



Appendix F



Noise Abatement Alternatives



Appendix F Noise Abatement Alternatives

This appendix presents the range of the noise abatement alternatives that were considered in this Part 150 Noise Compatibility Study (Part 150 Study) to mitigate noise impacts of aircraft operations at the Chicago-Rockford International Airport (RFD or Airport). The proposed measures were evaluated for the anticipated benefits and costs associated with its implementation. Each recommended measure was reviewed with the membership of the Advisory Committee (AC). Local planning professionals from the surrounding communities were invited to meet with the project team to discuss the types of measures that were evaluated and recommended. Copies of all of the materials that were sent are located in **Appendix G, Public Involvement**.

Those alternatives that are recommended for inclusion in the RFD 2023 Noise Compatibility Program (NCP) are included in **Chapter Four, Noise Compatibility Program**.

» F.1 Noise Abatement Alternatives

This section discusses the consideration and evaluation of potential new noise abatement alternatives for possible inclusion in the RFD 2023 Noise Compatibility Program (NCP). The concept of noise abatement generally focuses on measures that may be able to affect the source of the noise such that the receivers of noise (residential areas etc.) are exposed to less noise. Thus, abatement measures generally are concerned with actions that would alter the use or configuration of air space, flight tracks, airport facilities, or aircraft operations, so as to reduce or shift the location of noise. The evaluation of a number of these alternatives is required under Title 14 of the Code of Federal Regulations (14 CFR) Part 150, even though they may have little utility for local application at RFD. These measures tend to fall into one of the five general categories listed below.

- Runway Use Modifications
- Flight Routing Modifications
- Aircraft Operational Procedure Modifications
- Airport Facility Modifications
- Airport Regulations and Facility Restrictions

The consideration of the various potential noise abatement techniques must be undertaken in the context of the current 2023 NCP at RFD as well as the policies of the Federal Aviation Administration (FAA) under 14 CFR Part 150. There were several noise abatement measures that were approved as voluntary in the RFD 2003 NCP. These noise abatement measures are discussed further in **Section F.1.1**.

In order to evaluate each noise abatement alternative, a set of evaluation criteria was established and used to identify the benefits and drawbacks of each alternative. The criteria include feasibility, safety, operational considerations, and noise reduction. After it was determined that an alternative was feasible, safe, and had no major operational drawbacks, an assessment of the benefits in terms of noise and land use compatibility was conducted. Because a decrease in one area may result in an increase in another area, priorities were developed to clarify the evaluation process. The noise impact priorities were as follows:

- Reductions in the 65+ DNL noise contours (most important).
- Sensitivity to shifting noise from one area to another (important).
- Ensuring that the tradeoffs of increased versus decreased noise are understood before making a decision.



