# Runway 11-29 Safety Area Improvement Project Louisville International Airport

# DRAFT Environmental Assessment

**U.S. Department of Transportation** 

**Federal Aviation Administration** 

Louisville Regional Airport Authority

March 2014

This Environmental Assessment becomes a Federal document when evaluated and signed and dated by the Responsible FAA official.

Responsible FAA Official

Date

\*\*This document is intended to be read in its entirety.\*\*

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# 1. PURPOSE AND NEED

The Federal Aviation Administration (FAA) may require the preparation of an EA on any action at any time to assist agency planning and decision making (40 CFR 1501.3b). FAA Order 1050.1E, Environmental Impacts: Policies and Procedures, paragraph 404b, states that "Program offices must prepare concise EA documents with a level of analysis sufficient to:

(1) Understand the purpose and need for the proposed action, identify reasonable alternatives, including a no action alternative, and assess the proposed action's potential environmental impacts.

(2) Determine if an EIS is needed because the proposed action's potential environmental impacts will be significant."

If the FAA evaluation of the Final EA determines that the proposed action will not result in impacts requiring the preparation of an Environmental Impact Statement (EIS), they shall prepare a Finding of No Significant Impact (FONSI). This EA was prepared in compliance with the National Environmental Policy Act of 1969 (NEPA) [42 U.S.C. Section 4321, et seq.], the implementing regulations of the Council on Environmental Quality (CEQ) [40 CFR Parts 1500-1508] and FAA directives (Order 1050.1E, Environmental Impacts: Policies and Procedures, and Order 5050.4B, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions.

#### 1.1 PROJECT NEED

The Louisville International Airport - Standiford Field (SDF) is located in the City of Louisville in Jefferson County, Kentucky as shown in **Figure 1** (figures are in Appendix B of this document). SDF is currently served by three runways as shown in **Figure 2**. All three runways are 150 feet wide. The two primary runways are the north-south parallel runways. Runway 17R-35L is 11,890 feet in length and Runway 17L-35R is 8,579 feet in length. Runway 11-29 is 7,250 feet long and serves as a secondary runway that is typically used when strong crosswind conditions exist. Use of the runway is almost always for takeoffs and landings to the west on Runway 29, which is used for 2.0% of all departures and 2.1% of all arrivals at SDF. Runway 11 is used for 0.1% of all departures and 0.0% of all arrivals at SDF. Navaids for Runway 29 are a Localizer, a Medium Intensity Approach Lighting System (MALSR) and a Precision Approach Path Indicator (PAPI).

In accordance with FAA Advisory Circular (AC) 150/5300-13A, Airport Design, runways are required to have a runway safety area (RSA) which is usually a graded area clear of obstacles. The RSA is centered on the runway centerline, encompassing the entire runway, and extends beyond each runway end. The RSA width and length beyond the runway ends is dictated by the Runway Design Code (RDC). The Aircraft Approach Category (AAC), Airplane Design Group (ADG) and approach visibility minimums are combined to determine the RDC, which for SDF is D-V based on the current and projected fleet mix. The RSA width standard for this RDC is 500 feet. The RSA length standard beyond the runway end is 1,000 feet (for overshoots) and the length prior to the threshold is 600 feet (for undershoots) for runway approaches that provide vertical guidance. Vertical guidance consists of either an instrument approach procedure that

includes vertical guidance or a visual guidance lighting aid (such as a PAPI). Runways without vertical guidance require a full 1,000 feet of RSA beyond the runway end for undershoots. Although the RSA encompasses the entire runway, the focus of this analysis is the safety areas beyond the runway ends of Runway 11-29.

The FAA standard RSA for Runway 11-29 is 1,000 feet from the end of the runway pavement and 500 feet wide. Existing RSAs are shown in Figure 3. The existing RSA at the west (Runway 11) end is 655 feet x 500 feet and 733 feet x 500 feet at the east (Runway 29) end. Runway 29 has a Global Positional System (GPS) approach that provides vertical guidance for GPS-equipped users in addition to a PAPI. Runway 11 has a visual approach that does not have vertical guidance. The existing RSA on Runway 29 satisfies the RSA requirement of 600 feet for undershoots. With no vertical guidance, the RSA on Runway 11 does not satisfy the RSA requirement of 1,000 feet for undershoots. Neither runway end satisfies overshoot requirements. It is impractical to relocate I-65 off the Runway 29 end to provide the 1,000 x 500 feet for Runway 11 overshoots. Although these RSAs do not meet the FAA standards, FAA has allowed use of the full runway length of 7,250 feet for takeoffs and landings. In accordance with Public Law 109-115-Nov. 30, 2005, Runway 11-29 must be brought into compliance with the FAA RSA standards for overshoots and undershoots by December 31, 2015. Application of these standards on the existing airport would require use of a portion of the runway pavement, which would result in 6,840 feet available for takeoffs and landings on Runway 29 and 6,946 feet available for takeoffs and 6,537 feet for landings on Runway 11, as shown in Figure 4. UPS has advised LRAA that it needs 7.250 feet for landings and takeoffs on Runway 29.

The use of an engineered material arresting system (EMAS) is an alternative to providing 1,000 feet of safety area beyond the end of a runway for overshoots.

The entire length of the existing runway does not have paved shoulders. For D-V aircraft, Runway 11-29 is required to have 35-foot paved shoulders, in accordance with AC 150/5300-13A. Pavement at the intersection of Taxiway E with Runway 29 needs to be widened and does not have fillets, which are needed to provide a smooth transition from runway/taxiway to the shoulder for aircraft. Some pavement at the intersection of Taxiway F with Runway 29 is temporary bituminous and needs replacement and widened with concrete. The intersection of Taxiway N with Runway 11-29 is distressed and needs a mill and overlay. There are 10 concrete slabs in Runway 11-29 near this intersection that are distressed and need replacement.

If the required 1,000 x 500 feet RSA were provided off the end of Runway 11, existing Crittenden Drive, the airport service road and industrial property would lie within the standard RSA. Since the RSA must be clear of obstacles, Crittenden Drive and the airport service road would have to be relocated and property acquired to avoid penetration of the RSA.

# **1.2 PROJECT PURPOSE**

The purpose of the project is to provide on existing airport property a runway safety area for Runway 11-29 in accordance with FAA standards, provide paved runway shoulders 35 feet wide as required and maintain the existing Runway 29 landing distance and departure distance of 7,250 feet.

