

EXPERT REVIEW BA, November 2024

1. Assignment

lenW requests an additional (expert) review of the results of the Balanced Approach study Schiphol Airport (hereafter: BA). The purpose of the review is to check whether the results are logical and replicable, both for the individual measures and for the combined package of measures, including an overall capacity reduction.

It concerns the following individual measures and package of measures:

Individual measures	Package of measures
1. Use of quieter aircraft during the night-time period	Combination of measures 1 to 5, incl. an overall capacity reduction.
2. Stimulate the use of quieter aircraft through airport charges	
3. Additional fleet renewal	
4. Exclude aircraft with a cumulative margin lower than 13 EPNdB during the night-time period	
5. Cap the number of movements during the night-time period to 27,000 movements	

2. Approach

The following approach was used for the review:

- Based on the description of the measures in the draft report, including the number of movements and aircraft types affected by the measure, an expert estimate of the expected effect per measure was made in advance.
- Whether the expected effects on the traffic situation are reflected in the traffics underlying the noise calculations within the framework of the BA and, if applicable, whether differences can be explained and are correct, were checked.
- It was tested whether the effects on the Lden and Lnight noise exposure correspond to the expected effects per measure, whether the effects align with the changes in the traffics underlying the noise calculations and, if applicable, whether differences are explainable and correct.

The measures were first considered individually, then in conjunction.

3. Expected impact per measure

This section describes the expected effects per measure based on an expert estimate.

Individual measures	Expected effect
1. Use of quieter aircraft during the night-time period (M1)	<ul style="list-style-type: none">• The impact of this measure is twofold:<ul style="list-style-type: none">◦ Deployment of quieter types at night vs noisier types during the day;◦ Noisy ICA flights at night are substituted with quiet EUR flights during the day.• Since it is only a time and type swap for landings, an effect should only be visible for landings.

Individual measures	Expected effect
	<ul style="list-style-type: none"> • The impact is expected to be significant because a) it involves a large number of movements and b) it involves heavy aircraft. • Expected effect on noise exposure: <ul style="list-style-type: none"> ◦ Concerns 16% of heavy movements at night & heavies are dominant for L_{night} noise exposure (48% of landings); however, for some noisy aircraft at night there is no change expected decrease in the order of 0.5 dB(A) L_{night} for landings. ◦ Number of effective landings (number of movements incl. night penalty factor) for the 24-hour period by heavies decreases by 10%; heavies are approx. 20% of total traffic -> expected decrease is for L_{den}, which is an order of magnitude of approximately 0.2 dB(A) for landings (around primary runways). No effect for take-offs and effect for sec. runways is nil.
2. Stimulate use of quieter aircraft through airport charges (M2)	<ul style="list-style-type: none"> • It affects about 2.5% of the total fleet, mainly the more noisy types in the fleet. • The impact should be reflected in traffics and noise contours for both take-offs and landings. • The measure has a greater impact on heavies (5.3% of movements) than on mediums (1.9% of movements). • The expected decrease in noise is max. 0.2 dB(A), based on a limited number of movements and the assumption that it is more or less evenly distributed over the 24-hour period.
3. Additional fleet renewal (M3)	<ul style="list-style-type: none"> • Effect should be visible in traffics only for KLM and TRA, both for take-offs and landings. • Expected effect on noise exposure: <ul style="list-style-type: none"> ◦ A more significant effect for L_{night}, especially take-offs, due to relatively large share of TRA flights. ◦ Order of magnitude effect for L_{den}: decrease to 0.4 dB(A), not proportionally distributed. ◦ The decrease in L_{night} may be somewhat more significant.
4. Exclude aircraft with a cumulative margin lower than 13 EPNdB during the night-time period (M4)	<ul style="list-style-type: none"> • Measure affects a small number of movements. • Decrease in noise at night due to swapping B744s with B738, for both take-offs and landings. • The effect for landings will be smaller than for take-offs due to the smaller share of B744 in the number of landings (estimate: << 0.2 dB(A)). • Additional effect on daytime noise exposure is limited: effect due to change in take-off weight for A332, A333 and B747 (estimate: <0.1 dB(A)) and (limited) increase of B747s during the day due to swapping with B738 at night.
5. Cap the number of movements during the night-time period to 27,000 movements	<ul style="list-style-type: none"> • Decrease from 32k to 27k corresponds to a decrease of over 15% in the number of movements. With a proportional effect, this leads to a decrease of 0.7 dB(A) for L_{night}. • Largely, a proportional effect is expected; however, for KLM and TUI, there is no decrease in the number of ICA flights at night. • As the ICA flights of KLM and TUI at night involve landings, the effect for take-offs will be more significant (greater than 0.7 dB(A)) than for landings (less than 0.7 dB(A)). • Effects should be visible for both take-offs and landings. • As the reduction has been assumed mainly at the margins of the night, the effect on the use of Aalsmeerbaan