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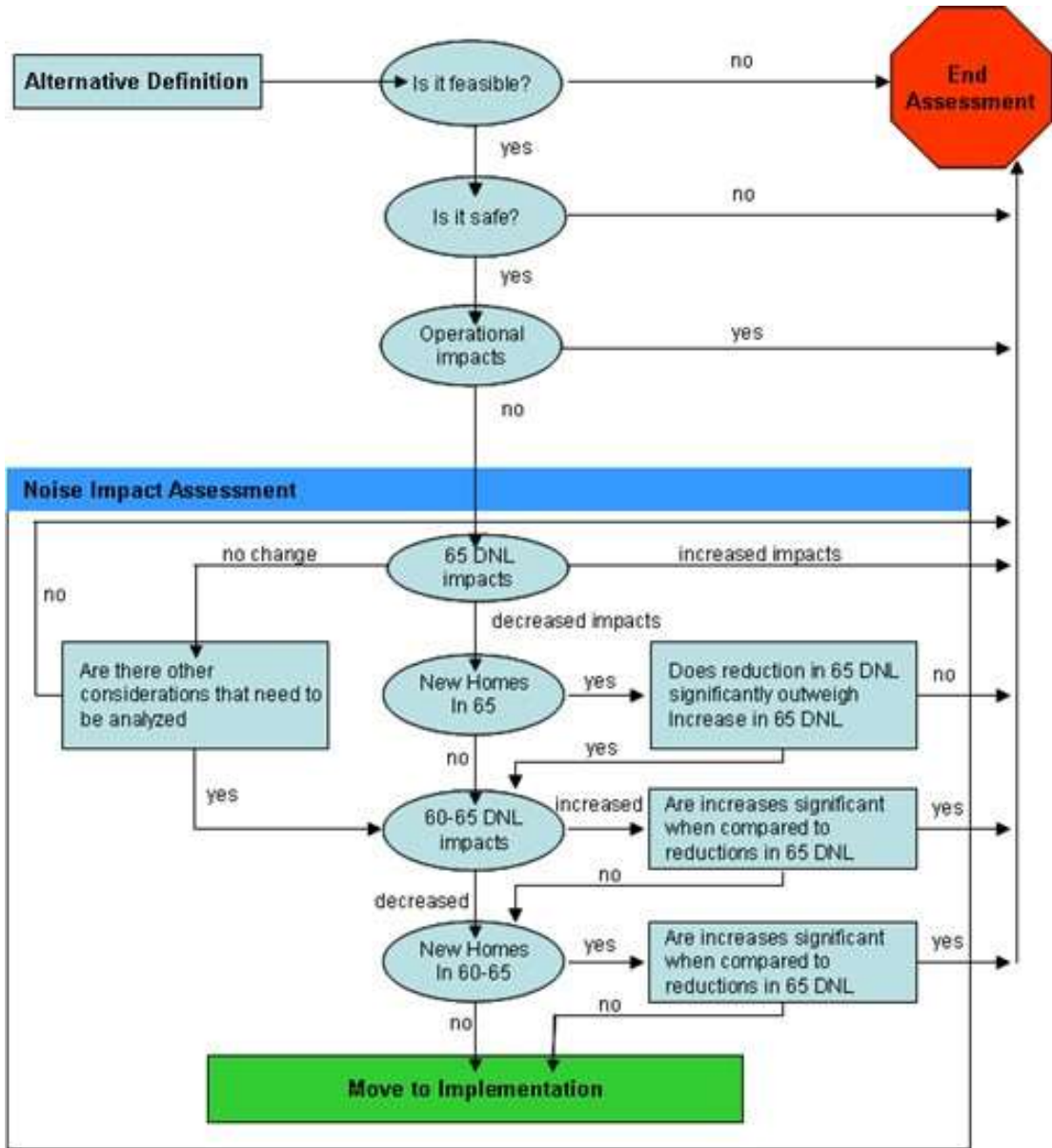
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- Recognizing that an alternative may have a net reduction in noise impacts, but may be eliminated because those impacts are a result of decreases in one area with a similar level of increases in another.

Exhibit F-1, Noise Abatement Alternative Evaluation Process, graphically depicts the steps of the evaluation process for abatement alternatives.

Within the aforementioned context, a two-step evaluation method was conducted for potential new abatement alternatives. First, a qualitative screening analysis was conducted on the full range of potential new abatement alternatives for RFD to determine whether or not they were feasible, and safe, and whether or not they would cause operational impacts. The noise abatement screening analysis is provided in **Section F.1.2**. Secondly, those alternatives that were determined to be feasible were then subjected to a quantitative analysis, including, where applicable, an analysis of the benefits or drawbacks and potential implementation costs (see **Table F.1**).

EXHIBIT F-1 | NOISE ABATEMENT ALTERNATIVE EVALUATION PROCESS





F.1.1 Previously Approved Noise Abatement Measures

This section provides a review of the abatement measures that were recommended and approved as voluntary noise abatement measures in the 2003 RFD NCP. Provided for each measure is a description, the current status, and the recommendation for this NCP Update. These previous noise abatement measures are either recommended to be continued, continued with modification or withdrawn.

Measure NA-1

Description: Recommends maintaining existing noise abatement procedures per a Tower Order of June 15, 1984. This order states that touch and go operations (when aircraft traffic land and depart without stopping or exiting the runway for the purposes of pilot training) or traffic pattern activity (the flow prescribed for landing, or takeoff, in this case used for the purposes of pilot training) on Runways 1/19 shall be directed to turn so as to keep aircraft west of the airport. Aircraft over 12,500 pounds shall be directed to climb to 2,500 feet MSL (1,750 feet above field elevation) whenever traffic permits. Aircraft making circling approaches shall be kept west of the airport and shall not be permitted to make passes over the airport. For late night training, as winds permit, full stop landings should be made on Runway 1 and takeoffs should be made on Runway 19.

