

**RSA DETERMINATION
(2018)
AND
RUNWAY SAFETY AREA
ANALYSIS (2009)**

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Effective Date: January 1, 2016

ARP SOP No. 8.00

APPENDIX B. RSA DETERMINATION FORM

1. **LOCID:** JQE **City/State:** Concord/North Carolina
2. **Airport Name:** Concord Regional Airport
3. **Runway:** 02/20
4. **DETERMINATION:**
 - ☒ RSA Meets Standards
 - ☐ The Existing RSA Does not meet standards but it is practicable to improve the RSA so that it will meet current standards.
 - ☐ The existing RSA can be improved to enhance safety, but the RSA will still not meet current standards.
 - ☐ The existing RSA does not meet current standards, and it is not practicable to improve the RSA.
5. ☒ **RSA Determination Replaces Previous Determination:** June 10, 2010
(Date of previous determination)
6. **Part 139 Airport:** ☒ **OR** **RSAI Attached (Non-Part 139 Airport):** ☐
7. **Visibility Minimums (check one):** ☐ $\geq \frac{1}{4}$ NM ☒ $< \frac{1}{4}$ NM 02 Runway End
☐ $\geq \frac{1}{4}$ NM ☒ $< \frac{1}{4}$ NM 20 Runway End
8. **Aircraft Approach Category/Airplane Design Group:** I
9. **RSA Standard (AC 150/5300-13):** 1,000 ft/600 ft 500 ft
Length Width
10. **Existing RSA Dimensions measured from runway end, stopway end, or end of Landing Distance Available (LDA) or Accelerate Stop Distance Available (ASDA) if declared distances published in the Airport Facility Directory:**

Runway Apch End	Length (existing)	Width (existing)	Dimensions Uniform?
02	1,000 ft Dep/600 ft App	500 ft	Yes
20	1,000ft Dep/1,000ft App	500 ft	Yes

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11. Selected Improvement Alternatives:

- a. All improvements complete (skip to item 14): ☒
b. Runway Length/Position Alternatives:

Rwy Apch End	Relocate	Shift	Realign	Shorten	Declared Distances	Other (specify)

Relocate = Move entire runway to new position

Shift = Move or slide existing runway along its longitudinal axis

Realign: Rotate runway axis

Declared Distances (if applicable)

Runway Apch End	TORA	TODA	LDA	ASDA
02	7,400	7,400	7,400	7,400
20	7,400	7,400	6,350	7,400

- c. Expand/Grade RSA surface:

Runway Apch End	Acquire Land to Increase Size	Grade Surface	Install Standard EMAS (Full Dimension RSA)	Non-Standard EMAS (Non-Standard RSA)

12. Object Removal:

Runway Apch End	Relocate Road/Highway	Relocate Utilities	Relocate Fencing	Other (specify)

NOTE: NAVAIDS are tracked in the RSAI database, or RSA Inventory, and addressed through a separate process. FAA-ATO Tech Ops issues an RSAI Project Compliance Notice when a non-standard, FAA-owned NAVAID is removed or retrofitted within an RSA. Completed ATO Technical Operations RSAI Project Compliance Notices must be attached to the RSAD.

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13. **Supporting Documentation/Rationale:** This determination is based on the best, current available information. If information becomes available at a later date that can effect changes or revisions to this determination, the determination will be revised.

The following documentation supports this determination:

Attached	Supports RSAD	Type of Documentation
<input type="checkbox"/>	<input type="checkbox"/>	Runway Safety Area Inventory
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Airport Master Record or Airport Facility Directory
<input type="checkbox"/>	<input type="checkbox"/>	Approved Airport Layout Plan Click here to enter text. (Date)
<input type="checkbox"/>	<input type="checkbox"/>	On-site verification by sponsor, State, ADO or Certification Inspector
<input type="checkbox"/>	<input type="checkbox"/>	NOAA/NGS Obstruction Chart
<input type="checkbox"/>	<input type="checkbox"/>	As-Built Construction Plans Click here to enter text. (Date)
<input type="checkbox"/>	<input type="checkbox"/>	Approved Airport Certification Manual
<input type="checkbox"/>	<input type="checkbox"/>	Financial Feasibility and Equivalency of Runway Safety Area Improvements and Engineered Material Arresting Systems Study (Order 5200.9)
<input type="checkbox"/>	<input type="checkbox"/>	Correspondence from Airport
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Other (Specify) Memo dated September 7, 2018 from ATO for JQF RSA Inventory Compliance Notice.

