



Dallas Executive Airport

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"The Regional Airports Division Manager shall review all data collected for each RSA in Paragraph 7, along with the supporting documentation prepared by the region for that RSA, and make one of the following determinations:

- (1) The existing RSA meets the current standards contained in AC 150/5300-13, *Airport Design*.
- (2) The existing RSA does not meet the current standards, but it is practicable to improve the RSA so that it will meet current standards.
- (3) The existing RSA can be improved to enhance safety, but the RSA will still not meet current standards.
- (4) The existing RSA does not meet current RSA standards, and it is not practicable to improve the RSA."

The findings of this Master Plan will aid the Regional Airports Division Manager for the FAA's Southwest Region in making a determination on the existing condition of RSAs at Dallas Executive Airport. Appendix 2 of FAA Order 5200.8 provides direction for an RSA determination. This includes the alternatives that must be evaluated. Paragraph 3 of Appendix 2 states:

"The first alternative that must be considered in every case is constructing the traditional graded runway safety area surrounding the runway. Where it is not practicable to obtain the entire safety area in this manner, as much as possible should be obtained. Then the following alternatives shall be addressed in the supporting documentation ...:"

- A. Construct the traditional graded runway safety area surrounding the runway.
- B. Relocation, shifting, or realignment of the runway.
- C. Reduction in runway length where the existing runway length exceeds that which is required for the existing or projected design aircraft.
- D. Implementation of declared distances.
- E. Installation of Engineered Materials Arresting Systems (EMAS).
- F. A combination of runway relocation, shifting, grading, realignment, or reduction.

The following sections will outline each alternative for meeting RSA at Dallas Executive Airport. Moreover, some of the alternatives will present options for meeting RSA requirements as well as extensions to the north end of the runway.

RSA ALTERNATIVE A: PROVIDE FULL RSA

The full standard 1,000-foot RSA is currently available northwest of the Runway 13 end. As a result, the northwestern RSA meets FAA standards. Southeast of the Runway 31 end, however, the required 1,000-foot RSA standard is not met. The RSA is first obstructed by the airport perimeter fence approximately 507 feet southeast of the pavement end. Farther southeast, the RSA is obstructed by U.S. Highway 67 and its outer roadways as depicted on **Exhibit 4B**. The RSA then

extends into an open field southeast of the highway. No inhabitable facility is located in the extended RSA.

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Providing the full RSA would require the relocation/re-routing of U.S. Highway 67 and its outer roadways. The areas to the east, south, and west are heavily populated by both residential and commercial uses. Relocating or rerouting the highway would be cost-prohibitive as it would require substantial property acquisition and subsequent displacement of many homes and Therefore, providing businesses. for the full 1,000-foot standard RSA beyond the current runway pavement end is not considered prudent and/ or practicable and will no longer be considered in this study.

RSA ALTERNATIVE B: RELOCATE, SHIFT, OR REALIGN THE RUNWAY

The next alternative considers three options of relocating the runway, shifting the runway, and/or realigning the runway. These three alternative options have specific definitions.

Relocate Runway Option

Per FAA guidelines, to relocate a runway would be to rebuild a new runway in the same orientation onairport. The airport does not have the space to provide a new runway in the same configuration without a significantly reduced runway length. Due to the configuration of existing property and given the high level of urban development surrounding the airport, this is not a prudent or practicable solution.

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Shift Runway Option

Shifting the runway would require the removal of at least 493 feet of pavement from the southeast end of the runway and the addition of 493 feet to the northwest end as depicted on **Exhibit** 4D. If the FAA also requires the full runway object free area (OFA), the minimum runway shift required would be 525 feet. Several impacts would be experienced with a runway shift. The instrument landing system (ILS) serving Runway 31 would have to be relocated and recalibrated. This would include relocating the lead-in approach lighting system. This action can leave the airport without an ILS approach for up to two years while equipment is moved and/ or calibrated and new instrument procedures are developed.

Shifting the runway 493 feet (or 525 feet if the full OFA is required) to the northwest would also shift the Runway 13 RPZ farther to the northwest. As a result, additional private commercial and residential property would be introduced into the RPZ which may need to be acquired or not allowed by the FAA. Finally, the FAA discourages roads from being located in the RPZ, especially the central portion of the RPZ. A proposed runway shift to the northwest would place the RPZ over the intersection of Ledbetter Drive and Westmoreland Road into the central portion of the RPZ. FAA standards don't explicitly prohibit roads from the RPZ, especially those currently located in an existing RPZ. Proposed changes to runway ends which would create a new situation with a road in the RPZ, however, can potentially be rejected by the FAA.

Planning detail cost estimates have been prepared for the runway shift option. The estimates were prepared by the current airport's engineer (Garver) and refined by the preparer of this study. It is estimated that the proposed 493-foot shift of Runway 13-31 and parallel Taxiway B would cost approximately \$2.02 million. The 525foot shift, to provide full OFA if required by the FAA, is estimated to cost approximately \$2.11 million. It should be noted that these costs include new pavements to the northwest end of the runway (runway and taxiway), pavement removal at the southeast end of the runway, and relocation of the ILS glideslope antenna. The cost is relatively high due to significant terrain differences north of the runway requiring sizable fill and embankment to extend Taxiway B to the northwest.