	<p>runway (used more often between 6:00 and 7:00) may be somewhat more significant.</p> <ul style="list-style-type: none"> • Effects for Lden should be a logical carry-over of the effects for Lnight; after all, in the D and E periods the change is minimal (only an increase by 5,000 flights going from N -> D/E ~ 0.03 dB(A)). The carry-over effect from Lnight will obviously be greater -> decrease in Lden everywhere/almost everywhere, especially around the primary runways.
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4. Assessment of the effects on the traffic situation and noise exposure

This section describes whether the visible changes in the traffic situations and the Lden and Lnight noise exposure correspond to the expected effects and, if applicable, whether the differences between them are explainable and correct.

Measure 1

- The measure is reflected in the traffic as expected.
- The expected effects are visible in Lden and Lnight contours.

Measure 2

- The measure is reflected in the traffic as expected.
- A somewhat unexpected effect occurs in noise exposure: a limited increase in noise exposure is visible for landings at the Polderbaan and Kaagbaan runways, especially at night.
 - The effect is possibly due to replacing existing aircraft with new heavier aircraft, as a result of a change in aircraft types for a number of landings at night:
 - A333 - A339 and A359 (217 movements);
 - B763 - B788 (232 movements);
 - B77W - A388 (3 movements);
 - B738 - B38M (181 movements)
- This may provide a plausible explanation for the (limited) increase.
- The decrease in noise exposure for take-offs is as expected.

Measure 3

- The measure is reflected in the traffic as expected.
 - Initially, an 'unexpected' effect was visible: the total number of movements for the individual measure deviates from other scenarios.
 - However, this turned out to be correct and the result of the method of modelling the fleet's autonomous development. The numbers of movements in the traffics for the reference and other measures are scaled for the expected autonomous fleet development. For KLM and TRA, the effect of this individual measure has been eliminated in the number of movements and replaced by the expected fleet development for KLM and TRA.
 - This is found to be correctly implemented in the traffics.
- The noise effect of the measure corresponds to expectations based on traffics.

Measure 4

- The measure is reflected in the traffic as expected.
- The effect on noise exposure for night take-offs is somewhat more significant than initially expected but is in line with the change in traffic. The effect is more significant

than expected due to a relatively higher proportion of B747s being swapped out for B738s than initially estimated. The effect is in line with the measure.

- The other effects for Lnight noise exposure and the carry-over effects to Lden noise exposure align with expectations.

Measure 5

- The measure is reflected in the traffic as expected.
- The expected effects are indeed visible in Lnight contours: the effect for take-offs is somewhat more significant than for landings, and the effect near the Aalsmeerbaan runway is indeed more pronounced than at other locations.
- The effects on Lden noise exposure are also a logical extension of the effects on Lnight noise exposure: mostly decreases in noise, effects mainly around primary runways, no unexpected effects.

Package of measures

- The total effect of the combination of measures (measures 1 to 5) on Lden and Lnight noise exposure is a true 'sum' of the effects of the individual measures.
- The effect of scaling down the volume on traffics is correctly incorporated (only the number of movements during the day and evening decreases when scaling down from 500k to a lower annual volume; the night volume remains at 27k). The impact of an (annual) volume restriction has been processed based on an overall scaling down (except for the night-time period). The number of movements decreases proportionally; no account of a possible shift in runway use has been taken when the number of movements decreases.
- The effect of scaling down the volume on Lden noise exposure is in line with what is expected based on volume reduction; there is no effect on Lnight noise exposure due to keeping the night volume fixed at 27k.

5. Assessment of the effects on houses exposed to noise nuisance, people experiencing nuisance and sleep disturbance

The BA study results in the calculated effect of (the package of) measures on the numbers of houses exposed to noise nuisance, (Lden and Lnight), people experiencing severe nuisance and severe sleep disturbance.