Status: Approved as Voluntary

Recommendation: ***Recommended to be withdrawn.*** The original intent of this measure was to abate the effects of nighttime aircraft noise and overflight that would occur during airline pilot training between the hours of 10:00 p.m. to 7:00 a.m. The airport no longer has pilot training occurring at the airport, that would warrant this abatement measure.

Measure NA-3

Description: Recommends that all aircraft departing on Runway 7 be fanned along three departure tracks: Left, Right, and Center. The aircraft are routed due east on the center track, to the southwest on the track turning to the right, and to the northwest on the track turning to the left.

Status: Approved as Voluntary, Implemented

Recommendation: ***Recommended to be continued.***

Measure NA-4

Description: Recommends that pilots of C-130 aircraft practicing short-field landings and takeoffs (using a short amount of runway length) on Runway 19 be directed to turn as soon and as tightly as practicable after takeoff. The aircraft should remain as close to the airport as possible when flying through the pattern, provided aircraft maintain pattern altitude of 2,500 feet MSL per existing Tower Order.

Status: Approved as Voluntary

Recommendation: ***Recommended to be withdrawn.*** The original intent of this measure is to direct aircraft traffic to the northwest and away from residential areas southwest of the airport, including the Woodcrest Estates subdivision and the area north of the Rock River near Woodcrest Estates. In addition, the floodplain northwest and adjacent to the airport is a broad, noise-compatible area, and it would be desirable for the C-130s to remain over this area to the extent practical. The airport currently experiences no transient C-130s that do training at the airport.

Measure NA-7

Description: Recommends during nighttime hours (10:00 p.m. to 7:00 a.m.) all aircraft over 12,500 pounds departing Runway 25 having departure courses of 250 degrees clockwise through 069 degrees inclusive turn right on course to the Dubuque (DBQ) or the Nodine (ODI) navigational fix as soon as practicable.



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Status: Approved as Voluntary, Implemented

Recommendation: **Recommended to be continued with modifications.** The original intent of this noise abatement measure was to minimize the noise impacts to residential properties (Woodcrest Estates) from Runway 25 departures that turn right on course after departure. It is recommended that the headings and fixes be removed from the measure.

New Description: During nighttime hours (10:00 p.m. to 7:00 a.m.) all aircraft over 12,500 pounds departing Runway 25 having departure courses that would require a right turn after departure, to turn right on course to navigational fix or heading as soon as practicable.

Measure NA-8

Description: Recommends during daytime hours (7:00 a.m. to 10:00 p.m.) all aircraft over 12,500 pounds departing Runway 25 having departure courses 070 degrees clockwise through 249 degrees inclusive retain 20-degree left turn and maintain heading until reaching 3,000 feet MSL.

Status: Approved as Voluntary, Implemented

Recommendation: **Recommended to be continued with modifications.** The original intent of this noise abatement measure was to minimize the noise impacts to residential properties (Woodcrest Estates) from Runway 25 departures that turn left on course after departure. It is recommended that the headings and fixes be removed from the measure.

New Description: During daytime hours (7:00 a.m. to 10:00 p.m.) all aircraft over 12,500 pounds departing Runway 25 having departure courses that would require a left turn after departure, to turn left on course to navigational fix or heading as soon as practicable.

Measure NA-9

Description: Recommends during nighttime hours (10:00 p.m. to 7:00 a.m.) all aircraft over 12,500 pounds departing Runway 19 having departure courses of 0 degrees clockwise through 190 degrees maintain runway heading until reaching 3,000 feet MSL before turning on course.

Status: Approved as Voluntary, Implemented

Recommendation: **Recommended to be continued with modifications.** The original intent of this noise abatement measure was to minimize the noise impacts to residential areas east and southeast of the airport. It is recommended that the headings and fixes be removed from the measure.

New Description: During nighttime hours (10:00 p.m. to 7:00 a.m.) all aircraft over 12,500 pounds departing Runway 19 having departure courses requiring a left turn based on destination to maintain runway heading until reaching 3,000 feet MSL before turning on course.

Measure NA-10

Description: Recommends an informal runway use program to delineate the preferred runway use and order of runway selection to reduce aircraft noise impacts.

