

CHAPTER 2

PURPOSE AND NEED

2.1 PURPOSE AND NEED

The purpose of the Proposed Action by Evansville-Vanderburgh Airport Authority District (Sponsor) is to provide the airport with improvements which meet Federal Aviation Administration (FAA) design standard criteria and to enhance the operating safety conditions at the Airport. The need is to remove the nonstandard runway safety area (RSA) and reclaim full use of the primary runway length to meet the needs of the most demanding aircraft (critical aircraft) that operates at the Airport. The justification for runway length required for the critical aircraft is explained in detail later in this chapter. The current FAA RSA standards were established in 1988. The FAA developed these RSA standards to help protect lives and property, both in the air and on the ground, in the event an aircraft undershoots, overshoots, or veers off a runway. Standard RSAs must be cleared, drained, and capable of supporting aircraft movements under normal conditions. They must also meet the dimensional requirements of 1,000 feet beyond the end of the runway and 500 feet wide for the aircraft operating at EVV. If objects such as navigational aids must be located in an RSA to operate properly, they must be frangible, designed to break away when hit by a plane, at a height of three inches or less from the ground. The RSA off the ends of both Runway 4 and 22 is non-compliant with current FAA standards. The FAA has issued a national directive to bring RSAs into compliance with FAA airport design standards. There is a Congressional mandate to have non-compliant RSAs fixed by 2015.

2.2 SPONSOR'S PROPOSED ACTION

The Sponsor has adopted the following actions as its preferred alternative on October 26, 2009. To address existing and future needs, the Sponsor is proposing several airfield development items for the Airport through a phased improvement program. The length of this phased development program is dependent upon federal funding but is anticipated to be completed by December of 2015. The Sponsor's Proposed Action is depicted in **Exhibit 2-1**, and outlined in the following sections:

2.2.1 Phase 1

- Land acquisition/reimbursement for Runway 4-22 relocation and enabling projects
- Runway 18-36 approach study and obstruction removals
- Construction project for relocation of Vectren power line in 18-36 approach
- Design project for Indiana Southern Railway relocation

- Construction project for Indiana Southern Railway relocation
- Design project for Oak Hill Road rerouted to intersect with Kansas Road with a new intersection at Millersburg Road
- Design project for S.R. 57 realignment
- Drainage study and permitting for jurisdictional waterway impacts

2.2.2 Phase 2

- Design project for service and access road realignments
- Construction project for Oak Hill Road rerouted to intersect with Kansas Road with a new intersection at Millersburg Road
- Construction project for S.R. 57 realignment
- Design project for Phase 1 grading, drainage and paving package for Runway 4-22 relocation and parallel taxiway improvements
- Runway 4-22 utility relocations
- Commission new Indiana Southern Railway Route and decommission old railway route

2.2.3 Phase 3

- Commissioning to begin on Runway 18 for improved approach procedures (anticipating approach minimums to be as low as 250-foot ceiling height with ½-mile visibility). Runway 18-36 published approaches are targeted to be in place by June 1, 2012 to allow for use by commercial service activity
- Construction project for Phase 1 grading, drainage and paving package for Runway 4-22 relocation and parallel taxiway improvements
- Construction project for service and access road realignments
- Design project for Runway 4 and Runway 22 Nav aids (Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR), glide slope and localizer relocation)
- Design project for electrical package/vault upgrades for Runway 4-22 relocation and parallel taxiway improvements

2.2.4 Phase 4

- Construction project for Runway 4 and Runway 22 Nav aids (MALSR and localizer)
- Construction project for Phase 1 electrical package/vault upgrades for Runway 4-22 relocation and parallel taxiway improvements
- Design project for Phase 2 grading, drainage and paving package for Runway 4-22 relocation and parallel taxiway improvements
- Miscellaneous mitigation measures

2.2.5 Phase 5

- Construction project for Phase 2 grading, drainage and paving and package for Runway 4-22 relocation and parallel taxiway improvements
- Construction project for Phase 2 electrical package/vault upgrades for Runway 4-22 relocation and parallel taxiway improvements
- Construction project for Runway 4 and Runway 22 Nav aids (VASI, glide slope and localizer)
- Miscellaneous mitigation measures
- Demolition and removal of pavement on south end of Runway 4-22
- Commissioning of Runway 4-22 CAT I ILS and MALSR (Runway 4-22 published approaches are targeted to be in place by December 1, 2015 to allow for use by commercial service activity)

2.3 PURPOSE OF THE PROPOSED ACTION

The purpose of the Proposed Action is for Runway 4-22 to comply with RSA standards as outlined in *FAA Advisory Circular (AC) 150/5300-13, Airport Design* and *FAA Order 5200.8 Runway Safety Area Program*. As specified in *FAA AC 150/5300-13, Airport Design*, RSAs must meet specific object clearing, grading, and load bearing requirements. The RSA enhances safety by providing cleared areas to significantly minimize personal injury and damage to an aircraft in the event of an overshoot, undershoot, or veer-offs. They also provide improved accessibility for fire-fighting and rescue equipment during emergencies. RSAs should be graded and free of any structures, traverse ways, roads, railroads, and parking areas.⁹ The objective of *FAA Order 5200.8* is to ensure design standard conformity for all RSAs at federally obligated airports and 14 Code of Federal Regulations (CFR) Part 139 certificated airports, to the extent practicable.

