

## Appendix 7.4.7 Predicted Noise Levels at Noise Sensitive Receivers from Aircraft Taxiing

### The Worst Operation Mode (Year 2030)

Based on the operational data / assumptions described above, the INM model was used to compute the A-weighted equivalent continuous noise level ( $L_{Aeq,30 \text{ mins}}$  (dBA)) for the worst 30 mins. periods during day & evening and night time periods at NSRs for Year 2030 due to the aircraft taxiing operations. The monthly averaged meteorological data for Year 2011 is adopted and the ground topography has been incorporated in the INM model. **Tables 1a & b** show the unmitigated ground noise levels associated with the aircraft taxiing operations (in  $L_{Aeq, 30 \text{ mins}}$ ) under the worst 30 mins. period during day & evening and night time periods, respectively, at the representative NSRs.

Table 1a: Planned Ground Noise Levels in Year 2030 (Unmitigated)

| Time Period                   | *Predicted $L_{Aeq, 30 \text{ mins}}$ at NSRs (dBA) |      |      |      |      |      |      |       |       |       |      |      |        |        |        |
|-------------------------------|---|------|------|------|------|------|------|-------|-------|-------|------|------|--------|--------|--------|
|                               | TC-1  | TC-2 | TC-3 | TC-4 | TC-5 | TC-6 | TC-7 | TC-11 | TC-16 | TC-46 | TS-1 | TS-2 | SLW -1 | SLW -2 | SLW -3 |
| Day & Evening<br>1700-1730    | 35  | 32   | 33   | 35   | 36   | 36   | 33   | 33    | 34    | 35    | 40   | 40   | 43     | 41     | 40     |
| *Noise Criteria (dBA)         | 60  | 60   | 65   | 60   | 60   | 60   | 60   | 60    | 60    | 60    | 64   | 60   | 65     | 65     | 63     |
| Exceedance of Noise Criteria? | No  | No   | No   | No   | No   | No   | No   | No    | No    | No    | No   | No   | No     | No     | No     |
| Mitigation Measure required?  | No  | No   | No   | No   | No   | No   | No   | No    | No    | No    | No   | No   | No     | No     | No     |
| Night<br>2330-2400            | 38  | 36   | 36   | 38   | 40   | 40   | 37   | 37    | 38    | 38    | 45   | 44   | 47     | 46     | 43     |
| *Noise Criteria (dBA)         | 50  | 50   | 55   | 50   | 50   | 50   | 50   | 50    | 50    | 50    | 55   | 50   | 55     | 55     | 55     |
| Exceedance of Noise Criteria? | No  | No   | No   | No   | No   | No   | No   | No    | No    | No    | No   | No   | No     | No     | No     |
| Mitigation Measure required?  | No  | No   | No   | No   | No   | No   | No   | No    | No    | No    | No   | No   | No     | No     | No     |

**Remarks:**

- 1). FAA conducted an Aviation Environmental Design Tool (AEDT) program to improve the aviation environmental assessment computational capabilities. One of the program is to improve the Noise-Power-Distance (NPD) for taxi noise modeling. For lower engine thrust setting for taxing, source noise is only obtained through an approximate extrapolation of NPD data of current INM model. Database of NPD for a nominal taxi stage by processing existing measurement data was then developed. The modified NPD data (instead of INM's NPD data) as per the Appendix F of "Airport Cooperative Research Program (ACRP) Web-Only Document 9: Enhanced Modelling of Aircraft Taxiway Noise, Volume 2: Aircraft Taxi Noise Database and Development Process" published by Transportation Research Board (TRB) of The National Academies dated January 2013 were adopted for all identified highest static engine thrust's aircrafts, with further conservative substitutions for aircraft types of Boeing 777-300ER & 787-8R by Boeing 777-300 & 787-8, respectively. Moreover, engine power with 7% was adopted for aircraft taxiing (or idling) as per the ICAO definition, as described in Chapter 2 - Airport Taxiing Operations of "ACRP Web-Only Document 9: Enhanced Modelling of Aircraft Taxiway Noise, Volume 1: Scoping" by TRB of The National Academies dated June 2009. The above-mentioned aircraft taxi noise database developed under the TRB's ACRP is considered as a valid source of information, as the study "Enhanced Modelling of Aircraft Taxiway Noise" was sponsored and administered by recognized national organizations which were the U.S. FAA and the TRB of the National Academies and the study was already completed, with the report published in 22 April 2013 (see: <http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=2798>).
- 2). Correction for scaling up to the busiest day (based on the busiest dates profile in Year 2011) for peak ground noise assessment with +0.5 dBA has been adopted. Detailed can be referred to the **Appendix 7.4.4**.
- 3). (\*) denotes the planned fixed noise criteria or the predicted ground noise levels associated with the aircraft taxiing operations for 07L-25R (North) only.