# 1.3 PROPOSED PROJECT

The Proposed Project is shown in **Figure 5** and consists of the following:

- Construct 35-foot shoulders throughout length of Runway 11-29,
- Runway 29 end pavement improvements (widen pavement at the intersection of Taxiway E and add fillets; widen pavement and replace temporary bituminous pavement with concrete at the intersection of Taxiway F),
- Runway 11-29 pavement rehabilitation (mill and overlay at Taxiway N intersection and replacement of 10 concrete slabs),
- Construct asphalt overrun at Runway 11 end,
- Construct 211-foot-long EMAS at Runway 11 end,
- Construct 300-foot-long tunnel 15 feet deep to maintain the airport service road at Runway 11 end,
- Install PAPI at Runway 11 end, and
- Relocate Runway 29 localizer at Runway 11 end.

The cost is estimated at \$21.5 million.

# 1.4 PROPOSED ACTION

The proposed action is environmental approval, for implementation and use, of the preferred alternative selected in Section 2.2.

# 1.5 PERMITS AND APPROVALS

The anticipated permits and approvals required to implement the Proposed Project are provided in **Table 1**.

Unit of Government	Permit or Approval				
Enderel Aviation	Approval of Revised Airport Layout Plan				
Administration (EAA)	Approval of Airport Improvement Program Funding				
Administration (PAA)	Approval of Final EA and issuance of FONSI				
Kentucky Division of Water	Kentucky Pollution Discharge Elimination System (KPDES) General Permit				
Resources	(potential update of current permit)				
Jefferson County	Erosion Control Permit				

#### Table 1: Permits and Approvals

## **1.6 REQUESTED FEDERAL ACTIONS**

The proposed action will include unconditional approval of the Airport Layout Plan (ALP) and approval of the relocation of the Runway 29 localizer for the preferred alternative. The FAA Air Traffic Office Eastern Service Center has reviewed and approved the relocation of the localizer.

The proposed action will include the issuance of environmental approval to establish eligibility of the Airport to compete for Federal funding of the development.

Subject to completion of the environmental document approval and availability of funding, implementation of the preferred alternative will commence. The LRAA will construct, operate, and maintain the preferred alternative for the Airport.

# 2. ALTERNATIVES

# 2.1 ALTERNATIVES UNDER CONSIDERATION

The analysis of alternatives was developed in accordance with the latest criteria from FAA Order 5200.8 *Runway Safety Area Program*, FAA Order 5200.9, *Financial Feasibility and Equivalency of Runway Safety Area Improvements and Engineered Material Arresting Systems (EMAS)*, FAA Advisory Circular 150/5300-13A, *Airport Design*, and FAA Advisory Circular 150/5220-22B, *Engineered Materials Arresting Systems (EMAS) for Aircraft Overruns*.

The FAA requires the use of FAA Order 5200.9 when conducting a RSA alternatives analysis. The guidance uses a standard EMAS installation as a benchmark for comparing and determining the best financially-feasible alternative for RSA improvements. It also establishes the maximum financially-feasible cost for RSA improvements, whether EMAS is involved or not.

All alternatives use declared distances in the analysis. In addition, the alternatives compare using declared distances with no major physical improvements, using EMAS, installing vertical guidance, and making physical improvements to bring Runway 11-29 into compliance with current RSA standards.

The implementation of declared distances introduces a set of terminology and criteria that need to be analyzed. The following is a brief explanation of the criteria as contained in FAA AC 150/5300-13A:

- Takeoff Run Available (TORA): The TORA is defined as the runway length declared available and suitable for the ground run of an aircraft taking off.
- Acceleration Stop Distance Available (ASDA): The ASDA is defined as the runway plus stopway length declared available and suitable for the acceleration and deceleration of an aircraft aborting takeoff. A standard RSA or EMAS is required beyond the end of the ASDA.
- Landing Distance Available (LDA): The LDA is defined as the runway length declared available and suitable for landing an aircraft. A full RSA or EMAS is required beyond the end of the LDA.

EMAS performance, as stated in AC 150/5300-13A, is dependent upon aircraft weight, landing gear configuration, tire pressure, and exit speed of the design aircraft. The design aircraft for Runway 11-29 is the Boeing MD-11aircraft. Based on takeoff performance calculations provided by Engineered Arresting Systems Corporation (ESCO), the maximum allowable takeoff weight (MTOW) on a 7,250-foot runway at SDF for the MD-11 aircraft is approximately 480,000 pounds. Installing EMAS on the west end of the runway would provide for overshoots for aircraft landing from the Runway 29 end. Aircraft typically weigh less when landing than

when taking off. The FAA recommends designing EMAS based on the MTOW of the design aircraft. Based on this MTOW, the resulting EMAS bed should be approximately 490 feet in length with a 75-foot setback per **Figure 3** of FAA Order 5200.9 (in **Appendix A**). However, the available distance for EMAS from the west end of the runway to the programmed Taxiway A extension is less than 300 feet, as shown in **Figure 5**.

According to FAA Advisory Circular (AC) 150/5220-22B, a standard EMAS system is designed for a runway exit speed of 70 knots for the design aircraft.

#### 2.1.1 Alternative 1 -- No Action Alternative

The No Action Alternative represents the course of action that would be pursued if the Proposed Project is not implemented. It consists of the existing airport facilities shown in Figure 3 and the declared distances for Runway 11-29 shown in Figure 4. The distance available for takeoffs is governed by the shorter of two distances – the TORA and the ASDA. For Runway 11-29 the TORA is the physical length of the runway. ASDA is the distance needed to stop the aircraft once full power has been attained and the pilot has to abort the takeoff. That distance must include 1,000 feet for stopping that cannot be part of the runway pavement. For the types of aircraft in the FedEx and UPS fleets, the ASDA determines the available takeoff distance. As shown in Figure 4, the ASDA and LDA on Runway 29 would be decreased from existing 7,250 feet to a declared distance of 6,840 feet. For Runway 11 operations, the ASDA would decrease from existing 7,250 feet to a declared distance of 6,946 feet and the LDA would decrease from existing 7,250 feet to a declared distance of 6,537 feet. This alternative would require 35-foot shoulder construction throughout length of Runway 11-29, Runway 29 end pavement improvements (widen pavement at the intersection of Taxiway E and add fillets; widen pavement and replace temporary bituminous pavement with concrete at the intersection of Taxiway F), Runway 11-29 pavement rehabilitation (mill and overlay at Taxiway N intersection and replacement of 10 concrete slabs), and signing and marking revisions for an estimated total cost of \$5.1 million.