Departures

- Runway 19 preferred for all departures.
- Runway 25 would be used for departures when use of Runway 19 could not be used due to wind, weather, or operational necessity.
- Runway 1 would be used for departures when both Runway 19 and Runway 25 could not be used due to wind, weather, or operational necessity.



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Daytime Arrivals

- The runway that would maximize traffic flow would be used for arrivals.

Nighttime Arrivals

- Runway 1 preferred for all arrivals.
- Runway 7 would be used for arrivals when use of Runway 1 could not be used due to wind, weather, or operational necessity.

Status: Approved as Voluntary, Implemented

Recommendation: **Recommended to be continued.** The original intent of this measure is to result in a large proportion of departures and arrivals being made to and from the south or west of the airport and taking advantage of the most compatible land uses.

Measure NA-11

Description: Recommends that all aircraft requiring more than 8,000 feet certified take-off length use Runway 25. Measure NA-11 was implemented after Runway 7/25 was extended by 3,500 feet to its current length of 10,000 feet. Occasionally fully-loaded large aircraft may not be able to safely take off on an 8,000-foot runway (Runway 1/19 is 8,199 feet long). When these circumstances preclude the use of Runway 19, the preferred runway for takeoff, Runway 25 should be used.

Status: Approved as Voluntary, Implemented

Recommendation: **Recommended to be continued**

Measure NA-12

Description: Recommends during daytime hours (7:00 a.m. to 10:00 p.m.) all aircraft over 12,500 pounds departing Runway 25 having departure courses of 250 degrees clockwise through 069 degrees inclusive turn right on course to the Dubuque (DBQ) or the Nodine (ODI) navigational fix as soon as practicable

Status: Approved as Voluntary, Implemented

Recommendation: **Recommended to be continued with modifications.** The original intent of this noise abatement measure was to minimize the noise impacts to residential properties (Woodcrest Estates) from Runway 25 departures that turn right on course after departure. It is recommended that the headings and fixes be removed from the measure.

New Description: During daytime hours (7:00 a.m. to 10:00 p.m.) all aircraft over 12,500 pounds departing Runway 25 having departure courses that would require a right turn after departure, to turn right on course to navigational fix or heading as soon as practicable.

Measure NA-13

Description: Recommends during nighttime hours (10:00 p.m. to 7:00 a.m.) all aircraft over 12,500 pounds departing Runway 25 having departure courses 070 degrees clockwise through 249 degrees inclusive turn to a heading of 200 degrees as soon as practicable and maintain heading until reaching 3,000 feet MSL

Status: Approved as Voluntary, Implemented

Recommendation: **Recommended to be continued with modifications.** The original intent of this noise abatement measure was to minimize the noise impacts to residential properties (Woodcrest Estates) from Runway 25 departures that turn left on course after departure. It is recommended that the headings and fixes be removed from the measure.



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New Description: During nighttime hours (10:00 p.m. to 7:00 a.m.) all aircraft over 12,500 pounds departing Runway 25 having departure courses that would require a left turn after departure, to turn left on course to navigational fix or heading as soon as practicable.

Measure NA-14

Description: Recommends aircraft weighing more than 12,500 pounds conduct touch and go and low approach training activity on the south side of the airport when using Runways 7 or 25.

Status: Approved as Voluntary, Implemented

Recommendation: ***Recommended to be continued with modifications.*** The original intent of this noise abatement measure was to minimize the effects of aircraft training overflights to the more densely populated land uses to the north and east of the airport and thus reduce the potential for noise complaints to occur.

New Description: Recommends aircraft to conduct touch and go and low approach training activity on the south and west side of the airport, when traffic permitting.

Measure NA-15

Description: Recommends during nighttime hours (10:00 p.m. to 7:00 a.m.) all aircraft over 12,500 pounds departing Runway 1, maintain runway heading until reaching 3,000 feet MSL before turning on course.

Status: Approved as Voluntary, Implemented

Recommendation: ***Recommended to be continued***

Measure NA-16

Description: Recommends encouraging the use of noise attenuating construction standards for all new on-airport structures/facilities and use those structures as noise barriers/buffers to adjacent off-airport land uses.