14. **Narrative Documentation/Comments (summary of preferred RSA improvement alternative(s), summary of completed improvements, documentation of deviation from selected RSA improvement alternative, documentation of unusual circumstances etc.) (Attach additional sheets if necessary):**


The Runway 02 Localizer antenna was relocated to 645 ft from the Runway 02 Threshold to provide 600 ft RSA on the Runway 02 Approach End. Declared distances were instituted to provide a fully compliant RSA.

The sponsor would like to install EMAS on the Runway 02 end, so that they may recover the lost length associated with the Landing Distances Available (LDA) for Runway 20. Please note that the RSA currently meets standards with the declared distances.

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Effective Date: January 1, 2016

15. Signatures:



Phillip J. Braden
Manager, Memphis ADO

9/12/18
Date

B-4



Federal Aviation Administration

Memorandum

Date: 9/07/18
To: Anthony Cochran, ESA Airports Regional RSA Representative
From: John Lerch, NAVAIDS/Infrastructure/PIM Team
Prepared By: Amie Duffey, Program Analyst, NAVAIDS PIM Team
Subject: Runway Safety Area Inventory Compliance Notice

The Air Traffic Organization initiated RSA violation projects to address the following violation(s):

The localizer antenna is located inside the RSA, and the "Declared" safety area.

Service Area/Region: ESA / ASO
Airport Name/Location Identifier: Concord Regional Airport, NC (JQF)
Facility Type/object: LOC
Runway/Runway End: 20/02
ARP Unique Number(s): 748170020006
Job Control Number: 906156

The aforementioned NAVAID object(s) comply with the current airport design standards for the Runway Safety Area (RSA) and an update to the RSA database is requested by the ATO. The update to the RSA Inventory to reflect the following:

- ☐ The existing RSA meets the current standards contained in AC 150/5300-13.
- ☒ The object was removed from the RSA.
- ☐ The RSA was improved to the extent practicable.
- ☐ The object in the RSA is a Non-Federal system.

Comments:

The Runway 02 localizer antenna was relocated to a platform 645' from the RWY 02 threshold. The Declared distance for the RWY 02 threshold is 400', which places the localizer antenna 45' outside of the declared distance RSA.

If you have any questions, please contact Frank Cruz at 404-305-7129.


Team Mgr Signature and Date 9/7/18


RSA Regional POC Signature and Date 9/7/18

☒ Concur ☐ Non-Concur

Attachments: Runway Safety Clearance Form

Atlanta NAVAIDS Engineering Center Runway Safety Area (RSA) Clearance Form			
Project:	RSA Sterilization		Date: 09/04/2018
Location:	Concord Regional Airport	TSSC WR #: 2028	
JCN:	906156	ARP Unique Id:	748170020006
Runway End:	02		
Facility:	LOC	Facility Ident:	JQF Runway: 20
RSA Tasks: The localizer antenna is located inside the RSA, and the "Declared" safety area.			
RSA Violation Clearance Date:		08/28/2018	
Action Taken.			
Unique ID (748170020006) – The Runway 02 localizer antenna was relocated to a platform 645' from the RWY 02 threshold. The Declared distance for the RWY 02 threshold is 400', which places the localizer antenna 45' outside of the declared distance RSA.			

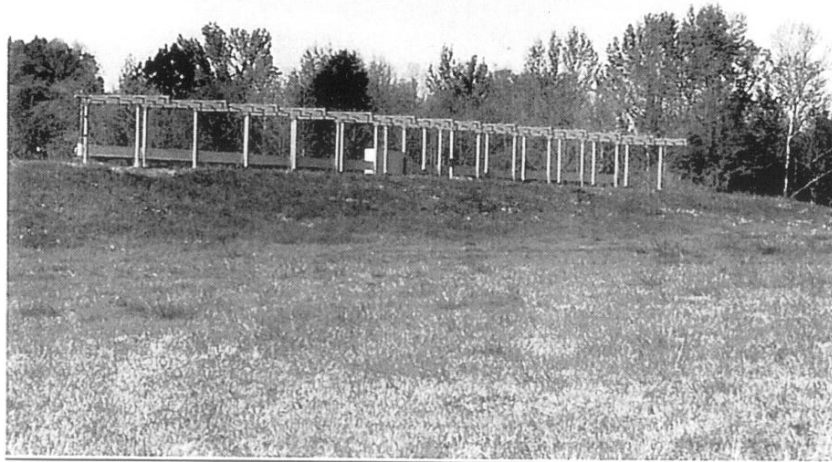


Figure 1: RWY 20 Localizer antenna before.