Therefore, the No Action Alternative would not meet the project purpose and need since it would not maintain the existing Runway 11-29 landing and take-off distance of 7,250 feet.

### 2.1.2 Alternative 2 -- Proposed Project

The Proposed Project is described in Section 1.3 and shown in **Figure 5**. It was developed to determine if an EMAS bed that meets standards could be constructed west of proposed Taxiway A within the airport property. An EMAS bed with a length of 211 feet with a setback of 589 feet was evaluated and determined adequate for the design aircraft while maintaining the 7,250-foot LDA and ASDA for Runway 29. The ASDA and LDA would be 6,946 feet for Runway 11. An exit speed of 70 knots for the critical aircraft is attained and therefore achieves the FAA standard.

The location of this EMAS bed crosses over the Airport Service Road. To avoid property acquisition, a 300-foot tunnel 15 feet deep would be constructed under the EMAS bed for the Airport Service Road. This alternative also requires installation of a PAPI and relocation of the existing localizer due to the location of the EMAS bed. The FAA Air Traffic Office Eastern Service Center has reviewed and approved the relocation of the localizer.

The total cost is estimated at \$21.5 million. A detailed breakdown of the costs and assumptions is provided in Appendix A. Note that the EMAS must be replaced during the 20-year life cycle, which also includes annual maintenance costs.

### 2.1.3 Alternatives Eliminated

#### Standard RSA Alternative

The Standard RSA Alternative is shown in **Figures 6** and **6A** and consists of the following:

- Construct 35-foot shoulders throughout length of Runway 11-29,
- Runway 29 end pavement improvements (widen pavement at the intersection of Taxiway E and add fillets; widen pavement and replace temporary bituminous pavement with concrete at the intersection of Taxiway F),
- Runway 11-29 pavement rehabilitation (mill and overlay at Taxiway N intersection and replacement of 10 concrete slabs),
- Clear and grade 1,000 x 500-foot area at Runway 11 end to provide standard RSA,
- Acquire approximately 3.95 acres of commercial manufacturing/enterprise zone property,
- Relocate Crittenden Drive and the airport service road around Runway 11 end RSA, and
- Relocate Runway 29 localizer at Runway 11 end.

Extending the RSA requires the Airport Service Road, Crittenden Drive and the existing airport boundary fence to be relocated. The relocation of the Airport Service Road and Crittenden Drive would require property acquisition from portions of six parcels within the adjacent industrial development. The property acquisition assumes that all of parcels 6 and 8 would need to be acquired in addition to portions of Parcels 3, 5, 9 & 10, for a total of approximately 4.0 acres (see **Figure 6A**).

This property acquisition requires 35% of an existing business to be acquired. However, it would not be likely that only one third of the business operations would be able to be relocated due to the nature of the business (chemical coatings). Chemical coating is a multi-stage process and removing one of the stages from the process would render the plant out of its current capacity. Relocation of the entire chemical plant could potentially involve significant environmental, political and public pressures from the surrounding community.

The total cost is estimated at \$48.6 million of which land acquisition is approximately \$40.9 million. This alternative was eliminated because it would cost an estimated \$29.5 million more than the Proposed Project and would be disruptive to the surrounding community.

# 2.2 PREFERRED ALTERNATIVE

The No Action Alternative would not meet the project purpose and need since it would decrease the LDA and the ASDA on Runway 29. The Proposed Project would achieve the project purpose and need and its environmental impacts are minimal. The Proposed Project is therefore selected as the preferred alternative.

# 3. AFFECTED ENVIRONMENT AND FUTURE ACTIONS

SDF is located approximately five miles south of the downtown of the City of Louisville, which is the seat of government for Jefferson County. Louisville is also the center of a seven-county Metropolitan Statistical Area comprised of Bullitt, Jefferson, Oldham, and Shelby Counties in Kentucky and Clark, Floyd, and Harrison Counties in Indiana. SDF is centrally located within a built-up urban environment. The land use immediately west of Runway 11-29 consists of a mixture of airport-compatible development (warehousing, industrial and commercial). Residential neighborhoods adjoin the warehousing, industrial, and commercial areas. The land use immediately east of Runway 11-29 and I-65 was residential in the past, but is now an Enterprise Zone District and residents can voluntarily relocate as part of the LRAA noise mitigation plan.

Future actions include implementation of the Long Term Plan for SDF shown in **Figure 7**. The committed foreseeable future action affecting the alternatives under consideration is the extension of Taxiway A.

# 4. ENVIRONMENTAL CONSEQUENCES

This section assesses the environmental impacts of the alternatives under consideration in accordance with the policies and procedures contained in FAA Order 5050.4B, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Projects, as revised April 28, 2006 and FAA Order 1050.1E, Policies and Procedures for Considering Environmental Impacts, as revised March 20, 2006, for compliance with NEPA and implementing regulations issued by the Council on Environmental Quality (CEQ) found in 40 CFR parts 1500-1508.

Order 1050.1E describes the 18 environmental impact categories that must be addressed in this Draft EA. These 18 categories are addressed in alphabetical order.

## 4.1 AIR QUALITY

The two primary laws that apply to air quality are NEPA and the Clean Air Act, as amended (CAA). The FAA is required under NEPA to prepare an environmental review document for Federal actions that can potentially affect the quality of the human environment including air The CAA established National Ambient Air Quality Standards (NAAQS) for six quality. pollutants, termed "criteria pollutants." The six pollutants are carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO<sub>2</sub>), ozone (O7<sub>3</sub>), particulate matter (PM-10 and PM-2.5) and sulfur dioxide  $(SO_2)$ . The CAA requires each state to adopt a plan approved by the EPA – called the state implementation plan - to achieve the NAAQS for each criteria pollutant. The proposed action's impact on air quality in a NEPA document is normally assessed by evaluating the impact of the proposed action on the NAAQS. Therefore, Federally sponsored airport development in Kentucky must conform with the Kentucky State Implementation Plan (SIP) in accordance with the criteria and procedures established in the SIP as specified by EPA in 40 CFR Part 51, Subpart W – Determining Conformity of General Federal Actions to State or Federal Implementation Plans. According to Subpart W, a conformity determination (with the SIP) is required for each criteria pollutant if the emissions in a non-attainment or maintenance area for that pollutant caused by a federal action (proposed action) would equal or exceed a specified annual emission rate when compared to the no action alternative or would be 10 percent or more of the non-attainment or maintenance area's emission inventory for that pollutant in the SIP.

