

Mr Gavin Derrick
Southampton City Council
Civic Centre,
Southampton,
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By email

Date: 10th November 2020
Reference: R8824-1 Rev 0

Dear Gavin

**RE: Proposed Runway Extension, Southampton International Airport
Peer Review of (Further) Amended Noise Impact Assessment**

Thank you for your recent instruction. I am pleased to provide our further peer review of the updated noise impact assessment relating to the proposed runway extension at Southampton International Airport (Eastleigh Borough Council planning application Reference F/19/86707) below.

1.0 INTRODUCTION AND BACKGROUND

- 1.1 The application is for the construction of a 164-metre runway extension at the northern end of the existing runway, associated blast screen to the north of the proposed runway extension, removal of existing bund and the reconfiguration and extension of existing long stay car parking to the east and west of Mitchell Way to provide an additional 600 spaces.
- 1.2 An Environmental Impact Assessment has been undertaken by Savills and WSP. Chapter 11 and associated appendices of the Environmental Statement (ES) relate to noise impact (undertaken by WSP). An addendum has been provided following consultation with Eastleigh Borough Council and other stakeholders.
- 1.3 This is the third report produced by 24 Acoustics Ltd for Southampton City Council on the subject. Our initial report (Reference R8315-1 Rev 0 dated 6 January 2020) commented on the original noise impact assessment (noise chapter of the Environmental Statement) and concluded the following (wording taken directly from our previous report):

- *Aircraft usually take off and land into the wind to maximise lift. The prevailing wind in this part of the country is south-westerly meaning the majority of departures will occur over Southampton and the majority of approaches over Eastleigh. The ES states that this split was 76/24 in 2016 (meaning that the majority of departures occurred over Southampton and approaches over Eastleigh). For reasons unknown, however, a split of 64/36 has been used for the future scenarios. This will have the effect of underestimating the noise impact over Southampton and should be clarified by the Airport/ WSP.*
- *The proposals will accommodate a 36% growth in aircraft movements between 2016 and 2037. They will also accommodate a change in aircraft type which is currently dominated by the DHC800 to the B737/A319/A320 which are estimated to represent 40% of all movements by 2037¹.*
- *Aircraft noise levels have been expressed as 16 hour L_{eq} levels during an average Summer day. It should be noted that humans do not integrate (average) noise levels over 16 hours and the 'real world' noise impact may relate to the maximum noise level associated with each aircraft movement together with the number of daily events. It would be helpful if contours showing the number of events exceeding (for example) 65 and 70 dB $L_{A_{Max,S}}$ (N65 and N70) could be provided. In practice the noise level associated with a regional jet arrival may be slightly lower than that from a turbo-prop aircraft which may be of some benefit to residents living under the approach path in Southampton (such as those in Bitterne Park). Departure noise levels, however, are significantly greater.*
- *24 Acoustics does not agree with WSP's determination of the noise levels that relate to LOAEL and SOAEL for aircraft movements. Levels reported in the AECOM/ Defra publication are lower. In addition, the Airport's NAP defines a lower level for LOAEL. As a result it is our opinion that the ES has significantly under-estimated the full extent of the likely noise impact. Regardless, the noise predictions do not indicate that there will be an unacceptable adverse impact and, in planning terms, this means that the noise impact may be acceptable if mitigated to a minimum. It is our opinion, however, that the mitigation offered (particularly for noise impact between LOAEL and SOAEL) is inadequate.*
- *The Airport has offered to provide sound insulation to receptors which fall at/above (their definition of) SOAEL and to continue with the existing mitigation defined in their Noise Action Plan for receptors with a noise impact between LOAEL and SOAEL. The limitations of sound insulation cannot be over-stated. They will benefit internal areas at receptors providing residents keep windows closed (which may lead to ventilation and overheating issues). They will clearly be of no benefit to external amenity areas. Therefore, the provision of sound insulation to properties should be considered only as a last resort.*
- *It is considered that the Airport's Noise Preferred Routes, whilst potentially suitable for the existing operations, may not go far enough for the new proposals. It is considered that the Airport should be asked to consider new noise abatement procedures/ routes to reduce the number of households affected by the proposals.*

¹ These figures have now changed as a result of the latest application and the proposal to limit movements to 3 mppa.