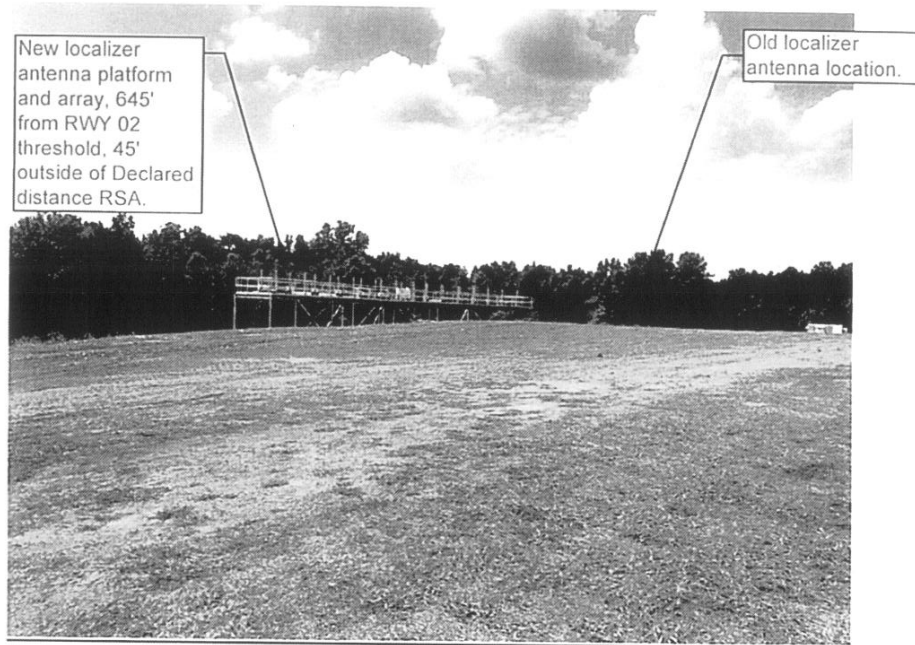


Figure 2: RWY 20 Localizer antenna, after.

