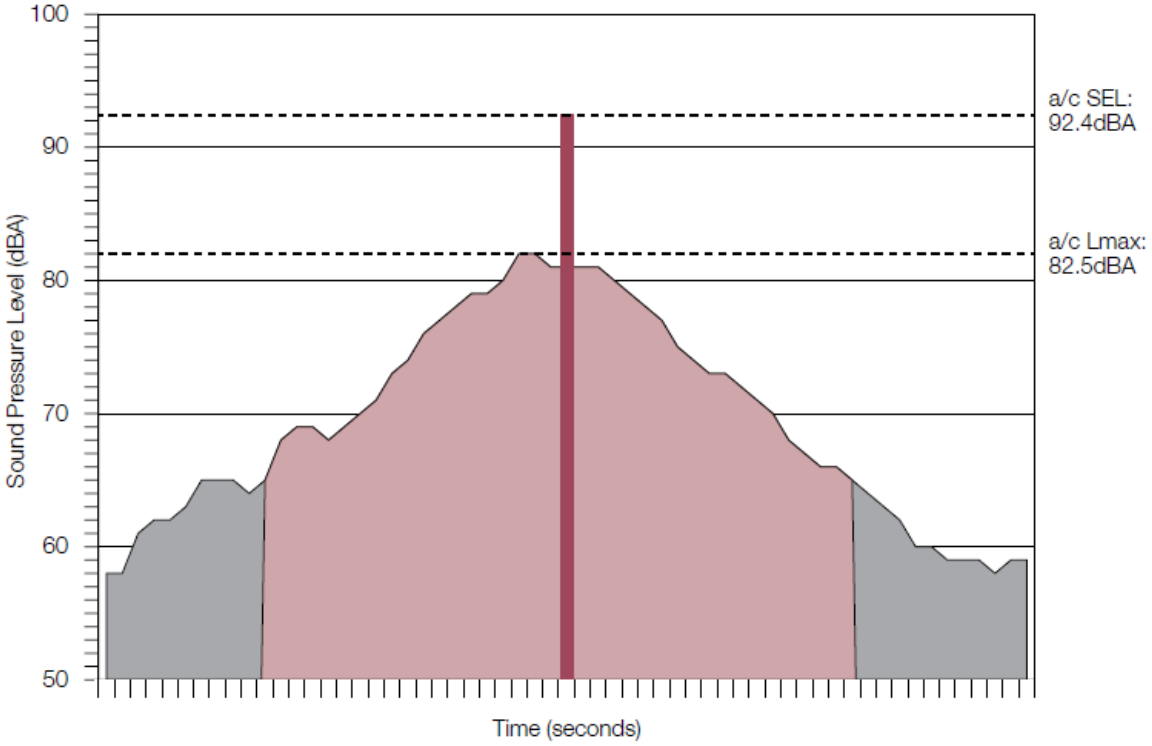


Figure 3.1: Aircraft time history, showing maximum level L_{Amax} and associated Sound Exposure Level (SEL)[41]



Q8. How significant is the fact that in table 5.3 of Mr Charles's SoC some 370 people would be exposed to an LAeq 16hr in excess of 63dB in 2025, if the SFSR were to be removed? While exceeding 63dB may trigger a grant scheme for insulation what significance has a noise level in excess of 63db have for enjoyment of a garden i.e. what difference to the human ear is 63dB+ compared to 57dB?

I am assuming that the question is referring to the significance of the exposure to 63+ dB (and that exposure increasing from 57+ to 63+ dB) rather than the significance of the number of people so affected.

[On the significance of the numbers, I would simply say that they represent an increase i.e. a worsening of the impact of aircraft noise on the community.]

Several sources present the results of social surveys showing how the % of people highly annoyed by aircraft noise varies with the LAeq 16 hour value. Once such, taken from the Airports Commission Discussion Paper 05: Aviation Noise is copied below. The value for those living within the 57 dB contour (mid-point 58.5) is 11.1%, which rises to 28% for those living within the 63 dB contour (mid-point 64.5 dB). This Table is based on the ANIS survey carried out in 1985 and it is now acknowledged that it is an underestimate of public response to aircraft noise.

Table 4.1: Percentage of people 'highly annoyed' for each L_{Aeq} 16h mid-point level

Mid-point L_{Aeq16h} level	Percentage highly annoyed
55.5	6.6%
58.5	11.1%
61.5	18.0%
64.5	28.0%
67.5	40.7%
70.5	54.9%
73.5	68.2%

Source: CAA/CAP 725

The Airports Commission Discussion Paper 05: Aviation Noise also refers to World Health Organisation (WHO) Guidelines, which includes outdoor living areas, as shown below.