- 1.4 WSP addressed many of these points in their updated ES chapter. Our second report (dated 12th August 2020) reviewed this and concluded:
- *We previously questioned the modal split which has been used for the assessment years (2021 and 2037) as this differs from the split used in the 2016 baseline year. The updated ES has advised that the split for the future years has been based upon the average data over the past 3 years. We believe that this data may relate to the entire year rather than the Summer months and will have had the effect of underestimating the noise impact over Southampton. Southampton City Council should make enquiries to ensure that the modal split used for the future years is representative of the Summer period.*
 - *The revised ES has reduced the LOAEL from 54 dB $L_{Aeq, 16 \text{ hour}}$ to 51 dB $L_{Aeq, 16 \text{ hour}}$. This is now commensurate with the airport's own Noise Action Plan and 24 Acoustics concurs with this value. The SOAEL remains at 63 dB $L_{Aeq, 16 \text{ hour}}$. Whilst there is evidence to suggest that this could be lower there is currently little precedence to support this.*
 - *The updated ES has re-emphasised the airport's commitment to provide sound insulation to receptors which fall at/above the SOAEL and to continue with the existing mitigation defined in their Noise Action Plan for receptors with a noise impact between LOAEL and SOAEL. Again, we emphasise that the limitations of sound insulation cannot be over-stated. They will benefit internal areas at receptors providing residents keep windows closed (which may lead to ventilation and overheating issues) and will be of no benefit to external amenity areas. Therefore, the provision of sound insulation to properties should be considered only as a last resort.*
 - *It is understood that arrival and departure procedures cannot be altered at the current time as they will fall under an air change proposal which will occur sometime 'in the 2020s'. This is most regrettable as it is considered that changes such as alterations to noise preferred routes, approach glide angles etc. could result in significant reductions in noise impact to Southampton receptors. The airport should be strongly encouraged to consider any changes which are feasible now outside of the ACP process. One such change, which would be beneficial to Southampton receptors, would be to prevent aircraft from turning (from runway/ 217 degree heading on take off from runway 20) until over Southampton Water. This is a minor change from the current procedure (which allows a turn earlier at an altitude not less than 2000 feet) and would significantly reduce the amount of aircraft movements directly over large parts of the residential areas of the city.*
 - *The updated ES has introduced a night-time noise assessment relating to flight operations during the shoulder hour between 06:00 and 07:00 hours (Monday to Saturday). It is appreciated that this is difficult to assess objectively, however, the assessment methodology is considered flawed and, depending upon the likely number of flights it appears that there is significant risk of sleep disturbance on departures over Southampton (on runway 20) to some residents. On balance, however, the ES has not quantified the baseline position and it may be that a similar level of impact already occurs. The sound insulation scheme should be extended to residents experiencing noise levels at this period which could cause sleep disturbance and suitable robust eligibility criteria should be drawn up.*
 - *In summary it is clear that the aircraft operations associated with the proposed runway expansion will cause an adverse/ significant adverse noise impact at some Southampton receptors. The Planning Practice Guidance, however, is clear in that this is not unacceptable providing measures are taken to reduce the impact to a*

minimum. It is our opinion that the mitigation described in the ES is insufficient. We recommend the following further measures:

- *Alterations to departure and approach procedures, where feasible within the constraints of the ACP process;*
- *Further detail on the sound insulation proposals to include measures to provide ventilation and prevent overheating so that affected residents need not open their windows for any reason. Further eligibility assessment criteria for sound insulation to include receptors which are at high risk of excessive noise from flights within the shoulder period between 06:00 and 07:00 hours.*

1.4 In response to feedback from Eastleigh Borough Council Southampton International Airport now propose a 3 mppa passenger cap with an associated noise contour limit (based upon geographical area) which applies based upon this cap. WSP (acting on behalf of Southampton International Airport) has also introduced the use of the N65 metric to further assess noise impact. Southampton International Airport consider that they would reach the 3 mppa cap by the 2033 and therefore the assessment is now presented for this year.