CONCORD-PADGETT REGIONAL AIRPORT

MASTER PLAN UPDATE

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION				AIRPORT MASTER RECORD		AFD EFF 09/13/2018 FORM APPROVED OMB 2120-0015	
ASSOC CITY:		CONCORD	4 STATE: NC	LOC ID: JQF	FAA SITE NR: 16644.2'A		
AIRPORT NAME:		CONCORD RGNL		5 COUNTY: CABARRUS NC			
CBD TO AIRPORT (NM): 07 W			6 REGION/ADO: ASO/MEM	7 SECT AERO CHT: CHARLOTTE			
<u>GENERAL</u>			<u>SERVICES</u>		<u>BASED AIRCRAFT</u>		
0 OWNERSHIP: PUBLIC > 70 FUEL: 100LL A A1+					90 SINGLE ENG: 114		
1 OWNER: CITY OF CONCORD					91 MULTI ENG: 15		
2 ADDRESS: 9000 AVIATION BLVD			> 71 AIRFRAME RPRS: MAJOR		92 JET: 32		
CONCORD, NC 28027			> 72 PWR PLANT RPRS: MAJOR		TOTAL: 161		
3 PHONE NR: 704-920-5900			> 73 BOTTLE OXYGEN: HIGH				
4 MANAGER: DANNY JACOBS			> 74 BULK OXYGEN:		93 HELICOPTERS: 5		
5 ADDRESS: 9000 AVIATION BLVD			> 75 TSNT STORAGE: HGR, TIE		94 GLIDERS: 0		
CONCORD, NC 28027			> 76 OTHER SERVICES:		95 MILITARY: 0		
6 PHONE NR: (704) 920-5941			AVNCS, CHTR, INSTR, RNTL, SALES		96 ULTRA-LIGHT: 0		
7 ATTENDANCE SCHEDULE:							
ALL	ALL	ALL	<u>FACILITIES</u>		<u>OPERATIONS</u>		
			> 80 ARPT BCN: CG		100 AIR CARRIER: 2,500		
8 AIRPORT USE: PUBLIC			> 81 ARPT LGT SKED : SEE RMK		102 AIR TAXI: 6,164		
9 ARPT LAT: 35-23-15.9900N ESTIMATED			BCN LGT SKED: SS-SR		103 G A LOCAL: 23,299		
0 ARPT LONG: 080-42-32.8900W			> 82 UNICOM: 122.950		104 G A ITRNRT: 33,139		
1 ARPT ELEV: 704.7 SURVEYED			> 83 WIND INDICATOR: YES-L		105 MILITARY: 861		
2 ACREAGE: 750			84 SEGMENTED CIRCLE: YES		TOTAL: 65,963		
3 RIGHT TRAFFIC:			85 CONTROL TWR: YES		OPERATIONS FOR		
4 NON-COMM LANDING: NO			86 FSS: RALEIGH		12 MONTHS		
			87 FSS ON ARPT: NO		ENDING: 06/30/2018		
5 NPIAS/FED AGREEMENTS: NGHLY			88 FSS PHONE NR:				
6 FAR 139 INDEX: I C U 10/2006			89 TOLL FREE NR: 1-800-WX-BRIEF				
<u>RUNWAY DATA</u>							
0 RUNWAY IDENT: 02/20							
1 LENGTH: 7,400							
2 WIDTH: 100							
3 SURF TYPE-COND: ASPH-G							
4 SURF TREATMENT: GRVD							
5 GROSS WT: 5							
6 (IN THSDS) D 129.0							
7 2D							
8 2D/2D2							
9 PCN: 37 /F/C/X/T							
<u>LIGHTING/APCH AIDS</u>							
0 EDGE INTENSITY: HIGH							
2 RWY MARK TYPE-COND: PIR - G / PIR - G			- / -	- / -	- / -	- / -	
3 VGSB: P4L / P4L			/	/	/	/	
4 THR CROSSING HGT.: 69 / 38			/	/	/	/	
5 VISUAL GLIDE ANGLE: 3.50 / 3.00			/	/	/	/	
6 CNTRLN-TDZ: - N / - Y			- / -	- / -	- / -	- / -	
7 RVR-RVV: - / -			- / -	- / -	- / -	- / -	
8 REIL: Y /			/	/	/	/	
9 APCH LIGHTS: / MALSR			/	/	/	/	
<u>OBSTRUCTION DATA</u>							
0 FAR 77 CATEGORY: C / PIR			/	/	/	/	
1 DISPLACED THR: / 650			/	/	/	/	
2 CTLG OBSTN: TREES / TREES			/	/	/	/	
3 OBSTN MARKED/LGTD: /			/	/	/	/	
4 HGT ABOVE RWY END: 13 / 127			/	/	/	/	
5 DIST FROM RWY END: 281 / 3,200			/	/	/	/	
6 CNTRLN OFFSET: 248L / 500R			/	/	/	/	
7 OBSTN CLNC SLOPE: 6:1 / 23:1			/	/	/	/	
8 CLOSE-IN OBSTN: N / N			/	/	/	/	
<u>DECLARED DISTANCES</u>							
0 TAKE OFF RUN AVBL (TORA): 7,400 / 7,400			/	/	/	/	
1 TAKE OFF DIST AVBL (TODA): 7,400 / 7,400			/	/	/	/	
2 ACLT STOP DIST AVBL (ASDA): 7,400 / 7,000			/	/	/	/	
3 LGND DIST AVBL (LDA): 7,400 / 6,350			/	/	/	/	
RPRT MGR PLEASE ADVISE FSS IN ITEM 86 WHEN CHANGES OCCUR TO ITEMS PRECEDED BY >							
10 REMARKS							
26 INDEX C ARFF.							
34 RWY 02/20 GROOVED FULL LENGTH ASPHALT.							
81 WHEN ATCT CLSD: TDZL RY 20: HIRL RY 02/20 & REIL RY 02 PRESET LOW INST' ACTVTD MALSR RY20: REIL RY 02: TDZL RY 20: HIRL RY 02/20 - CTAF.							
10-002 FOR CD WHEN ATCT IS CLSD CTC CLT APCH AT 704-359-0241.							