Specific Environment	Critical Health Effect(s)	L_{Aeq} (dB)	Time Base (Hours)	L_{Amax}, fast (dB)
Outdoor living area	Serious annoyance, daytime and evening	55	16	-
	Moderate annoyance, daytime and evening	50	16	-
Dwelling indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	-
	Sleep disturbance, night time	30	8	45
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60
Outdoors in parkland and conservation areas	Disruption of tranquillity	See note		

Table 4 WHO guidelines relevant to aircraft noise and residential areas

The significance of 63 dBA Leq,16 hour is also explained in the SoC of GBBCA, BAP Report Appendix 7.1 Noise Report, page 5 (Dec 2013 ES):

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

On page 9 the same report refers to the 63 dB LAeq,16h, contour as representing moderate levels of annoyance.

On the subjective effect of an increase of 6B

The same source (i.e. Appendix 7.1 Noise Report Dec 2013 ES), in Table 2, page 7, indicates that a change of between 3 and 5 dB is of marginal subjective impression whereas one of between 6 and 9 dB is of significant subjective impression.

Appendix 2 of the same source gives a selection of various semantic descriptors that have been used to categorise the impact of changes of 6 dB, or thereabouts, They generally includes terms and phrases such as: moderate increase, significant, high adverse (M74 Junction 5),moderate, significant negative impact.

What, you might ask, does an increase of 6 dB sound like?

In objective terms an increase of 6 dB represents a four-fold (i.e. 400%) increase in sound energy, and would be distinctly noticeable increase in loudness. An increase of 6 dB is what you would get by having four similar noise sources (fans, hairdryers, electric shavers, noisy toys, four people talking at once etc. operating together instead of just such source operating on its own (or you might find a demo of such an increase on the internet).

Another way of experiencing a 6 dB change would be to listen to an outdoor sound source such as a lawnmower in a fairly large garden (well away from sound reflecting walls, fences etc.) A 6 dB change is what you would experience by doubling your distance from the source e.g. from 1m away to 2 m away (or from 2m to 4m etc.).

It should also be remembered that in the case of intermittent bursts of aircraft noise the increase of 6 dB may be due in part to noisier aircraft but also in part due to there being more aircraft within the16 hour daytime period. If this was entirely due to an increase in numbers only, i.e. if there were no change in the average noise levels of aircraft noise (a mix of some noisier and some quieter aircraft, for example.) then a 6 dB change would represent an **four-fold increase** in numbers of aircraft movements in the 16 hour period, i.e. aircraft passing four times more frequently.

Q9. If there is a margin of error for the 57 dB contour presumably there could also be with the 63db contour i.e. could more people be affected than estimated figures?

Yes there will be a similar margin of error (or uncertainty) for all the contours, and so, yes, more people could be affected than the estimated figures.

Q10. What are your thoughts on the merits of INM v ANCON software programmes for the prediction of aircraft noise levels and aircraft noise contours?

Contours produced using ANCON2 (the latest version of ANCON) have been produced by ERCD (a part of CAA) at the three designated London Airports (Heathrow, Gatwick and Stansted) as well by a number of regional airports including Aberdeen, Birmingham, Manchester, Glasgow, Edinburgh and Leeds Bradford Airports (and maybe others that I don't know about).

Contours using INM have been produced by Bickerdike Allen and Partners at GBBCA, Luton, East Midlands, Cardiff, Robin Hood (Doncaster Sheffield), and London City Airports (and maybe others that I don't know about).

ERCD Report 1102 'Aircraft noise model validation - How accurate do' we need to be' states (paragraph 4): 'There are significant similarities between INM and

ANCON version 2 having both been created from the same guidance material produced by ICAO, ECAC and SAE. However, for a given airport and a given set of operations, **it is possible to produce notably different contours, in terms of both size and shape**, from the two models'. The report continues to explain the reasons for differences, but they were not quantified.

Although ANCON may be considered a superior prediction system to INM, and contours produced by ERCD may have greater accuracy, more weight and authority and (maybe?) more independence than those produced by BAP or other private consultant, contours produced by BAP using INM have the advantage of consistency and continuity at GBBCA, provided that the system of third party verification in case of dispute can find general acceptance, and provided also that a satisfactory solution to dealing with the uncertainty question (Q3) can be found. No prediction system can be perfect.

A further point is that if a switch to ANCON were made at GBBCA there would have to be a calibration / comparison exercise, before ANCON could be used as the basis for contour cap verification. I would suggest that this should involve running ANCON predictions for (at least) two of the landmark contour predictions involved in the history of this case, for example either the 2005 +15% or the 2013 predictions, together with the 2025 without SFS contour prediction. This would be enable an 'INM to ANCON' calibration factor to be built into the contour cap limit, to be subsequently determined by the use of ANCON.

If my thinking on this is correct it would follow that a decision to use ANCON2 would require an INM v ANCON2 calibration exercise to be carried out before a final decision on the size of the contour cap (subsequently to be determined annually by ANCON2 predictions) could be made.