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Table 1b: Cumulative Ground Noise Levels in Year 2030 (Unmitigated)

| Time Period                   | Predicted $L_{Aeq, 30 \text{ mins}}$ at NSRs (dBA) |      |      |      |      |      |      |       |       |       |      |      |        |        |        |
|-------------------------------|--|------|------|------|------|------|------|-------|-------|-------|------|------|--------|--------|--------|
|                               | TC-1   | TC-2 | TC-3 | TC-4 | TC-5 | TC-6 | TC-7 | TC-11 | TC-16 | TC-46 | TS-1 | TS-2 | SLW -1 | SLW -2 | SLW -3 |
| Day & Evening<br>1700-1730    | 44   | 43   | 43   | 45   | 47   | 47   | 43   | 43    | 44    | 45    | 51   | 51   | 62     | 59     | 54     |
| Noise Criteria (dBA)          | 65   | 65   | 70   | 65   | 65   | 65   | 65   | 65    | 65    | 65    | 70   | 65   | 70     | 70     | 70     |
| Exceedance of Noise Criteria? | No   | No   | No   | No   | No   | No   | No   | No    | No    | No    | No   | No   | No     | No     | No     |
| Mitigation Measure required?  | No   | No   | No   | No   | No   | No   | No   | No    | No    | No    | No   | No   | No     | No     | No     |
| Night<br>2330-2400            | 43   | 42   | 42   | 44   | 46   | 46   | 42   | 42    | 43    | 44    | 51   | 51   | 52     | 49     | 47     |
| Noise Criteria (dBA)          | 55   | 55   | 60   | 55   | 55   | 55   | 55   | 55    | 55    | 55    | 60   | 55   | 60     | 60     | 60     |
| Exceedance of Noise Criteria? | No   | No   | No   | No   | No   | No   | No   | No    | No    | No    | No   | No   | No     | No     | No     |
| Mitigation Measure required?  | No   | No   | No   | No   | No   | No   | No   | No    | No    | No    | No   | No   | No     | No     | No     |

**Remarks:**

- 1). FAA conducted an Aviation Environmental Design Tool (AEDT) program to improve the aviation environmental assessment computational capabilities. One of the program is to improve the Noise-Power-Distance (NPD) for taxi noise modeling. For lower engine thrust setting for taxing, source noise is only obtained through an approximate extrapolation of NPD data of current INM model. Database of NPD for a nominal taxi stage by processing existing measurement data was then developed. The modified NPD data (instead of INM's NPD data) as per the Appendix F of "Airport Cooperative Research Program (ACRP) Web-Only Document 9: Enhanced Modelling of Aircraft Taxiway Noise, Volume 2: Aircraft Taxi Noise Database and Development Process" published by Transportation Research Board (TRB) of The National Academies dated January 2013 were adopted for all identified highest static engine thrust's aircrafts, with further conservative substitutions for aircraft types of Boeing 7773ER & 787-8R by Boeing 777300 & 787-8, respectively. Moreover, engine power with 7% was adopted for aircraft taxiing (or idling) as per the ICAO definition, as described in Chapter 2 - Airport Taxiing Operations of "ACRP Web-Only Document 9: Enhanced Modelling of Aircraft Taxiway Noise, Volume 1: Scoping" by TRB of The National Academies dated June 2009. The above-mentioned aircraft taxi noise database developed under the TRB's ACRP is considered as a valid source of information, as the study "Enhanced Modelling of Aircraft Taxiway Noise" was sponsored and administered by recognized national organizations which were the U.S. FAA and the TRB of the National Academies and the study was already completed, with the report published in 22 April 2013 (see: <http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=2798>).
- 2). Correction for scaling up to the busiest day (based on the busiest dates profile in Year 2011) for peak ground noise assessment with +0.5 dBA has been adopted. Detailed can be referred to the **Appendix 7.4.4**.