Status: Approved as Voluntary, Implemented

Recommendation: ***Recommended to be continued***

F.1.2 Screening of Potential New Noise Abatement Alternatives

This section summarizes the qualitative screening analysis of potential new noise abatement measures. **Table F-1, Noise Abatement Alternatives Screening summary** presents a summary of the screening of the abatement alternatives. The "Evaluation and Recommendation" column provides a brief synopsis of the issues and findings associated with each alternative and notes whether the alternative was recommended for further analysis.

The abatement alternatives that were evaluated for this NCP were as follows:

- Modification of arrival and departure flight routes,
- Increase 03/21 runway utilization for commercial traffic,
- Develop new approach and departure procedures,
- Extension of Runway 03/2,
- Construct sound barrier,
- Implement airport operations restrictions.



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TABLE F-1 | NOISE ABATEMENT ALTERNATIVES SCREENING SUMMARY

DESCRIPTION	BENEFITS	DRAWBACKS	EVALUATION AND RECOMMENDATION
FLIGHT TRACK MODIFICATIONS			
Modify arrival and departure flight tracks to reduce noise within the 65 DNL noise contour	Could reduce noise levels for the areas both inside and outside of the 65 DNL contour.	<p>Impacted areas northeast of Runway End 7 are primarily impacted by arrival operations on final approach. These flight track locations can not be adjusted. ATC currently disperses departure operations with left and right turns based on destination.</p> <p>Areas to the southwest of Runway End 25, are impacted by both arrival and departure operations. The arrival tracks could not be modified as the aircraft are on final approach near the impacted homes. Departures are currently dispersed with left and right turns as soon as practical.</p>	<p>Due to the inability to provide benefits to the homes impacted within the 65 DNL noise contour this alternative is NOT RECOMMENDED for further analysis.</p> <p>Several currently approved voluntary measures address departure flight track dispersion and turn locations and are recommended to be continued and or continued with modifications. (NA-3, NA-7, NA-8, NA-9, NA-12, NA-13, NA-14 and NA-15)</p>
RUNWAY USE MODIFICATIONS			
Increase usage of Runway 1/19	Could reduce noise levels for the areas within the 65 DNL noise contour to the northeast and southwest of Runway 07/25.	<p>Based on the RFD fleet, the majority of operations will require the use of Runway 7/25 due to the runway length and east west orientation of the runway. Runway 7 is also equipped with an ILS system making it the preferred arrival runway for larger/heavier aircraft. The amount of traffic required to provide substantial noise reduction benefits in impacted areas would not be achievable based on current wind, weather and operational necessities to operate aircraft safely.</p> <p>Increasing the arrivals to Runway1 and departures from Runway 19 could potentially impact residential areas south of the airport, offsetting any benefits in the reduction of homes in the 65 DNL to the northeast and southwest of the airport.</p>	<p>Due to the inability to provide benefits to the homes impacted within the 65 DNL noise contour this alternative is NOT RECOMMENDED for further analysis.</p>



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TABLE F-1 | NOISE ABATEMENT ALTERNATIVES SCREENING SUMMARY (CONTINUED)

DESCRIPTION	BENEFITS	DRAWBACKS	EVALUATION AND RECOMMENDATION
AIRCRAFT OPERATIONAL PROCEDURE MODIFICATIONS			
Optimized Profile Descent Approach procedure	Optimized Profile Descent (OPD) procedures (previously known as continuous descent approach [CDA]) have been used at some airports to reduce approach noise at a distance from the airport. Generally, their most notable effect relates to reduced fuel burn and corresponding air emissions.	Potential noise reduction benefits would be limited to areas outside DNL 65 dBA. Due to the location of the impacted homes, implementing OPD's would have no substantial noise benefit for impacted homes.	Due to the inability to provide benefits to the homes impacted within the 65 DNL noise contour this alternative is NOT RECOMMENDED for further analysis.
Implement Distant Noise Abatement Departure Profiles (NADP)	Implementing Distant NADPs can potentially reduce noise for areas further away from the runway end (greater than three miles).	Distant NADPs can potentially increase noise for areas closer to the runway end. Due to the impacted homes location, implementing NADP's would have no substantial noise benefit for impacted homes and could have a negative overall impact on areas close to the airport.	Due to the inability to provide benefits to the homes impacted within the 65 DNL noise contour this alternative is NOT RECOMMENDED for further analysis.
Implement Close-in Noise Abatement Departure Profiles (NADP)	Implementing Close-in NADPs can potentially reduce noise for areas in close proximity to the runway end (less than three miles).	Close-in NADPs can potentially increase noise for areas farther away from the runway end. Due to the fleet mix at RFD, the amount of aircraft that could safely perform and execute Close-in NADP's would be minimal, thus significant reductions to the number of impacted homes in the 65 DNL are unlikely.	Due to the inability to provide benefits to the homes impacted within the 65 DNL noise contour this alternative is NOT RECOMMENDED for further analysis.
Moderate Reverse Thrust on Landing	Reduces the amount of noise from the application of reverse thrust after landing.	Reverse thrust can not be eliminated altogether and would be up to the discretion of the pilot. Due to the location of the homes and the anticipated participation from pilots, significant reductions to the number of impacted homes in the 65 DNL are unlikely.	Due to the inability to provide benefits to the homes impacted within the 65 DNL noise contour this alternative is NOT RECOMMENDED for further analysis.