2.0 SCOPE OF PEER REVIEW

2.1 The scope of our peer review is unchanged from our work undertaken in January and August of this year. It relates to noise impact that may affect receptors within the city of Southampton.

2.2 Noise from groundborne operations and construction noise impacts are considered highly unlikely to affect Southampton receptors and therefore have not been considered. In addition, the construction and the operation of the proposed car park should not affect receptors in Southampton and have also not been considered.

2.3 This peer review therefore relates to noise from aircraft departures on runway 20 and arrivals on runway 02 only (relating to aircraft arrivals and departures over Southampton).

3.0 REVIEW OF UPDATED NOISE IMPACT ASSESSMENT

3.1 We comment on WSP's updates which specifically relate to the points raised by 24 Acoustics Ltd in either our first or second review (in italics) below.

Effect of Modal Split on Acoustic Modelling

3.2 The modal split relates to the ratio of departures/ landings in a particular direction. It is presented as Runway 20/ Runway 02 (departures over Southampton and approaches over Eastleigh/ departures over Eastleigh and approaches over Southampton). It is an important parameter as the use of an incorrect or inappropriate modal split may under or over-estimate the noise impact on receptors. It is considered particularly important in terms of the noise impact relating to departures on runway 20 (over Southampton).

3.3 **24A:** *We previously questioned the modal split which has been used for the assessment years (2021 and 2037) as this differs from the split used in the 2016 baseline year. The updated ES has advised that the split for the future years has been based upon the average data over the past 3 years. We believe that this data may relate to the entire year rather than the Summer months and will have had the effect of underestimating the noise impact over Southampton. Southampton City Council should make enquiries to ensure that the modal split used for the future years is representative of the Summer period.*

- 3.4 It is noteworthy that Paragraph 11.2.87 of revision 1 of the ES described a 2016 (baseline) runway split of 76/24 for runways 20 and 02 respectively. This was described as actual data for the Summer 2016 period. Table 1 of the WSP Technical note supporting the further updated ES describes the modal split for this period as 72/27. This split cannot be correct as the two values should total 100 and regardless this inconsistency casts doubt on the accuracy of the split used in the 3 mppa assessment.
- 3.5 The 3 mppa assessment is taken as the average of the summer modal splits between 2015 and 2019 resulting in a split of 72/28. It should be further noted that a split of 64/36 was used in the previous assessment. This highlights that the previous assessment was incorrect and will have under estimated the noise impact for departures occurring on Runway 20 (over Southampton). This is not a trivial difference and again given the inconsistencies identified above Southampton City Council/ Eastleigh Borough Council should satisfy themselves that the modal split used in this latest assessment is appropriate.

Use of N65/N70 dB Metrics to Assess Noise Impact

- 3.6 N65 or N70 are the number of aircraft movement events (in an average Summer day) in which the noise level exceeds a noise level of 65 dB $L_{Amax,s}$ or 70 dB $L_{Amax,s}$.
- 3.7 **24A:** *Aircraft noise levels have been expressed as 16 hour L_{eq} levels during an average Summer day. It should be noted that humans do not integrate (average) noise levels over 16 hours and the 'real world' noise impact may relate to the maximum noise level associated with each aircraft movement together with the number of daily events. It would be helpful if contours showing the number of events exceeding (for example) 65 and 70 dB $L_{Amax,s}$ (N65 and N70) could be provided. In practice the noise level associated with a regional jet arrival may be slightly lower than that from a turbo-prop aircraft which may be of some benefit to residents living under the approach path in Southampton (such as those in Bitterne Park). Departure noise levels, however, are significantly greater.*
- 3.8 **WSP:** The further updated ES has included the use of N65. This indicates the following:
- There will be no change in the number of households experiencing 100 or more events per day with noise levels of 65 dB $L_{Amax,s}$ (or more) between the baseline year and assessment year (2016 vs 2033);
 - There would be approximately 6,650 fewer households experiencing between 50 and 100 events per day generating a noise level of 65 dB $L_{Amax,s}$ or more;
 - There will be approximately 10,700 more households experiencing between 20 and 50 events per day generating a noise level of 65 dB $L_{Amax,s}$ or more.
- 3.8 The significance of the above figures is difficult to determine. It is, however, indicative of the fact that in 2033 the noise level associated with each individual movement will be greater than in 2016.