After studying alternatives for improvement to meet RSA design standards, the Sponsor proposes relocating Runway 4-22 to the northeast. As stated in the 2008 Airport Master Plan, this would involve the elimination of the southernmost 2,450 feet of Runway 4-22 and the extension of Runway 4-22 by 2,450 feet to the northeast. The Proposed Action would allow Runway 4-22 to maintain its current length of 8,021 feet (see Section 2.4.2 for justification of length).¹⁰ The purpose of the proposed improvements is to provide clear RSAs on Runway 4-22.

2.4 NEED FOR THE PROPOSED ACTION

2.4.1 Need to Bring Runway 4-22 into Conformance with Current FAA Standards

Runway 4-22 needs improvements in order to meet the FAA's RSA design standards. An FAA RSA Determination found the Runway 4-22 RSAs to be "practicable to meet standards," but also noted that the "RSA dimensions are less than 90% of the standard" and "Navaid improvements may be necessary to meet standards¹¹." Per current design standards, the Runway 4-22 RSA deficiencies include: fencing on U.S. 41 and St. George Road in RSA; localizers for Runways 4 and 22 in RSA; and the terrain off Runway 22 slopes downward and does not meet RSA grading requirements (see **Exhibit 2-2**). Also, the future

⁹ Federal Aviation Administration. September 2006. Advisory Circular 150/5300-13, through Change 10, *Airport Design*.

¹⁰ The Corradino Group. 2008. *Evansville Regional Airport Master Plan Update*.

¹¹ Federal Aviation Administration. August 1, 2000. *Evansville Regional Airport Runway Safety Area Data Sheet*.

widening of U.S. 41 by the Indiana Department of Transportation (INDOT)¹² could create additional RSA conflicts.

To enhance the operating safety conditions, there is a need for other associated airfield improvements including redesign of the complex geometry of Taxiway C and C4¹³, which will be resolved with correction of the Runway 4-22 RSA deficiencies. Also, the Runway 4-22 RSA improvements would eliminate the displaced threshold on Runway 4-22 and the intersection of Runway 4-22 and Runway 18-36, to provide independent runways increasing the reliability of each runway during maintenance and snow removal.

Per FAA compliance requirements, all practicable RSA improvements are to be completed by the end of FY 2015.¹⁴ Several years of construction will be necessary to accomplish the airfield improvements to provide FAA standard RSAs on Runway 4-22. Thus, the development programs needs to be started now in order to meet the FAA deadline. Appropriate FAA funding will also be necessary to meet the 2015 deadline. The Evansville area is growing to the north creating additional development pressure around the airport. To protect the existing investments at the airport it is important to accomplish the improvements now, before future growth makes it more difficult.

2.4.2 Need to Regain Full Use of Runway Length

Considerable investment has already been made to provide a reliable commercial service airport in Evansville. Maintaining and regaining full use of the current length on Runway 4-22 (8,021 feet) will enable EVV to continue to provide this service. In addition to existing obstructions that cause the Runway 4 threshold to be displaced 1,300 feet, reducing the usable landing length to 6,721 feet, the airlines operate with weight restrictions due to existing obstructions and aircraft performance. Any further reduction in runway length reduces the long-term economic viability of commercial service at EVV. The restrictions the airlines operate under are due to fuel loads in excess of what can be carried with today's runway length, as well as obstructions to the single-engine climb profiles of the Embraer Regional Jet (ERJ-145) that will be solved by relocating the threshold northeast, further away from the obstructions.

The ERJ-145 is considered to be one of the most demanding aircraft that

¹² The Corradino Group. 2008. *Evansville Regional Airport Master Plan Update*.

¹³ The Corradino Group. 2008. *Evansville Regional Airport Master Plan Update*.