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TABLE F-1 | NOISE ABATEMENT ALTERNATIVES SCREENING SUMMARY (CONTINUED)

DESCRIPTION	BENEFITS	DRAWBACKS	EVALUATION AND RECOMMENDATION
AIRPORT FACILITY MODIFICATIONS			
Extend Runway 1/19	Additional aircraft in the RFD fleet mix would be able utilize Runway 1/19, potentially reducing the utilization of Runway 7/25.	New residential areas to the north and south of the airport could be impacted by increasing utilization of Runway 1/19. Existing building and roadways to the north and the Kishwaukee River and existing railroad to the south limit the potential length of Runway 1/19. The cost benefit of such a project is not practical.	Due to the cost of this measure and limitations to the final runway length this alternative is NOT RECOMMENDED to be continued for further analysis.
Ground Run-up Enclosures (GRE)	Can reduce jet run-up noise levels by up to 20 dB.	Currently there are no significant jet aircraft maintenance activities that would justify the cost-benefit of constructing GRE's.	Due to the inability to provide benefits to the homes impacted within the 65 DNL noise contour this alternative is NOT RECOMMENDED for further analysis.
AIRPORT FACILITY RESTRICTIONS			
Implement Airport Operational Restrictions (Part 161 Restrictions) such as: noise-/time-based landing fees, airport capacity restrictions based on relative "noisiness", aircraft type restrictions based on "noisiness"	Can resolve noise annoyance issues with certain loud aircraft events or aircraft types operating at RFD.	Such restrictions would be subject to the costly and time-consuming analytical requirements under FAR Part 161 (Part 161). The FAA has never officially approved such measures. Would have severe financial ramifications both to the Airport and the region.	Restrictions on access to an airport are measures of last resort for use in the most extreme cases of noise impact. This alternative is NOT RECOMMENDED for further analysis.

Source: Landrum & Brown analysis, 2023.



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F.1.3 Noise Abatement Measure Screening Summary

In summary, based on the qualitative analysis described in section F.1 and F.1.2 the currently approved noise abatement measures reduce impacts within the 65+ DNL contour to the fullest extent. Of the thirteen (13) approved voluntary noise abatement measures five (5) are recommended to be continued and six (6) are recommended to be continued with modifications. Two (2) previously approved voluntary noise abatement measures are recommended to be withdrawn.

Six (6) previously approved voluntary noise abatement measures were recommended for continuation with modifications. Five (5) of these measures were recommended to have course headings and fix names removed, while focusing on the true intent of the measures to abate noise within the areas impacted by the 65+ DNL contour. One (1) measure address touch and go and low approach training activity at the airport, this measure was modified to include both runways, while focusing on the true intent of the measure to direct this type of aircraft activity to less densely populated areas to the south and west of the airport, when traffic permits. These six (6) measures will need to have written reapproval from the FAA as voluntary noise abatement measures.

Measures NA-1 and NA-4 are recommended to be withdrawn as they are no longer applicable at RFD. Both measures address civilian and military pilot training at RFD, the airport no longer has transient C-130 military operations as in the past, and there are no significant pilot training activities occurring at the airport. The standard pattern for both Runway 1/19 and 7/25 is a traffic pattern which keeps aircraft to the south and west of the airport, when traffic permits, which was the original intent of both noise abatement measures. In addition touch and go and low approach training activities are addressed in Measure NA-14, and will be further addressed in the modified measure for this NCP.