Definition of LOAEL & SOAEL

- 3.10 As previously advised, LOAEL (Lowest Observed Adverse Effects Level) and SOAEL (Significant Observed Adverse Effects Level) are not defined objectively in planning policy/guidance and therefore a degree of interpretation is required in order to adequately define. This was challenged in our review of the original ES. We did not originally agree with WSP's determination of the noise levels that relate to LOAEL and SOAEL for aircraft movements. In particular, the Airport's Noise Action Plan defined a lower level for LOAEL than that used in the original ES. As a result of this in the first revision to the ES used a reduced noise level for LOAEL (of 51 dB $L_{Aeq, 16 \text{ hour}}$) which we agreed was appropriate.

- 3.11 *WSP has continued to define SOAEL for aviation noise at 63 dB L_{Aeq, 16 hour}. As advised previously, there is evidence to suggest that this could be lower but there is currently little precedence to support this. It is noteworthy that it is receptors with noise impact falling at, or above, SOAEL that are to be offered sound insulation.*

Provision of Sound Insulation

- 3.12 **24A:** *The updated ES has re-emphasised the airport's commitment to provide sound insulation to receptors which fall at/above the SOAEL and to continue with the existing mitigation defined in their Noise Action Plan for receptors with a noise impact between LOAEL and SOAEL. Again, we emphasise that the limitations of sound insulation cannot be over-stated. They will benefit internal areas at receptors providing residents keep windows closed (which may lead to ventilation and overheating issues) and will be of no benefit to external amenity areas. Therefore, the provision of sound insulation to properties should be considered only as a last resort.*
- 3.13 In August 2020 we further stressed that whilst the provision of sound insulation to receptors is of value it will only protect the interior of properties, allowing certain activities such as sleeping not to be impeded. Private gardens and other external amenity areas will therefore be subject to noise impact at or above the SOAEL (defined as 63 dB L_{Aeq, 16 hour} as stated above) as a result. As advised previously, Heathrow Airport currently offer 'full costs' for sound insulation to residents in the 60 dB L_{Aeq, 16 hour} noise contour. Any sound insulation measures that are provided should also include alternative means of ventilation and measures to prevent overheating so that properties may be occupied at all times with no requirement to open windows or doors.
- 3.14 It is worth registering that the latest updates do not re-consider sound insulation proposals. Mitigation is offered, inter-alia, however, through the 3 mppa cap and associated physical noise contour limit.

Consideration of Noise Preferred Routes

- 3.15 **24A:** *It is considered that the Airport's Noise Preferred Routes, whilst potentially suitable for the existing operations, may not go far enough for the new proposals. It is considered that the Airport should be asked to consider new noise abatement procedures/ routes to reduce the number of households affected by the proposals. (24 Acoustics- January 2000)*
- 3.16 **24A:** *It is understood that arrival and departure procedures cannot be altered at the current time as they will fall under an air change proposal which will occur sometime 'in the 2020s'. This is most regrettable as it is considered that changes such as alterations to noise preferred routes, approach glide angles etc. could result in significant reductions in noise impact to Southampton receptors. The airport should be strongly encouraged to consider any changes which are feasible now outside of the ACP process. One such change, which would be beneficial to Southampton receptors, would be to prevent aircraft from turning (from runway/ 217 degree heading on take off from runway 20) until over Southampton Water. This is a minor change from the current procedure (which allows a turn earlier at an altitude not less than 2000 feet) and would significantly reduce the amount of aircraft movements directly over large parts of the residential areas of the city. (24 Acoustics August 2000).*
- 3.17 The latest updates do not comment on arrival and departure procedures/ routes and therefore we assume that WSP/ Southampton International Airport's position regarding this remains unchanged.