¹⁴ Federal Aviation Administration. November 19, 2007. *Fiscal Year 2008 ARP Business Plan*.

operates frequently at EVV. The ERJ-145 currently has more than 500 annual operations and is the design critical aircraft for this proposed action. FAA Advisory Circular 150/5300-13, *Airport Design*, and FAA Advisory Circular 150/5325-4B, *Runway Length Requirements for Airport Design* recommend that manufacturers' airport planning manuals (APM) be used for each individual airplane under consideration to obtain runway lengths for airport design. The manufacturer of the ERJ-145, Embraer, identifies the FAR Takeoff Runway Length for that airplane as 7,920 feet for a dry, leveled runway, zero wind, STD + 15° C. This length was interpolated according to the procedure outlined in FAA Advisory Circular 150/5325-4B, Chapter 4. This length does not take into consideration the requirements to adjust the obtained takeoff runway length for non-zero effective runway gradients. The obtained length must be increased by 10 feet per foot of runway difference in runway centerline elevations between the high and low points of the runway centerline elevations. The difference between the high and low point elevations along the proposed runway centerline is ±33 feet. Taking into effect this adjustment, the final recommended runway length is 8,250 feet. However, airline representatives using the ERJ-145 at EVV have indicated that the existing length of 8,021 feet on Runway 4-22 is adequate for future use (see Appendix J). Given this information, for the environmental analysis, maintaining the runway length of 8,021 feet is proposed as the final length for Runway 4-22 throughout this document.

In addition to the need for use of the full runway length on Runway 4-22, during times of closure, it will be critical for Runway 18-36 to maintain a length that is sufficient to serve the scheduled commercial carriers operating at EVV, especially regional jets which make up key critical commercial users.

When designing the future grades on Runway 4-22 consideration needs to be given to the FAR Part 77 7:1 transitional surface impacts off the sides of the runway on the surrounding community in addition to the line-of-sight along the runway.

2.4.3 Need for Associated Taxiway Improvements

Runway 4-22 has an existing parallel taxiway on the northwest side, Taxiway A. Taxiway A will also need to be extended when Runway 4-22 is relocated. Because a significant amount of earthmoving and grading will need to occur for relocation of Runway 4-22, a Master Grading Plan will be established during preliminary design to account for all elements of the proposed action as well as future development activities in the 20-year horizon.

2.4.4 Need for Enabling Projects

In order for there to be clear RSAs off both ends of Runway 4-22, there are a number of enabling projects that will need to be accomplished first. The enabling projects include: (1) Runway 18-36 approach improvements including the removal of obstructions that limit the reestablishment of instrument approach procedures and the addition of instrument approach equipment and procedures for Runway 18-36 in advance of the closure of Runway 4-22 during construction of the runway relocation, (2) land acquisition, (3) Oak Hill Road rerouted to intersect with Kansas Road with a new intersection at Millersburg Road, (4) S.R. 57 realigned to accommodate shifted Runway 4-22 taxiway object free area, and (5) relocation of a portion of the Indiana Southern Railway. All of the enabling projects are needed in advance of the actual relocation and reconstruction of Runway 4-22 to allow for development of RSAs to meet the FAA design standards.¹⁵

2.4.4.1 Approach Improvements for Runway 18-36

Without instrument approaches, Runway 18-36 cannot be used by air carriers during nighttime operations and when weather conditions are more demanding than Visual Flight Rules (VFR). Runway 4-22 will be closed for an extended period of time to construct the RSA improvements. The air carriers will need to use Runway 18-36 during the period of construction to relocate Runway 4-22. Instrument approaches with minimums as low as 250' and $\frac{3}{4}$ mile (with MALS-F) will be developed before construction of Runway 4-22 begins with consideration given to terrain, impact on surrounding neighborhoods, and implementation cost.

An obstruction survey and analysis of the precision approach surfaces (Part 77 and TERPs) on Runway 18 was completed in December 2008 and the data submitted to the applicable agencies (airspace and flight procedures) for their review and comment in an effort to get a new approach in place.

To obtain an instrument approach, the runway has to have a clear glidepath qualification surface (GQS). Upon receiving a request for a new approach, the flight procedures office (FPO) conducts an initial feasibility study to determine specific needs and if the request should go any

¹⁵ The Corradino Group. 2008. *Evansville Regional Airport Master Plan Update*.

further, (infrastructure, GQS penetrations, additional survey requirements, environmental issues, etc).

The obstruction survey identified two obstructions that would conflict with improved instrument approach procedures serving Runway 18-36 that will require remediation. The first obstruction is a Vectren power line serving the Airport and adjoining neighborhood that requires relocation. The high voltage carried by the power line makes burying the line an impractical option. The second group of obstructions involves tree removal and regrading off the north approach to the runway. These obstructions are being addressed as part of a construction project underway in 2009 to remove the obstructions and regrade the approach area of Runway 18. Excavated material obtained from the Runway 18 approach area is being used to grade the Runway 4-22 RSA to bring it as close to compliance with current FAA standards as can be achieved without relocating the Runway 4 localizer antenna. The removal of the Runway 18 approach obstructions and the associated grading activities within the Runway 18 approach area and Runway 4-22 RSA were independently reviewed and categorically excluded by the FAA on July 20, 2009, fulfilling the requirements of NEPA.