Jefferson County, Kentucky is non-attainment for PM-2.5. Since annualized aircraft operations are not expected to materially change due to the No Action Alternative and the Proposed Project, changes in air quality emissions are expected to be minimal.

The proposed physical improvements for the alternatives under consideration are minimal; it is not expected that the air quality emissions during construction will exceed any de minimis levels for criteria pollutants.

# 4.2 COASTAL RESOURCES

Federal activities involving or affecting coastal resources are governed by the Coastal Barriers Resources Act (CBRA), the Coastal Zone Management Act (CZMA) and Executive Order (E.O.) 13089, Coral Reef Protection. The CBRA, as amended, prohibits federal financing for development within the Coastal Barriers Resources System, which consists of undeveloped coastal barriers along the Atlantic and Gulf coasts and along the shores of the Great Lakes. The CZMA requires that a proposed action be consistent with approved coastal zone management programs.

The alternatives under consideration are not located within a federally-designated coastal barrier area or coastal zone or coral reef area; therefore, analysis of the alternatives under consideration with respect to the CBRA, CZMA and E.O. 13089 is not applicable.

# 4.3 COMPATIBLE LAND USE

The compatibility of existing and planned land uses in the vicinity of an airport is associated with the extent of the airport's noise impacts, other impacts exceeding thresholds of significance that have land use ramifications including disruption of communities, relocation and induced socioeconomic impacts, and effects on the safety of aircraft operations.

The Airport Development Grant Program (49 USC 47101 *et seq.*) requires that a project may not be approved unless the Secretary of Transportation is satisfied that the project is consistent with the plans (existing at the time the project is approved) of public agencies for development of the area in which the airport is located (49 USC 47106(a)(1)).

The current and foreseeable runway use for Runway 11-29 is minimal (approximately 2.1% overall) and the alternatives under consideration should not materially alter the use of the runway. The Proposed Project would not have an adverse noise impact because it would have the same effect as the No Action Alternative on noise sensitive land uses, as shown in **Figure 10**.

The alternatives under consideration would have no land use effects.

# 4.4 CONSTRUCTION IMPACTS

Construction impacts are short-term, occurring only during the period when construction personnel and equipment are operating at SDF.

Construction noise is very transient in nature and dependent on the type of work. The equipment that produces it is limited to the construction area on airport or to the haul routes. This noise is mitigated by the fact that construction is predominantly performed during daylight hours when people are much less sensitive to noise.

Potential temporary air quality impacts from construction include fugitive dust associated with site work and haul routes, exhaust and machinery-related emissions from construction equipment and haul vehicles and potential congestion in the vicinity of construction sites and on haul routes. Contractors would be required to mitigate construction/grading activities disrupting ground cover by controlling fugitive dust emissions and other airborne particulates in accordance with specifications including measures such as applying water to exposed soils, and limiting the extent and duration of exposed soil conditions. All equipment on this project will be required to be maintained in good working order and all air pollution control equipment will be operational. Contractors would be required to conform to all applicable federal, state, and local regulatory requirements.

The earthwork necessary to construct the Proposed Project will create the potential for erosion and siltation. An Erosion Control Permit from Jefferson County will be required. Based on recent construction projects in the vicinity, construction of the tunnel should encounter perched water sources and therefore dewatering is expected. Sumps and pumps should be needed during construction to control groundwater. The contractor should employ a geotechnical engineer to monitor the tunnel excavation and construction. The FAA AC 150/5370-10E, "Standards for Specifying Construction of Airports," Item P-156 "Temporary Air and Water Pollution, Soil Erosion, and Siltation Control" will be included in the project specifications and the contractor will be required to meet the requirements in it.

All construction debris will be required to be disposed of at an approved site and none of it will be allowed to be deposited in wetlands or other sensitive sites.

Heavy equipment used during construction would require fueling, routine maintenance, and potentially minor repairs while on site. There is a risk of minor spills or leaks of petroleum products during maintenance and equipment refueling. This risk is typical of any construction project involving similar activities. The contractor is responsible for the implementation of measures to prevent petroleum spills and the reporting and clean-up requirements for any petroleum spills that occur during construction.

# 4.5 DEPARTMENT OF TRANSPORTATION ACT, SECTION 4(f)

This section considers the impacts of the airport alternatives on resources eligible for review under Section 4(f) of the 1966 Department of Transportation Act.<sup>1</sup> Section 4(f) states that the

<sup>&</sup>lt;sup>1</sup> In January 1983, as part of an overall recodification of the DOT Act, Section 4(f) was amended and codified in 49 U.S.C, Section 303. This regulation is commonly known as "Section 4(f)."

Secretary of the U.S. Department of Transportation may not approve a project that requires the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or land in an historic site of national, state or local significance. The act requires that no project be approved unless there is no feasible and prudent alternative to using that land and planning for the project includes all possible measures to minimize harm resulting from the use of the land. Section 4(f) applies if archaeological sites are found that warrant preservation in place.

Gray & Pape, Inc. performed a Phase I historical/architectural survey in 2002 that identified a complex south of the proposed RSA improvement for Runway 11 that has been determined eligible for listing in the NRHP by the Kentucky State Historic Preservation Officer (SHPO) – a circa (c.) 1920s brick factory building complex that was the original factory of the Wood Mosaic Corporation. The complex is located on MacLean Avenue west of Crittenden Drive, and would not be affected by the Proposed Project. The Final EA for Construction of Parallel Taxiway A Project (HNTB Corporation, August 2006) provides detail for these resources.

A Phase 1 archaeological survey was completed by Gray & Pape, Inc. in May 2007.<sup>2</sup> An area (Area 1, Figure 7 in the report) was not accessible and was recommended for a Phase 1 survey. The Report is available for review at the LRAA office; contact Dwight Clayton at (502) 368-6524. This area would not be affected by the alternatives under consideration.

The alternatives under consideration would have no effect on Section 4(f) resources.