These results were also considered as part of the review. These calculated effects of the individual measures and the package of measures were found to align with the calculated effects on noise exposure.

For the interpretation of the calculated effects, the following is also noted. Depending on the measure, there are variations in:

- a. the scale of the impact,
- b. the location where the measure (mainly) affects noise exposure, as the measures have a different effect on take-offs/landings and per runway,
- c. the period the measure has an impact on, and therefore the impact on the Lden and Lnight noise exposure.

A comparison of the impact of the individual measures shows, therefore, for measures 1 and 2, that the decrease in Lden effects is of the same order of magnitude, but the decrease in Lnight effects is different. Similarly, measures 3 and 5 produce a similar decrease in the number of severely affected people, but measure 5 produces a greater

decrease in the number of houses exposed to noise nuisance. The differences in the calculated impact of the measures can be explained based on the calculated effects of the measures on noise exposure.

Comparison of the decrease in the number of houses exposed to noise nuisance and severely affected people Lden

In addition to the review, IenW asked for further consideration for (the difference in) the decrease in the number of severely affected people within the 48 Lden contour compared to the decrease in the number of houses exposed to noise nuisance within the 58 Lden contour as a result of the BA package of measures.

The analysis of this provides the following picture:

- Approx. 24% of the houses within the 58 Lden contour in the BA baseline situation are on the edge of the noise-exposed area, with a noise exposure between 58 and 59 Lden. This means that if noise exposure were to decrease by 1 dB(A) Lden, the number of houses within the 58 Lden contour would decrease by approx. 24%. Approx. 75% of these houses lie in the direct area of influence of a non-preferred runway. This concerns houses in Aalsmeer, Zwanenburg, Amstelveen, Buitenveldert and Uithoorn, among others. Therefore, the most effective way to reduce the number of houses exposed to noise nuisance is to reduce noise exposure at these locations.
- Regarding the number of severely affected people within the 48 Lden contour of the baseline situation, 19% of these have a noise exposure between 48 and 49 Lden. If the noise exposure levels were to decrease by 1 dB(A) Lden, the number of people severely affected within the 48 Lden contour decreases by approx. 26% - 27%: this concerns the 19% of the number of people severely affected with a noise exposure level between 48 and 49 Lden plus a decrease in the number of people severely affected in the area with more than 49 Lden because fewer people in this area will experience severe nuisance due to the decreasing noise exposure levels (statistically, fewer people suffer severe nuisance if the noise exposure levels are lower). The effect on the number of people severely affected, more than that for the number of houses within the 58 Lden contour, is due to a decrease in noise exposure at both preferential and non-preferential runways.
- Based on the above, it follows:
 - If the total noise exposure were to decrease by 1 dB(A), the decrease in the number of people severely affected within the 48 dB(A) Lden contour will be greater than the decrease in the number of houses exposed to noise nuisance within the 58 dB(A) Lden contour.
 - A decrease in noise exposure at the preferred runways will have a greater effect on the number of seriously affected people within the 48 dB(A) Lden contour than on the number of houses within the 58 dB(A) Lden contour, and vice versa for the non-preferred runways.
- The impact of the BA package of measures is reflected throughout the surrounding area but is most significant for the preferential runways. The package of measures, therefore, has a greater effect on the number of people suffering severe nuisance within the 48 Lden contour than on the number of houses within the 58 Lden contour.

6. Conclusion

The review did not reveal any unexplained or incorrect effects in the overall noise modelling and calculations underlying the BA.

Based on the review conducted, two areas of concern follow:

- Measure 2 (Stimulate use of quieter aircraft through airport charges) somewhat unexpectedly increases noise exposure levels for landings (to a limited extent). A plausible explanation could be that this is due to a heavier fleet as a result of the measure. However, the decrease in noise exposure levels for take-offs is in line with expectations. It is recommended to check whether the calculated effect is indeed the result of replacing existing aircraft with new heavier aircraft and thus correctly determined.
- The scaling down of the annual volume does not take into account a possible shift in runway use due to fewer movements. This (possible) effect on runway use may increase the effect of a restriction of the annual volume on the number of houses and people suffering severe nuisance within the noise contours. It is recommended to clearly state that this effect may occur.

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