Extending the runway to the northwest is a viable option, one that will be explored further later in this chapter. Reducing the pavement at the south end of the runway, however, would not be ideal. As previously noted, the current runway length has been shown to be lacking for some of the larger and more demanding business jets. Ultimate planning for the optimum runway length indicated 7,000 feet would be needed. A runway shift to the northwest and a reduction to the southeast end would further reduce the limited area available for any potential runway extension, as an extension to the northwest end is the only option for Runway 13-31. As

a result, the alternative of shifting the runway to the north is not found to be a prudent option and will no longer be considered.

Realign Runway Option

Realigning the runway is another option to consider under this alternative. For Dallas Executive Airport, this option could include building an entirely new runway oriented differently to replace Runway 13-31, or it could include improving crosswind Runway 17-35 to serve as the airport's primary Constructing a realigned runway. runway within the current property boundaries was found not feasible. The airport encompasses a rectangular land mass which is nearly square. The current alignment of Runway 13-31 maximizes the existing area available as it extends from the northwest corner to the southeast corner of airport property. Reorienting the runway would reduce the area available for the runway, thereby, allowing only for a shorter runway length than is currently provided by Runway 13-31. Moreover, the land immediately to the north of Runway 13 is rugged having significant variances in elevation, heavy tree concentration, and creeks and drainage channels. Constructing a new reoriented runway in this area would be cost-prohibitive. As this option could







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-LEGEND -

— — — Airport Property Line

Runway Safety Area (RSA)

- Object Free Area (OFA)
- Ultimate Airfield Pavement
- Pavement to be Removed
 - Runway Protection Zone (RPZ)



Exhibit 4D: SHIFTING RUNWAY 13-31 493' ALTERNATIVE

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not provide even equal runway length and having excessive costs, it has been rejected as not prudent, practicable, and/or feasible.

Another runway realignment option could include improving Runway 17-35 to replace Runway 13-31 as the airport's primary runway. In order to do so, Runway 17-35 would need to provide at least 6,451 feet of length with the opportunity to be extended up to an optimum length of 7,000 feet. The improved runway would also need to meet the larger safety area standards for ARC D-II now in place on Runway 13-31 as described earlier. This option presents significant challenges primarily due to topography and existing roads and land uses north and south of the airport.

The terrain in areas north and south of the runway has significant elevation changes. For example, Runway 17 is situated at 650.7 feet mean sea level (MSL). The topography north of the runway end generally falls to the north/northwest. Approximately 470 feet north of the extended runway centerline, the ground topography is 640 feet MSL as depicted on Exhibit **4E**. The terrain continues to fall to 630 feet MSL at 770 feet north, 620 feet MSL 1,010 feet north, 610 feet MSL 1,490 feet north, 600 feet MSL 1,660 feet north, and finally to 590 feet MSL 1,870 feet north at the property line. The elevation changes support a creek in the north central portion of airport property. South of the runway, the topography is relatively flat until a point approximately 700 feet south of the extended runway centerline. At this point, the terrain drops only two feet; however, only 30 feet farther west, the terrain falls ten feet and continues to decrease sharply over the next 90 feet south as depicted on the exhibit. An on-airport access road, currently being

improved, then traverses the area and the terrain then continues to fall farther south.

Exhibit 4F presents two alternatives which consider improving Runway 17-35 to meet ARC C/D-II standards while providing maximum runway length within what are considered to be significant boundaries. Both alternatives consider extending the runway north to a point at which the RSA and OFA would meet the northern property line. It is believed that the areas north of the airport, including Ledbetter Drive and residential properties, cannot be mitigated for new runway construction. To the south, Red Bird Lane is considered a boundary in the first alternative (left side of the exhibit), while U.S. Highway 67 is considered a boundary in the second alternative (right side of the exhibit).

Alternative 1 includes extending Runway 17-35 940 feet to the north and 498 feet to the south providing a resultant runway length of 5,238 feet. As noted above, this option would be the maximum length possible to provide full ARC C/D-II RSA and OFA within the northern property line and Red Bird Lane to the south. Obviously, this length falls more than 1,000 feet short of that currently provided by Runway 13-31. In fact, this length is much shorter than can be accomplished by simply reducing the length of Runway 13-31 so as to provide a full safety area. The northerly extension would shift the RPZ north of airport property beyond Ledbetter Drive into a residential area. Approximately 16 acres of the RPZ would be shifted beyond airport property and an estimated seven residential units would fall under the shifted RPZ. The southerly extension, as proposed, would shift the RPZ beyond airport property as well but this area

is open land use and compatible with RPZ standards. The area would need to be acquired fee simple or in easement.