## 4.6 FARMLANDS

The Farmland Protection Policy Act (FPPA) regulates Federal actions with the potential to convert farmland to non-agricultural uses. As stated in the Natural Resources Conservation Service (NRCS) Rules, Part 658 -- Farmland Protection Policy Act, *Farmland* means prime or unique farmlands as defined in section 1540(c)(1) of the Act or farmland that is determined by the appropriate state or unit of local government agency or agencies with concurrence of the Secretary to be farmland of statewide local importance. It does not include land already in or committed to urban development or water storage.

The area affected by the Proposed Project does not contain prime or unique farmland and is planned for airport use. Therefore the alternatives under consideration would not impact farmlands.

# 4.7 FISH, WILDLIFE, AND PLANTS

Section 7 of the Endangered Species Act (ESA), as amended, applies to Federal actions and sets forth requirements for consultation to determine if the proposed action may affect an endangered or threatened species. If an endangered or threatened species or its critical habitat may be affected, Section 7(a)(2) of the ESA requires the Federal lead agency to consult with the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS), as appropriate, to ensure that the proposed action does not jeopardize the continued existence of the

<sup>&</sup>lt;sup>2</sup> Phase 1 Archeological Investigations for Taxiway A and Relocation of Crittenden Drive, Louisville International Airport, Gray & Pape, Inc., May 1, 2007

affected species. Threatened, endangered, candidate and proposed state-listed animal and plant species and their habitats that exist in the affected environment must also be considered. Plant or animal species with special status are also included.

The affected environment is the area that would be disturbed by the proposed construction. The area that would be disturbed by the Proposed Project consists of mowed turf and pavement on airport property. There is one federally endangered species, the Indiana Bat (*Myotis sodalis*), that could potentially forage in the proximate area west of Runway 11. The potential Indiana Bat habitat is not within the affected environment and therefore the alternatives under consideration would not adversely affect the Indiana Bat.

# 4.8 FLOODPLAINS

Executive Order 11988 directs Federal agencies to take action to reduce the risk of flood loss, minimize the impact of floods on human safety, health and welfare, and restore and preserve the natural and beneficial values served by floodplains. Order DOT 5650.2 contains DOT policies and procedures for implementing the executive order. Agencies are required to show there is no practical alternative before taking action that would have a significant encroachment on a 100-year floodplain based on a 100-year flood. In terms of NEPA, a significant encroachment would occur when the proposed action would have notable adverse impacts on the natural and beneficial values of the floodplain.

Floodplains are defined as that portion of lowland and flat area adjoining waters subject to a one percent or greater chance of flooding in any given year (i.e., a 100-year flood event). Federal Emergency Management Agency (FEMA) 100-year and 500-year floodplain data were reviewed for the existing airport site to determine potential impacts.

As shown in **Figure 8** southern portions of SDF are located in a 100-year floodplain. The Proposed Project would not occur within the floodplain; therefore, there is no impact from the alternatives under consideration.

# 4.9 HAZARDOUS MATERIALS, POLLUTION PREVENTION AND SOLID WASTE

Four primary laws have been passed governing the handling and disposal of hazardous materials, chemicals, substances and wastes. The two statutes most important to this project are the Resource Conservation and Recovery Act (RCRA), as amended, and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended. RCRA governs the generation, treatment, storage and disposal of hazardous wastes. CERCLA provides for consultation with natural resources trustees and cleanup of any release of a hazardous substance (excluding petroleum) into the environment. Agencies should include an appropriate level of review regarding the hazardous nature of any materials or wastes to be used, generated or disturbed by the proposed action, as well as the control measures to be taken.

Known sites containing hazardous or potentially hazardous substances are present along Runway 17R-35L, Taxiway B and west of Runway 17R-35L as shown in **Figure 9**. The Proposed Project may affect soil containing foundry sand. This soil is from the former Louisville Forge and Gear

(LF&G) site and would need to be handled and disposed of in accordance with the controls set forth in the "Soils Management Plan" issued on April 29, 1997 by ETI Corradino and the "General and Site-Specific Environmental Controls, Louisville International Airport at Standiford Field, Louisville, Kentucky" issued March 2011 by the LRAA.

# 4.10 HISTORICAL, ARCHITECTURAL, ARCHAEOLOGICAL AND CULTURAL RESOURCES

Historical, architectural, archaeological and cultural resources that would be affected by federally funded/licensed undertakings come under the protection of the National Historic Preservation Act of 1966 (16 U.S.C.470), as amended. This act, in Section 106, requires federal agencies to consider the effects of such undertakings on properties listed, or eligible for listing, in the National Register of Historic Places (NRHP). Regulations related to this process are described in 36 CFR Part 800: Protection of Historic Properties.

A broader range of cultural resources comes under the protection of Section 4(f) of the U.S. Department of Transportation (DOT) act of 1966, which requires projects funded by the DOT to avoid significant historic sites unless there is no "feasible and prudent" alternative. In general, this provision applies to resources that are in, or are eligible for inclusion in, the NRHP. However, at the discretion of the DOT, Section 4(f) protection may also be extended to properties that do not meet NRHP criteria as long as the responsible jurisdiction advocates Section 4(f) status.

The area of potential effect (APE) is the geographic area or areas within which an undertaking may cause changes in the character or use of archaeological sites or historic properties. A potential effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling or association. Examples of adverse effects include physical damage or alteration of the property, change of the character of the property's use or of physical features within its setting that contribute to its historical significance, and introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features. The Proposed Project would not introduce atmospheric or audible elements when compared to the No Action Alternative.

Therefore, the APE for historic properties is the area that contains a property that would be acquired or physically disturbed to the extent that its current use may be affected, or that would be significantly visually affected by the alternatives. For archaeological sites, the APE is the area where the ground could be disturbed as a direct or indirect consequence of the Proposed Project. As stated in Section 4.5 above, there are no historic properties determined eligible for listing in the NRHP and no archaeological sites that would be affected by the alternatives under consideration.

# 4.11 LIGHT EMISSIONS AND VISUAL IMPACTS

Light emission effects consider the extent to which any lighting associated with the undertaking would create an annoyance among people in the vicinity or interfere with their normal activities. Visual or aesthetic effects deal more broadly with the extent that the undertaking contrasts with the existing environment, architecture, historic or cultural setting, or land use planning, and whether the jurisdictional agency considers this contrast objectionable.

The alternatives under consideration would not adversely impact residential areas. Since the Proposed Project would not include vertical improvements, it is not expected that it would have aesthetic effects.