## The Interim Phase Operation Mode (Year 2021)

**Tables 2a & b** show the unmitigated ground noise levels associated with the aircraft taxiing operations (in  $L_{Aeq, 30 \text{ mins}}$ ) under the worst 30 mins. period during day & evening and night time periods, respectively, at the representative NSRs for Year 2021.

Table 2a: Planned Ground Noise Levels in Year 2021 (Unmitigated)

| Time Period                   | *Predicted $L_{Aeq, 30 \text{ mins}}$ at NSRs (dBA) |      |      |      |      |      |      |       |       |       |      |      |        |        |        |
|-------------------------------|---|------|------|------|------|------|------|-------|-------|-------|------|------|--------|--------|--------|
|                               | TC-1  | TC-2 | TC-3 | TC-4 | TC-5 | TC-6 | TC-7 | TC-11 | TC-16 | TC-46 | TS-1 | TS-2 | SLW -1 | SLW -2 | SLW -3 |
| Day & Evening<br>1400-1430    | 41  | 38   | 38   | 42   | 44   | 44   | 39   | 40    | 40    | 42    | 49   | 48   | 45     | 42     | 38     |
| *Noise Criteria (dBA)         | 60  | 60   | 65   | 60   | 60   | 60   | 60   | 60    | 60    | 60    | 64   | 60   | 65     | 65     | 63     |
| Exceedance of Noise Criteria? | No  | No   | No   | No   | No   | No   | No   | No    | No    | No    | No   | No   | No     | No     | No     |
| Mitigation Measure required?  | No  | No   | No   | No   | No   | No   | No   | No    | No    | No    | No   | No   | No     | No     | No     |
| Night<br>2300-2330            | 38  | 34   | 34   | 37   | 39   | 39   | 37   | 37    | 37    | 37    | 42   | 42   | 44     | 41     | 39     |
| *Noise Criteria (dBA)         | 50  | 50   | 55   | 50   | 50   | 50   | 50   | 50    | 50    | 50    | 55   | 50   | 55     | 55     | 55     |
| Exceedance of Noise Criteria? | No  | No   | No   | No   | No   | No   | No   | No    | No    | No    | No   | No   | No     | No     | No     |
| Mitigation Measure required?  | No  | No   | No   | No   | No   | No   | No   | No    | No    | No    | No   | No   | No     | No     | No     |

Remarks:

- 1). FAA conducted an Aviation Environmental Design Tool (AEDT) program to improve the aviation environmental assessment computational capabilities. One of the program is to improve the Noise-Power-Distance (NPD) for taxi noise modeling. For lower engine thrust setting for taxiing, source noise is only obtained through an approximate extrapolation of NPD data of current INM model. Database of NPD for a nominal taxi stage by processing existing measurement data was then developed. The modified NPD data (instead of INM's NPD data) as per the Appendix F of "Airport Cooperative Research Program (ACRP) Web-Only Document 9: Enhanced Modelling of Aircraft Taxiway Noise, Volume 2: Aircraft Taxi Noise Database and Development Process" published by Transportation Research Board (TRB) of The National Academies dated January 2013 were adopted for all identified highest static engine thrust's aircrafts, with further conservative substitutions for aircraft types of Boeing 7773ER & 787-8R by Boeing 777300 & 787-8, respectively. Moreover, engine power with 7% was adopted for aircraft taxiing (or idling) as per the ICAO definition, as described in Chapter 2 - Airport Taxiing Operations of "ACRP Web-Only Document 9: Enhanced Modelling of Aircraft Taxiway Noise, Volume 1: Scoping" by TRB of The National Academies dated June 2009. The above-mentioned aircraft taxi noise database developed under the TRB's ACRP is considered as a valid source of information, as the study "Enhanced Modelling of Aircraft Taxiway Noise" was sponsored and administered by recognized national organizations which were the U.S. FAA and the TRB of the National Academies and the study was already completed, with the report published in 22 April 2013 (see: <http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=2798>).
- 2). Correction for scaling up to the busiest day (based on the busiest dates profile in Year 2011) for peak ground noise assessment with +0.5 dBA has been adopted. Detailed can be referred to the **Appendix 7.4.4**.
- 3). (\*) denotes the planned fixed noise criteria or the predicted ground noise levels associated with the aircraft taxiing operations for 07L-25R (North) only.