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The second alternative presented on the right half of **Exhibit 4F** also presents a 940-foot northerly extension of Runway 17-35. This alternative, however, would extend south beyond Red Bird Lane to where the OFA would be met by U.S. Highway 67. As such, the alternative presents a 1,747-foot extension to the south. The resultant runway length for this alternative would be 6.487 feet. This alternative would require bridging over Red Bird Lane creating a tunnel structure as closure of the road is not considered feasible or desirable. Similar to Alternative 1, the northern extension would shift the RPZ beyond the northern airport property boundary to include seven residences. The southerly extension would also extend beyond airport property. As depicted, the proposed extension would shift the entire 45 acres of the RPZ off-airport and would encompass an estimated 12 residences.

The option of improving Runway 17-35 to serve as the reoriented primary runway would be costly. Simply increasing the RSA dimensions to meet ARC C/D-II standards would require significant fill north and south of the runway without any pavement extensions. Moreover, a creek traverses the wooded areas to the north which would also need to be mitigated in some manner. Obviously then, any extensions of Runway 17-35 to the north or south would require substantial site preparation costs prior to pavement construction.

It has been estimated that the first alternative presented on **Exhibit 4F** would cost \$32.33 million. Nearly half of that cost would be for site preparation and embankment to

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mitigate topographic challenges. The second alternative would be much more costly at \$90.65 million. The embankment costs are nearly \$30 million of the total and an estimated \$20 million for bridging/tunneling Red Bird Lane is also included. It should be noted that these costs do not include property acquisition and/ or incompatible land use mitigation for the RPZ which would further add significant costs if required by the FAA. Based on costs alone, this alternative is not a feasible and/or prudent Moreover, environmental option. factors include placing new noise conditions atop the residences north of the runway and the potential need to mitigate the incompatible land uses (acquire and relocate homeowners) further strengthens the decision to not pursue this alternative any longer.

RSA ALTERNATIVE C: DECREASE RUNWAY LENGTH

As presented in Chapter Three, the current runway length of 6,451 feet meets the majority of aircraft users. This length, however, is not deemed adequate to fully meet the needs of all aircraft users. Previous analysis and requests from the FBO indicated a need for 7,000 feet so as to provide adequate length for the full array of business jet users.

Under this alternative, the southern end of the runway would have to be reduced by at least 493 feet so as to fully meet the RSA standard. As a result, the runway length would be reduced to 5,958 feet. If the FAA also required that a full runway OFA be provided, the runway would need to be reduced by 525 feet leaving only 5,926 feet. Obviously both of these alternatives would reduce the utility of the runway allowing for less than 6,000 feet of runway. The FAA provides guidance regarding runway length reductions in Advisory Circular 150/5220-22A, Engineered Materials Arresting Systems (EMAS) for Aircraft Overruns. The AC states: "The FAA does not require an airport sponsor to reduce the length of a runway or declare its length to be less than the actual pavement length to meet runway safety area standards if there is an operational impact to the airport."

It is believed that reducing the runway length by 493 and/or 525 feet would have a significant negative operational impact to airport users. Moreover, that impact would extend to airport businesses that have invested millions at the airport to serve the potentially impacted operators. Therefore, decreasing runway length to meet RSA (and OFA) standards is not considered prudent and/or practicable.

RSA ALTERNATIVE D: IMPLEMENT DECLARED DISTANCES

The purpose of declared distances is to provide an equivalent RSA, OFA, and, in some cases, the RPZ in accordance with design standards at existing constrained airports where it is otherwise impracticable to meet standards. Declared distances are also employed where there are obstructions in the runway approaches and/or departure surfaces that the airport is unable to remove (as was outlined earlier in the chapter).

The TORA and TODA are typically equal to the actual runway length. The ASDA and the LDA are the primary considerations in determining the runway length available for use by aircraft, as these calculations must consider providing the RSA to standard in operational calculations. The ASDA and LDA can be figured as the usable portions of the runway length less the distance required to maintain adequate RSA beyond the ends of the runway or prior to the landing threshold. As previously noted, the required RSA is 500 feet wide and extends 1,000 feet beyond the runway ends (600 feet is required prior to the landing threshold).

The alternative of using declared distances as a means to provide runway safety area will not factor the RPZ limitations presented earlier in the chapter. These alternatives will be considered independent of any changes based on the RPZ locations as the FAA could allow for the existing non-standard conditions. The combination alternative to be presented later will consider implementing declared distances to meet both RPZ and RSA standards.

RSA Declared Distance Option 1a

Exhibit 4G presents the first RSA declared distance option. As depicted, Option 1a would utilize a reduction in the ASDA and LDA on Runway 13 to provide the full 1,000 feet of RSA beyond the far end of the runway. As previously noted, the current RSA length available beyond the far end of Runway 13 is 493 feet. Therefore, in order to provide 1,000 feet of RSA, the ASDA and LDA for Runway 13 would need to be reduced by 493 feet. As a result, the ASDA and LDA would be reduced to 5,958 feet. This reduction would allow the southern 493 feet to be considered RSA and not available for ASDA and LDA calculations. Combining the 493 feet of runway declared unavailable and the existing 507 feet of RSA equals the 1,000 feet of RSA required.