# 4.12 NATURAL RESOURCES AND ENERGY SUPPLY

The proposed action is to be examined to identify any proposed major changes in stationary facilities or the movement of aircraft and ground vehicles that would have a measurable effect on local supplies of energy or natural resources. For most actions, natural resource consumption does not typically result in significant impacts. If it is determined that demand will exceed supplies, impacts would be deemed significant and further review required.

The alternatives under consideration would have no adverse effect on local energy supplies.

# 4.13 NOISE

The analysis of noise considers the effects of aircraft noise on residential population and noisesensitive activities at other places (schools, hospitals, nursing homes, churches, auditoriums, outdoor amphitheaters, and concert halls). FAA's most recent compatible land use noise guidelines are contained in Appendix A of Title 14 CFR Part 150.

For aviation noise analysis, the FAA has determined that the cumulative noise energy exposure of individuals resulting from aviation activities must be established in terms of annual average day/night sound level (DNL) as FAA's primary noise metric. According to FAA land use compatibility guidelines, noise exposure levels of less than DNL 65 dBA are compatible with residential and other noise-sensitive land uses.

#### Significant Noise Impact Thresholds

According to FAA Order 1050.1E, a significant noise impact would occur if the analysis shows that the proposed project would cause noise-sensitive areas to experience an increase in noise of DNL 1.5 dB or more at or above DNL 65 dB noise exposure when compared to the no action alternative for the same timeframe. For example, an increase from DNL 63.5 to 65 dB is considered a significant impact.

Noise contours for the No Action Alternative and the Proposed Project are shown on **Figure 10**. The Proposed Project would not change runway use or fleet mix. When strong crosswind conditions exist, Runway 29 is used almost exclusively for takeoffs and landings to the west, which accounts for approximately 2.1% of all operations at SDF. Compared to the No Action Alternative, the Proposed Project would have a Runway 29 ASDA and LDA of 7,250 feet, compared to an ASDA and LDA of 6,906 feet for the No Action Alternative. The relocation of

the Runway 29 localizer would result in a very slight change to the flight track for the localizer approach. Right now the localizer course is 0.3 degrees offset from the runway centerline and the relocated localizer course is 0.6 degrees offset resulting in only a 0.3 degree difference. The paths diverge slightly beginning at the outer marker located 5.3 miles from the runway end. The maximum flight track difference between the Proposed Project and the No Action Alternative is 75 feet located at a point 1.6 miles from the end of the runway compared to the No Action Alternative. These effects on the DNL contours are minimal and not noticeable on **Figure 10**. The Proposed Project would not have an adverse noise impact on noise-sensitive uses because it would have essentially the same effect as the No Action Alternative on these uses.

# 4.14 SECONDARY (INDUCED) IMPACTS

Induced or secondary impacts include any shifts in patterns of population movement and growth, the demand for public services, and changes in business and economic activity to the extent influenced by proposed airport development. According to Order 1050.1E, secondary impacts would not normally be significant except where there is also a significant impact to another category; particularly noise, land use, or direct social impacts.

The affected environment is the City of Louisville and surrounding communities. The Proposed Project and No Action Alternative would not induce additional operations at SDF.

The development pattern in the City and surrounding communities in general and around the airport in particular, would not change as a result of implementing the Proposed Project. Population movement and the growth and demand for public services would not change beyond those patterns and levels currently experienced in the City and surrounding communities.

# 4.15 SOCIOECONOMIC IMPACTS, ENVIRONMENTAL JUSTICE AND CHILDREN'S ENVIRONMENTAL HEALTH AND SAFETY RISKS

#### **Socioeconomic Impacts**

Socioeconomic impacts include the displacement of persons and businesses as a result of the acquisition of real property, disruption of local traffic patterns that substantially reduce the levels of service of the roads serving the airport and surrounding communities, and a substantial loss in community tax base.

The Proposed Project would not displace persons or businesses or disrupt local traffic patterns; therefore there are no impacts.

#### **Environmental Justice (EJ)**

The U.S. Department of Transportation (DOT) issued DOT Order 5610.2, Environmental Justice (EJ) in Low-Income Populations and Minority Populations (62 FR 18377, April 15, 1997) to implement in part Executive Order (E.O.) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations (59 FR 7629, February 16, 1994) and the accompanying Presidential Memorandum, and the DOT Strategy (60 FR 33896, June 29, 1995). EJ is concerned with whether or not a federal action would result in a disproportionate environmental or public health adverse impact to minority populations or low income populations. E.O. 12898 requires an examination of whether these impacts are

disproportionately high and adverse, and evaluation of measures to avoid or minimize the identified disproportionately high and adverse impacts.

There would be no adverse effects on low-income or minority populations from the Proposed Project because there are no low-income or minority populations affected by the Proposed Project.

#### **Children's Environmental Health and Safety Risks**

The purpose of this impact category is to determine whether or not adverse impacts to the health and safety risks of children as a result of the Federal action are disproportionate. The Proposed Project would not affect the health and safety risks of children because there are no children affected by the Proposed Project.

## 4.16 WATER QUALITY

The Federal Water Pollution Control Act (commonly referred to as the Clean Water Act) provides for the establishment of water quality standards, control of discharges, development of waste treatment management plans and practices, prevention or minimization of the loss of wetlands, the location with regard to an aquifer or sensitive ecological area such as a wetlands area, and the regulation of other issues concerning water quality. The purpose of this section is to determine if the proposed action has the potential to exceed water quality standards from the discharge of surface water runoff or the impact to the groundwater and water supply/drinking water sources, or affect waste treatment management plans and practices. Wetland impacts are discussed in Section 4.17.

The affected environment consists of the receiving waters for storm water runoff and groundwater underlying the Proposed Project.

#### **Surface Water**

The airport property is approximately 70 percent impervious and lies within the Ohio River watershed. Storm water runoff from the airport drains in a generally north to south pattern and is collected in a system of ditches and storm sewer pipes and conveyed to seven outfalls. Small portions of the northwestern and northeastern corners of the airport drain to ditches, which discharge into the Metropolitan Sewer District (MSD) system. The airport has 40 oil/water separators located throughout the property to intercept storm water from chemical storage areas. Each unit has a valve that allows it to discharge to the sanitary or storm sewer as appropriate.