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Table 2b: Cumulative Ground Noise Levels in Year 2021 (Unmitigated)

| Time Period                   | Predicted $L_{Aeq, 30 \text{ mins}}$ at NSRs (dBA) |      |      |      |      |      |      |       |       |       |      |      |        |        |        |
|-------------------------------|--|------|------|------|------|------|------|-------|-------|-------|------|------|--------|--------|--------|
|                               | TC-1   | TC-2 | TC-3 | TC-4 | TC-5 | TC-6 | TC-7 | TC-11 | TC-16 | TC-46 | TS-1 | TS-2 | SLW -1 | SLW -2 | SLW -3 |
| Day & Evening<br>1400-1430    | 46   | 44   | 44   | 47   | 49   | 49   | 44   | 45    | 45    | 47    | 55   | 54   | 60     | 55     | 52     |
| Noise Criteria (dBA)          | 65   | 65   | 70   | 65   | 65   | 65   | 65   | 65    | 65    | 65    | 70   | 65   | 70     | 70     | 70     |
| Exceedance of Noise Criteria? | No   | No   | No   | No   | No   | No   | No   | No    | No    | No    | No   | No   | No     | No     | No     |
| Mitigation Measure required?  | No   | No   | No   | No   | No   | No   | No   | No    | No    | No    | No   | No   | No     | No     | No     |
| Night<br>2300-2330            | 43   | 42   | 41   | 44   | 46   | 46   | 42   | 42    | 43    | 44    | 52   | 51   | 59     | 55     | 51     |
| Noise Criteria (dBA)          | 55   | 55   | 60   | 55   | 55   | 55   | 55   | 55    | 55    | 55    | 60   | 55   | 60     | 60     | 60     |
| Exceedance of Noise Criteria? | No   | No   | No   | No   | No   | No   | No   | No    | No    | No    | No   | No   | No     | No     | No     |
| Mitigation Measure required?  | No   | No   | No   | No   | No   | No   | No   | No    | No    | No    | No   | No   | No     | No     | No     |

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- 1). FAA conducted an Aviation Environmental Design Tool (AEDT) program to improve the aviation environmental assessment computational capabilities. One of the program is to improve the Noise-Power-Distance (NPD) for taxi noise modeling. For lower engine thrust setting for taxing, source noise is only obtained through an approximate extrapolation of NPD data of current INM model. Database of NPD for a nominal taxi stage by processing existing measurement data was then developed. The modified NPD data (instead of INM's NPD data) as per the Appendix F of "Airport Cooperative Research Program (ACRP) Web-Only Document 9: Enhanced Modelling of Aircraft Taxiway Noise, Volume 2: Aircraft Taxi Noise Database and Development Process" published by Transportation Research Board (TRB) of The National Academies dated January 2013 were adopted for all identified highest static engine thrust's aircrafts, with further conservative substitutions for aircraft types of Boeing 7773ER & 787-8R by Boeing 777300 & 787-8, respectively. Moreover, engine power with 7% was adopted for aircraft taxiing (or idling) as per the ICAO definition, as described in Chapter 2 - Airport Taxiing Operations of "ACRP Web-Only Document 9: Enhanced Modelling of Aircraft Taxiway Noise, Volume 1: Scoping" by TRB of The National Academies dated June 2009. The above-mentioned aircraft taxi noise database developed under the TRB's ACRP is considered as a valid source of information, as the study "Enhanced Modelling of Aircraft Taxiway Noise" was sponsored and administered by recognized national organizations which were the U.S. FAA and the TRB of the National Academies and the study was already completed, with the report published in 22 April 2013 (see: <http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=2798>).
- 2). Correction for scaling up to the busiest day (based on the busiest dates profile in Year 2011) for peak ground noise assessment with +0.5 dBA has been adopted. Detailed can be referred to the **Appendix 7.4.4**.

## Full Operation Mode (Year 2032)

**Tables 3a & b** show the unmitigated ground noise levels associated with the aircraft taxiing operations (in  $L_{Aeq, 30 \text{ mins}}$ ) under the worst 30 mins. period during day & evening and night time periods, respectively, at the representative NSRs for Year 2032.