3.18 Whilst we accept that such changes may be subject to the ACP process (and thus out of the Airport’s control) we are of the opinion that changes to departure routes from runway 20 (over Southampton) could result in a significant reduction in noise impact on Southampton receptors. This was highlighted to me personally as a passenger on Friday 6th November 2020 on a Loganair Embraer ERJ135 flight from Southampton to Newcastle. I observed a steep climb and then right turn shortly after takeoff, the rate of climb then lessened and we flew over the densely populated areas of Swaythling, Portswood, Highfield, just south of Southampton Common (which is a SSSI), Shirley, Milbrook, Lordswood and Nursling. The departure track is shown below (taken from Flight Radar 24).

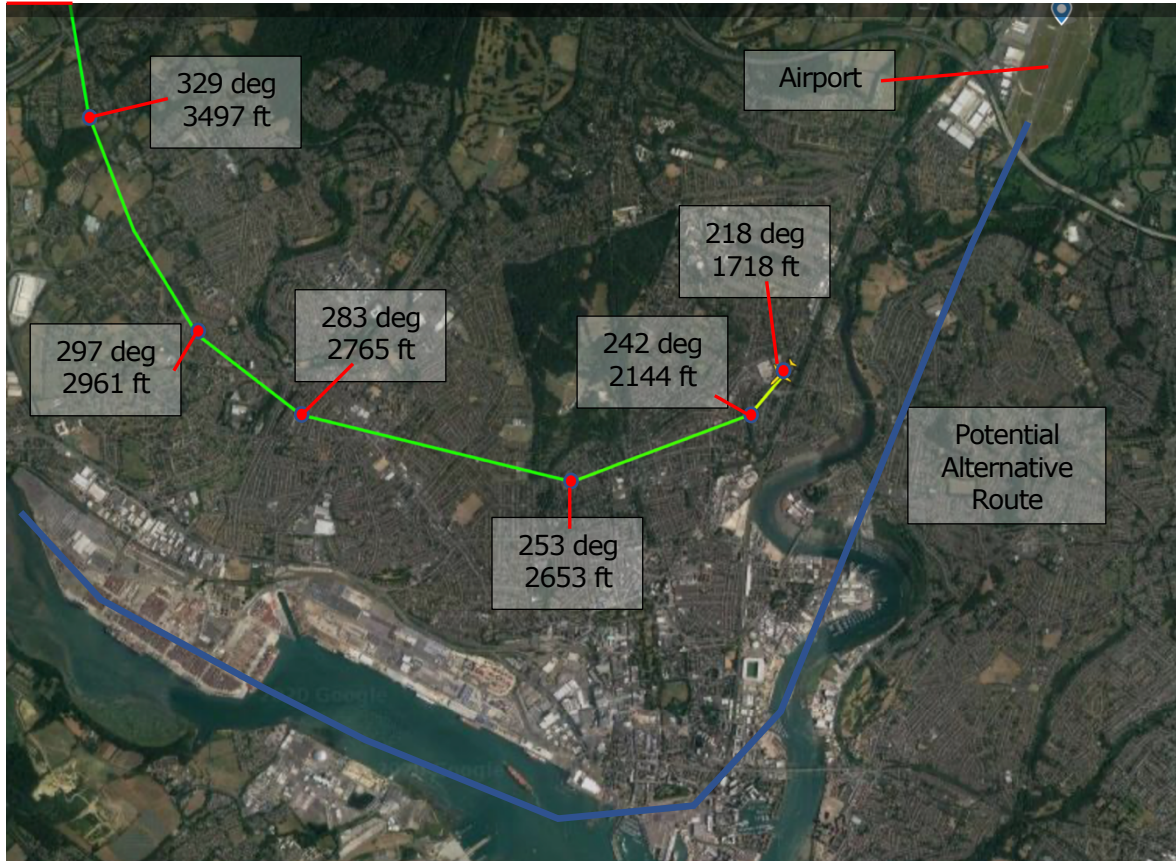


Figure 1: Departure Track of Loganair Flight LM540 on 6 November 2020 (Flight Radar 24) and potential alternative departure route