The airport has a Kentucky Pollutant Discharge Elimination System (KPDES) Permit that regulates the discharge of pollutants to the receiving waters. As characterized in the permit, storm water runoff from the airport may come into contact with aircraft deicing fluids, pavement deicing chemicals, and fuel residuals that have the potential to impact the storm water. The segment of Northern Ditch/Pond Creek that the airport runoff eventually discharges to is listed on Kentucky's 303(d) list of impaired waters because of ammonia (Un-ionized), fecal coliform, nutrient/eutrophication biological indicators, organic enrichment (sewage) biological indicators.

The runway/taxiway pavement associated with the alternatives will have little impact on water quality. Because of the addition of impervious area with the proposed construction, there may be an increase in runoff volume and peak discharge rate from the site.

The Proposed Project physical improvements would require an erosion and sediment control permit issued by Jefferson County. A comprehensive erosion control plan to minimize soil loss during construction will be needed to obtain this permit.

#### Groundwater

In Jefferson County, groundwater is obtained from sedimentary rocks of (oldest to youngest) Ordovician, Silurian, Devonian and Mississippian ages, and unconsolidated sediments of Quaternary age. SDF is underlain by Devonian Age fractured shale and limestone bedrock. The City of Louisville is located on the slope of the Cincinnati Arch in which bedrock is generally dipping westward. The potential for karst features and groundwater movement is high within the limestone bedrock

It is not expected that the Proposed Project would have an adverse effect on the groundwater. Post construction operation would also not likely have an adverse effect on the groundwater due to the limited pavement expansions. Construction activities may disturb existing contaminated soils, as discussed in Section 4.9, Hazardous Materials, Pollution Prevention and Solid Waste.

## Wastewater and Water Supply

The Proposed Project would not induce aircraft operations, and therefore would not increase wastewater flows or water supply requirements.

# 4.17 WETLANDS

Executive Order 11990, DOT Order 5660.1A: Preservation of the Nation's Wetlands, the Rivers and Harbors Act of 1899 and the Clean Water Act, Section 404, address activities in wetlands.

The US Army Corps of Engineers (USCOE) has jurisdiction over wetlands that are adjacent, tributary, or have significant nexus to waters of the US. The USCOE 1987 manual outlines the criteria and procedures for identifying wetlands. Once the USCOE receives a project specific permit application or request for a jurisdictional determination, the USCOE will determine if the affected wetlands are adjacent, tributary or have significant nexus to waters of the US. Isolated wetlands and areas created in upland which are not intended to create wetland conditions, such as the active waste water treatment ponds on the existing airport property, are not USCOE jurisdictional wetlands.

Review of the National Wetland Inventory as held by U.S. Fish and Wildlife indicated that there are no wetlands off either end of Runway 11-29; therefore the Proposed Project would not impact any wetlands.

# 4.18 WILD AND SCENIC RIVERS

The Wild and Scenic Rivers Act, as amended, describes those river segments designated or eligible to be included in the Wild and Scenic Rivers System. River segments eligible for

protection are those that are free flowing and have "outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural and other similar values." River segments that appear to qualify for inclusion in the National Wild and Scenic River System are listed on the Nationwide Rivers Inventory (NRI), compiled by the National Park Service of the U.S. Department of Interior.

No wild and scenic river or NRI river segment is located in the affected environment of any alternative. Therefore, the Proposed Project would not impact a wild and scenic river or NRI river segment.

# 4.19 CUMULATIVE EFFECTS

A cumulative effect on the environment results from the incremental effect of a proposed action/alternative when added to other past, present and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. The CEQ Handbook "Considering Cumulative Effects" (January 1997) recommends that a list of potential effects and issues be established during the scoping process; that a geographic boundary and timeframe be established, that a list of other actions contributing to cumulative effects be identified, and that information related to the affected environment and environmental consequences be obtained. This information should include thresholds, standards, guidelines and planning goals.

Cumulative effects are effects the alternative would have on a particular resource when added to effects on that resource due to past, present, and reasonably foreseeable actions within a defined timeframe and geographical area. The primary purpose of this analysis is to determine if the cumulative effects exceed the threshold of significance for the particular resource and therefore require either avoidance or mitigation. This requires the availability of quantitative data. Therefore, the timeframe used in this EA is five years for past actions. Reasonably foreseeable future actions are actions that the proponent has committed to completing within the same timeframe as the implementation of the proposed action.

Past, present and reasonably foreseeable future actions that could affect the Proposed Project are the construction of Crittenden Drive and the extension of Taxiway A. None of the resources in Sections 4.1-4.18 would have a cumulative effect from these actions that would result in a significant impact from the Proposed Project.

# 5. PUBLIC AND AGENCY COORDINATION

# 5.1 PUBLIC COORDINATION

The Draft EA has been posted on the LRAA website, http//www.flylouisville.com. The LRAA will hold an information open house during the comment period for the purpose of informing interested parties on the project.

# 5.2 INTERAGENCY COORDINATION

LRAA has coordinated with the Kentucky State Clearinghouse and the FAA in the preparation of this Draft EA.

# 6. LIST OF PREPARERS

Preparer	Title/Firm	Education/ Registration	Years Exp.	EA Responsibility		
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Scott Litsheim	Project Planner, HNTB	BA Geography	17	Technical Assistance and Graphics		

The following individuals assisted in the preparation of this document.

# 7. LIST OF AGENCIES, JURISDICTIONS, PRIVATE PARTIES AND DEPOSITORIES THAT RECEIVED THE DRAFT EA

#### Federal

U.S. Army Corps of Engineers

- U.S. Environmental Protection Agency
- U.S. Department of the Interior, Fish and Wildlife Service

U.S. Department of Agriculture

Kentucky Air National Guard

#### State

Kentucky Heritage Council, State Historic Preservation Officer Kentucky Division of Water Resources Office of State Highway Engineer

#### **Regional/Municipalities**

Louisville – Metro Public Works and Assets Jefferson County Air Pollution Control District Metropolitan Sewer District

#### Libraries

Bon Air Branch Library Highland-Shelby Park Branch Library Louisville Public Library

#### Others

UPS FedEx

# APPENDIX A

# SUPPORTING INFORMATION

Environmental Assessment – Runway 11-29 Safety Area Improvement Project





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#### RUNWAY 11-29 SAFETY AREA IMPROVEMENTS LOUISVILLE INTERNATIONAL AIRPORT INITIAL COST ESTIMATE