Table 3a: Planned Ground Noise Levels in Year 2032 (Unmitigated)

| Time Period                   | *Predicted $L_{Aeq, 30 \text{ mins}}$ at NSRs (dBA) |      |      |      |      |      |      |       |       |       |      |      |        |        |        |
|-------------------------------|---|------|------|------|------|------|------|-------|-------|-------|------|------|--------|--------|--------|
|                               | TC-1  | TC-2 | TC-3 | TC-4 | TC-5 | TC-6 | TC-7 | TC-11 | TC-16 | TC-46 | TS-1 | TS-2 | SLW -1 | SLW -2 | SLW -3 |
| Day & Evening<br>1700-1730    | 39  | 37   | 37   | 38   | 40   | 40   | 38   | 38    | 38    | 38    | 42   | 42   | 44     | 43     | 41     |
| *Noise Criteria (dBA)         | 60  | 60   | 65   | 60   | 60   | 60   | 60   | 60    | 60    | 60    | 64   | 60   | 65     | 65     | 63     |
| Exceedance of Noise Criteria? | No  | No   | No   | No   | No   | No   | No   | No    | No    | No    | No   | No   | No     | No     | No     |
| Mitigation Measure required?  | No  | No   | No   | No   | No   | No   | No   | No    | No    | No    | No   | No   | No     | No     | No     |
| Night<br>2330-2400            | 38  | 36   | 36   | 38   | 40   | 39   | 37   | 37    | 38    | 38    | 44   | 43   | 47     | 45     | 43     |
| *Noise Criteria (dBA)         | 50  | 50   | 55   | 50   | 50   | 50   | 50   | 50    | 50    | 50    | 55   | 50   | 55     | 55     | 55     |
| Exceedance of Noise Criteria? | No  | No   | No   | No   | No   | No   | No   | No    | No    | No    | No   | No   | No     | No     | No     |
| Mitigation Measure required?  | No  | No   | No   | No   | No   | No   | No   | No    | No    | No    | No   | No   | No     | No     | No     |

Remarks:

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- 2). Correction for scaling up to the busiest day (based on the busiest dates profile in Year 2011) for peak ground noise assessment with +0.5 dBA has been adopted. Detailed can be referred to the **Appendix 7.4.4**.
- 3). (\*) denotes the planned fixed noise criteria or the predicted ground noise levels associated with the aircraft taxiing operations for 07L-25R (North) only.

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Table 3b: Cumulative Ground Noise Levels in Year 2032 (Unmitigated)

| Time Period                   | Predicted $L_{Aeq, 30 \text{ mins}}$ at NSRs (dBA) |      |      |      |      |      |      |       |       |       |      |      |       |       |       |
|-------------------------------|--|------|------|------|------|------|------|-------|-------|-------|------|------|-------|-------|-------|
|                               | TC-1   | TC-2 | TC-3 | TC-4 | TC-5 | TC-6 | TC-7 | TC-11 | TC-16 | TC-46 | TS-1 | TS-2 | SLW-1 | SLW-2 | SLW-3 |
| Day & Evening<br>1700-1730    | 46   | 44   | 45   | 46   | 48   | 48   | 44   | 45    | 45    | 46    | 52   | 51   | 69    | 64    | 58    |
| Noise Criteria (dBA)          | 65   | 65   | 70   | 65   | 65   | 65   | 65   | 65    | 65    | 65    | 70   | 65   | 70    | 70    | 70    |
| Exceedance of Noise Criteria? | No   | No   | No   | No   | No   | No   | No   | No    | No    | No    | No   | No   | No    | No    | No    |
| Mitigation Measure required?  | No   | No   | No   | No   | No   | No   | No   | No    | No    | No    | No   | No   | No    | No    | No    |
| Night<br>2330-2400            | 44   | 42   | 42   | 44   | 46   | 46   | 43   | 43    | 44    | 43    | 50   | 50   | 52    | 49    | 47    |
| Noise Criteria (dBA)          | 55   | 55   | 60   | 55   | 55   | 55   | 55   | 55    | 55    | 55    | 60   | 55   | 60    | 60    | 60    |
| Exceedance of Noise Criteria? | No   | No   | No   | No   | No   | No   | No   | No    | No    | No    | No   | No   | No    | No    | No    |
| Mitigation Measure required?  | No   | No   | No   | No   | No   | No   | No   | No    | No    | No    | No   | No   | No    | No    | No    |

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