3.19 After landing at Newcastle I briefly spoke to the pilots. They explained that with only 6 passengers on board they experienced significantly more lift than normal (and hence potentially turned over the city earlier than normal). Regardless when I explained my understanding of Southampton Airport’s noise abatement procedure to them (which requires aircraft to turn to a heading of 217 degrees at 500 feet and then permits them to turn at an altitude of 2,000 feet or at Southampton Water (whichever comes first)) they were surprised and not aware of the option to turn over Southampton Water. Indeed, they showed me their operating procedure which shows that they should turn at 2,000 feet (with no mention of Southampton Water). They further explained that an early turn is actively encouraged by air traffic control. In fairness to Loganair it is possible that the climb rate of the Embraer ERJ135 may be such that they would always reach an altitude of 2000 ft long before reaching Southampton Water and hence the option to turn over Southampton Water is irrelevant.

3.20 Whilst it is appreciated and understood that any significant changes to the departure procedure needs to be subject to the ACP process, it is considered that the current proposals do route (higher powered) jet engine aircraft directly over highly populated areas of the city. It is considered that a departure procedure close to the runway heading followed by a turn at Southampton Water/ the docks (as indicated in Figure 1 above in blue) would significantly reduce noise impact over the city. It is considered establishing if such a route would be operationally possible and, if so, it would be worthwhile quantifying the improvement that this would make (by noise modelling) and if it is considered sufficiently significant it is strongly recommended that Southampton City Council/ Eastleigh Borough Council take steps to ensure that these views are represented during the ACP process.

4.0 SUMMARY

4.1 Southampton International Airport/ WSP have made further changes to the noise impact relating to the proposed extension of the runway on the basis of an assumed limit in passenger numbers of 3 mppa. A daytime summer noise contour restriction based upon this number of movements is also proposed. No further mitigation has been offered or considered. In complying with the area contour restriction, however, it will be necessary to consider mitigation as aircraft numbers grow. The assessment has also been updated to show the change in the number of properties that will be subject to an aircraft noise event at or exceeding 65 dB $L_{Amax,f}$.

4.2 The runway modal split upon which the updated assessment has been based still appears to be muddled and potentially incorrect. WSP should be asked to clarify this and update it if necessary.

4.3 Whilst the level of impact is reduced compared to the previous assessment (as a result of the reduction in the assumed number of passenger movements), concerns relating to the severity of the noise impact on the city of Southampton remain. The spirit of current national planning policy is that an adverse or potentially significantly adverse noise impact may be acceptable providing it is mitigated to a minimum. The updated assessment indicates that in excess of 10,000 new properties (an increase of approximately one third) will be introduced to between 20 and 50 aircraft events per day generating a noise level at, or in excess of, 65 dB $L_{Amax,s}$ in 2033 compared to the baseline year in 2016. It is arguable whether the proposed mitigation is adequate to address this increased impact.

4.4 It is appreciated that changes to departure routes/ noise abatement procedures over the city of Southampton need to be determined on a national basis as part of the ACP process. However, it is the author's opinion that the current procedures needlessly cause an excessive noise impact over densely populated areas of the city and that noise impact could be substantially reduced by a number of relatively simple route changes. The benefit of this could be quantified by noise modelling. If justified, it would then be strongly recommended that representatives from Southampton City Council and Eastleigh Borough Council ensure that their voices are adequately heard during the ACP process to facilitate these changes, if feasible.

I trust you will find the above to your satisfaction. Should you have any further queries please do not hesitate to contact me.

Yours sincerely,
For 24 Acoustics Ltd



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