Q11. What are your thoughts on debate about whether to use soft or hard ground setting in INMS for noise predictions? What is the significance for figures produced by both settings?

Appendix 2 of the SoC of BIA* presents evidence of an 8.5 to 10% difference in contour areas predicted using the hard ground and soft ground assumptions, with the hard ground setting producing the higher contour areas. *[Appendix 2 Bureau Veritas, Briefing Note to Dan Kennedy, DOENI (handwritten date 1/10/10, handwritten page numbers s 15,16, 17, 18).]

Advice was given to the Examination in Public by Mr Peter Havelock of CAA that the soft ground setting should be used for contour predictions at GBBCA, and we heard at the Inquiry that this has been the case for the last four years.*

The final paragraph of the Bureau Veritas extract queries this advice and suggests that the matter could be resolved with a meeting with Peter Havelock of the CAA. The outcome is unknown.

Although the discussion about hard ground / soft ground could be continued and explored further, in my view the more important point is continuity and consistency of prediction. On that basis I would suggest that the contour cap limit is set on the basis of the published contour size predictions, based on soft ground assumptions, and that therefore future verification predictions should similarly continue to us the soft ground setting.

Questions on Quota Count System

Q12 How would a quota count system, similar to that used by London City Airport and advocated by Mr Taylor on behalf of BIA, marry in with the Control Contour Cap system being put forward by GBBCA?

These are two alternative ways of setting limits on noise from the airport. Although it is possible that together they could give added confidence in the control measures in place, they could potentially produce a conflicting decision. In this case of course there must be a way of proceeding, for example by giving priority to one system.

Q13 Could/should the two systems be used in tandem or is QC really be a stand-alone control mechanism i.e. would marrying the two controls make it complicated to monitor or control?

Both systems can act as stand-alone control mechanisms. The advantage of the quota count system is that it is 'where we are starting from' – it is the system in place. I have already indicated the advantages of quota count systems in reply to your earlier set of questions (question 1). Other factors to consider are that:

1 Even if a quota system were to replace a contour area cap a contour prediction system would still be needed for example to indicate numbers of properties and people exposed to certain levels of noise, and to monitor the trends in these numbers year on year.

2 BAP, who currently predict contours at BCCA using INM also operate the quota system at LCA.

An advantage of running both systems together is that it would provide some continuity if for example a new version of INM were to produce step changes in the predicted contour area, or if a change in personnel or company producing the INM contours were to choose different parameter options as part of the prediction process.

If it was decided to go for a quota system at GBBCA it would take time to set up and calibrate relative to contour area, and maybe it would be necessary to run both systems together for a number of years anyway.

Q14 If QC was used as a back-up system, what would it be protecting against? Presumably against the proposed control cap being exceeded?

Yes, but only if the quota count was within the set limit and the contour area cap limit was exceeded. .

Q15 Quota controls are used at Heathrow, Gatwick and Stansted but only for night time flights. Only London City seems to using such a system in the daytime. Does London City also have a control contour of the type being suggested for GBBCA? Does LCA have a set control contour cap?

LCA does not have a contour cap system, but it does use annual contours (produced by BAP using INM) for the purpose of determining which properties are eligible for sound insulation. In addition strategic noise contours are also produced every five years for the purpose of meeting END (noise mapping) requirements.

Q16 Would a quota count system be more likely to maintain the present mix of turbo prop and jet planes at GBBCA in the future whereas the 7.5km^2 contour proposed by GBBCA is prefaced on the assumption that there would be a much higher proportion of jets in the future and a greater volume of flights (i.e. up to the 48,000 ATM limit).

Both systems, predicted contour area and a quota type system, should respond appropriately to possible changes of fleet mix, i.e. to the introduction of quieter, or noisier, aircraft. The INM software will include a noise emission database which will almost certainly include any new types of aircraft likely to be introduced into the fleet (or, if not provide guidance for a suitable substitute). The Quota count system used at Heathrow and Gatwick uses QC values for each aircraft type based on noise certification sound level measurements, and the quota type system used at LCA is based on noise measurement from the airports own noise monitoring system. Therefore all these alternative systems should respond to change of aircraft types in the fleet mix based on noise emission data of one type or another.

Q17 Can you give us an illustration of how QC would work?

Having decided on a contour control cap area (let us say the proposed 7.5 km^2 the next stage is to request GBCCA to use INM to make predictions for various fleet mix options (as many as they wish, but not exceeding the total aircraft movements limit) which equate to a contour area of 7.5 km^2, and for each such fleet mix convert to a corresponding quota count.

GBCCA then present the fleet mix which produces the highest quota count as their chosen quota count, which satisfies the 7.5 km^2 contour area. At this stage you may wish to submit the GBBCA predictions to independent third party verification.

The subsequent verification of compliance process, each year is by means of the quota count (and not by the contour area predictions).

This system uses INM modelling for determining the quota count limit, but not for subsequent verifications.