Although a small section of S.R. 57 does penetrate the Part 77 approach surface, it does not penetrate the terminal instrument procedures (TERPS) surfaces; accordingly, a design modification will be requested for FAA acceptance.

2.4.4.2 Land Acquisition

The Sponsor currently owns most of the land that would be required for the proposed improvements. A portion of this land acquisition program has not been reimbursed with federal funds, but should be assessed as a part of the Proposed Action.

In addition, there are eleven parcels containing approximately 91 acres that will be impacted by the Proposed Action, including four homes and two businesses. The parcels containing the homes are located within the proposed future runway protection zone (RPZ) of the shifted Runway 4-22. The businesses will be impacted by the relocation of Oak Hill Road and the Indiana Southern Railway. Land acquisition areas are shown on **Exhibit 2-3**.

2.4.4.3 S.R. 57 Realignment

Realignment of a portion of S.R. 57 is needed to enable the relocation of Runway 4-22. The associated extension of Taxiway A will require that a small portion of S.R. 57 be realigned to the north outside of the proposed taxiway safety area (TSA) and object free areas (OFA). The 2008 Airport Master Plan Update identified the relocation of S.R. 57 and associated intersection improvements of S.R. 57 and Oak Hill Road to maintain the traffic flows on S.R. 57.¹⁶ Alternatives for realigning S.R. 57 have been considered as a part of this environmental analysis.

2.4.4.4 Oak Hill Road Rerouting/Upgrading

A partial closure and rerouting of Oak Hill Road is needed to enable the relocation of Runway 4-22. Oak Hill Road is classified as an urban collector and serves as one of the main north-south routes through Vanderburgh County. It is located to the east of EVV, bypassing the current Runway 22 end before intersecting with S.R. 57. The 2008 Airport Master Plan Update identified the closure of Oak Hill Road to the north around the proposed Runway 4-22 extension safety areas, and the improvement of the existing Millersburg Road and Kansas Road pavements to preserve traffic flow.¹⁷ Alternatives for rerouting Oak Hill Road were reviewed during the environmental analysis. The preferred alternative would reconnect Oak Hill Road with S.R. 57 via Kansas Road and would include a new intersection with Millersburg Road to the northeast of its present location.

2.4.4.5 Indiana Southern Railway Relocation

Relocation of a portion of the Indiana Southern Railway is needed to enable the shifting of Runway 4-22 to the northeast. The relocation will begin at a point just west of Oak Hill Middle School and end at a tie-in point near the Rexam Closures and Containers plant on S.R. 57. The 2008 Airport Master Plan Update identified relocation of approximately one mile of the Indiana Southern Railway to conform to minimum allowable curve lengths and radii for railroads.¹⁸ Alternatives for the railway relocation have been considered during this environmental analysis.

¹⁶ The Corradino Group. 2008. *Evansville Regional Airport Master Plan Update*.

¹⁷ The Corradino Group. 2008. *Evansville Regional Airport Master Plan Update*.

¹⁸ The Corradino Group. 2008. *Evansville Regional Airport Master Plan Update*.

2.5 FORECASTS

Projections for the aviation demand for a 20-year planning period at EVV were made during the 2008 Master Plan Update. The forecasts included in the 2008 Master Plan Update are the most recent to be prepared for EVV. The aircraft operations and passenger enplanement forecasts are summarized in **Exhibit 2-4**. The forecasts show a steady increase in both aircraft operations and enplaned passengers through 2024.

EXHIBIT 2-4 EVANSVILLE REGIONAL AIRPORT 2008 Master Plan Update Forecasts		
Years	Aircraft Operations	Enplaned Passengers
2009	79,830	257,090
2014	85,980	283,740
2024	100,290	329,130

Source: Evansville Regional Airport Master Plan Update, 2008.

The FAA has reviewed the 2008 Master Plan Update forecasts and approved their use in this environmental analysis (see **Appendix B**).¹⁹

2.6 REQUESTED FEDERAL ACTION

The Sponsor proposed actions are in response to the federal mandate that RSAs conform to FAA design standards. The alternatives selected for review in this EA are based upon meeting this requirement. The requested federal actions of the FAA with regard to the proposed improvements include:

- issuing a finding of no significant impact (FONSI)
- approving unconditionally the Airport Layout Plan (ALP)
- establishing eligibility for federal funding under the Airport Improvement Program (AIP)
- allowing the Sponsor to use the funds collected through imposition of Passenger Facility Charges (PFC) to implement the development; and
- allowing revisions to instrument approach procedures.

¹⁹ Federal Aviation Administration. Chicago Airport District Office. August 28, 2008. Correspondence from Benjamin Mello, Community Planner.

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