No Action Alternative										
		Engineering Design		Construction Inspection		LRAA Management				
Item Description	Construction Costs	(% of Construction)	4	(% of Construction)	6	(% of Construction)	3		Item Total	
Shoulder Installation	\$ 1,292,638	<b>\$</b> 5	51,706	<b>\$</b> 7	7,558	<b>\$</b> 3	8,779	\$	1,460,680	
29 End Pavement Improvements	\$ 2,697,200	\$ 107,888		\$ 161,832		\$8	0,916	\$	3,047,836	
Pavement Rehabilitation	\$ 466,620	\$ 1	8,665	\$ 2	7,997	\$ 1	3,999	\$	527,281	
Signage/Striping Revisions	\$ 47,000	47,000 \$ 1,880		\$ 2,820		\$ 1,410		\$	53,110	
Alternate Totals	\$ 4,503,458	\$ 18	30,138	\$ 27	0,207	\$ 13	5,104	\$	5,088,907	

Proposed Project									
		Engineering Design	Construction Inspection	LRAA Management					
Item Description	Construction Costs	(% of Construction) 4	(% of Construction) 6	(% of Construction) 3	Item Total				
Shoulder Installation \$ 1,292,638		\$ 51,706	\$ 77,558	\$ 38,779	\$ 1,460,680				
29 End Pavement Improvements	\$ 2,697,200	\$ 107,888	\$ 161,832	\$ 80,916	\$ 3,047,836				
Pavement Rehabilitation	\$ 466,620	\$ 18,665	\$ 27,997	\$ 13,999	\$ 527,281				
Asphalt Overrun	\$ 221,553	\$ 8,862	\$ 13,293	\$ 6,647	\$ 250,355				
EMAS Installation (211')	\$ 4,493,959	\$ 179,758	\$ 269,638	\$ 134,819	\$ 5,078,173				
EMAS Life Cycle and Annual									
Replacement Cost	\$ 2,172,604	\$ 43,452.08	\$ 43,452.08	\$ 43,452.08	\$ 2,302,960				
Tunnel Installation & Service Road	\$ 7,500,000	\$ 300,000	\$ 450,000	\$ 225,000	\$ 8,475,000				
Rwy 29 Localizer Relocation	\$ 250,000	\$ 10,000	\$ 15,000	\$ 7,500	\$ 282,500				
PAPI Installation	\$ 50,000	\$ 2,000	\$ 3,000	\$ 1,500	\$ 56,500				
Alternate Totals	\$ 19,144,573	\$ 722,331	\$ 1,061,770	\$ 552,611	\$ 21,481,285				

Standard RSA Alternative									
		Engineering Design		Construction Inspection		LRAA Management			
Item Description	Construction Costs	(% of Construction)	4	(% of Construction)	6	(% of Construction)	3		Item Total
Shoulder Installation	Shoulder Installation \$ 1,292,638 \$ 51,706		\$ 77,558		\$ 38,779		\$	1,460,680	
29 End Pavement Improvements	\$ 2,697,200	\$ 107,888		\$ 161,832		\$ 80,916		\$	3,047,836
Pavement Rehabilitation	\$ 466,620	\$ 18,665		\$ 27,997		\$ 13,999		\$	527,281
Rwy 29 Localizer Relocation	\$ 250,000	\$ 10,000		<b>\$</b> 1	5,000	\$	7,500	\$	282,500
Grading of R/W 11 Safety Area \$ 5		ş	2,000	\$	3,000	\$	1,500	\$	56,500
Property Acquisition \$ 40,900,000							\$	40,900,000	
Crittenden Drive Relocation	\$ 2,100,000	\$ 84,000		\$ 12	6,000	\$ 6	3,000	\$	2,373,000
Alternate Totals \$ 47,756,458 \$ 274,258 \$		\$ 41	1,387	\$ 20	5,694	\$	48,647,797		

Notes:

1. Engineering Design is estimated at 4% of the Construction Costs.

2. Construction Inspection costs are estimated at 6% of the Construction Costs.

3. LRAA Management costs are estimated at 3% of the Construction Costs.

4. Quantities are based on the current information available.

5. Cost in the breakdown are based on past bid costs when available.

6. The cost to relocate the signage/striping revisions (\$47,000) in the No Action Alternate is carried over from earlier iterations of the report.

7. The cost of the tunnel installation based on installation of similar tunnels at other airports.

8. The cost to relocate the localizer (\$250,000) is carried over from earlier iterations of the report.

9. The cost of the PAPI is based on similar installations.

10. The cost of the grading the safety area is estimated based an area.

11. The cost of the property acquisition is carried over from earlier iterations of the report.

12. The cost of the Crittenden Drive relocation is carried over from earlier iterations of the report.

13. Does not include FAA reimbursable costs.

# **APPENDIX B**

# **FIGURES**

Figure 1 - Location Map

Figure 2 - Existing Airport

Figure 3 - Runway 11-29 Existing Conditions

Figure 4 - No Action Alternative

Figure 5 - Proposed Project

Figure 6 and 6A - Standard RSA Alternative Eliminated

Figure 7 - Long Term Airport Plan

Figure 8 - Floodplains

Figure 9 - Contaminated Sites

Figure 10 - 2016 Noise Contours - No Action Alternative and Proposed Project





# FIGURE 2 - EXISTING AIRPORT









# FIGURE 3 - RUNWAY 11-29 EXISTING CONDITIONS



#### LOUISVILLE INTERNATIONAL AIRPORT



## FIGURE 4 - NO ACTION ALTERNATIVE







# FIGURE 5 - PROPOSED PROJECT







## FIGURE 6 – STANDARD RSA ALTERNATIVE ELIMINATED







# FIGURE 6A - STANDARD RSA ALTERNATIVE ELIMINATED







FIGURE 7 – LONG TERM AIRPORT PLAN

AIRPORT AUTHORITY®



1-PERCENT ANNUAL CHANCE FLOODPLAIN BASE FLOOD ELEVATIONS DERIVED FROM THE DETAILED HYDRAULIC AMALYSES ARE PROVIDED AT SELECTED INTERVALS WITHIN THIS ZONE.

![](_page_35_Picture_3.jpeg)

![](_page_35_Picture_4.jpeg)

![](_page_36_Figure_1.jpeg)

![](_page_37_Figure_1.jpeg)

![](_page_37_Figure_2.jpeg)

## FIGURE 10 - 2016 NOISE CONTOURS NO ACTION ALTERNATIVE AND PROPOSED PROJECT

![](_page_37_Picture_4.jpeg)

![](_page_37_Picture_5.jpeg)