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Concord Regional Airport Runway Safety Area Analysis



Prepared For:
Concord Regional Airport
in association with
North Carolina Department of Transportation Division of Aviation
and Federal Aviation Administration

Prepared by:
Talbert & Bright, Inc.
in consultation with
S&ME, Inc.
HDR Engineering, Inc. of the Carolinas

October 13, 2009

**RUNWAY SAFETY AREA ANALYSIS
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RUNWAY SAFETY AREA ANALYSIS



In 1994 when Concord Regional Airport (Airport) was constructed the runway safety area (RSA) for Runway 2 was modified to a functional length of 600-feet to ensure that the wetlands and floodplain associated with the Rocky River would not be negatively impacted.¹

The ability of Concord Regional Airport to meet both existing needs and projected growth is dependent on the ability of Runway 2-20 to accommodate long-range jet traffic. In terms of economic impact, the primary users of the Airport are NASCAR race teams, which currently base their aircraft at the Airport and some have even located their business operations at the adjacent business park. These teams had a need for a longer runway. In addition to these teams, the rapid growth of the Airport and surrounding community, as well as the trend in aviation towards the use of corporate jets, strongly supported the need for extending and strengthening the existing runway. Therefore, Runway 20 was extended 1,900' to meet these needs.

The Federal Aviation Administration (FAA) has requested that the Airport evaluate all practicable alternatives for improving the RSA on Runway 2 to meet FAA requirements. The results of this analysis are discussed below.

PURPOSE OF ANALYSIS

According to FAA AC 150/5300-13 Airport Design (Change 14) the RSA, which is 500-feet wide by 600-feet long prior to landing threshold and 1,000-feet long beyond runway end, shall be:

- Cleared, graded, and have no potentially hazardous ruts, humps, depressions, or other surface variations.
- Drained by grading or storm sewers to prevent water accumulation.
- Capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and fire fighting equipment and the occasional passage of aircraft without causing structural damage to the aircraft.
- Free of objects, except for objects that need to be located in the runway safety area because of their function.

¹ Talbert, Cox & Associates, Inc. in association with Michael C. Rose and Associates, Inc. (July 1990). New Cabarrus County Airport, North Carolina Environmental Assessment. Prepared for U.S. Department of Transportation Federal Aviation Administration.

RUNWAY SAFETY AREA ANALYSIS



In an effort to meet FAA requirements, the Airport evaluated several options to extending the RSA to 1,000-feet including:

- physically extending the RSA toward the Rocky River;
- displacing the Runway 2 threshold;
- using engineering materials for emergency stopping (FAA AC 150/5220-22A Engineered Material Arresting Systems [EMAS] for Aircraft Overruns).

EXTENDING RSA TOWARD ROCKY RIVER

The evaluation of extending the RSA toward the Rocky River required determination of the extent of the floodplain and floodway associated with the Rocky River, as well as the extent of wetlands. The results of these analyses are discussed below.

Floodplain Analysis

An analysis was performed to evaluate the potential adverse impact the extension of the Runway 2 RSA would have on the current Rocky River floodplain and 100-year water surface elevations.² This analysis included trying to obtain the original step backwater computer model HEC-2 input/output information for the Rocky River; however this data was not available from FEMA and required that the base model be reestablished.

In an effort to reestablish the base model, two cross-sectional geometries were surveyed at the east (cross-section 1) and west (cross-section 2) ends of the existing RSA. The new HEC-2 computation included cross-sections BQ, 1, 2, and BR, as well as the known water surface elevation at cross-section BQ from the original Flood Insurance Study.³ The base model was successfully reestablished to duplicate the current 100-year flood elevations at cross-sections BQ (595.8) and BR (598.0).

Based on the HEC-2 modeling, it was determined that the Runway 2 RSA could be extended 240-feet without encroaching into the existing floodplain at cross-section 2 and encroaching into the existing floodplain at cross-section 1 by 120-feet (refer to illustrations on pages 4 and 5). However, the proposed extension would not increase the existing condition water surface elevations within the floodplain.

² HDR Engineering, Inc. of the Carolinas (December 2001). Approval Request of No-Impact Certificate for Concord Regional Airport Runway Safety Area Extension on Rocky River Cabarrus County, North Carolina. Prepared for Talbert & Bright, Inc.

³ Federal Emergency Management Agency (November 2, 1994). Flood Insurance Study Cabarrus County North Carolina and Incorporated Areas.

RUNWAY SAFETY AREA ANALYSIS



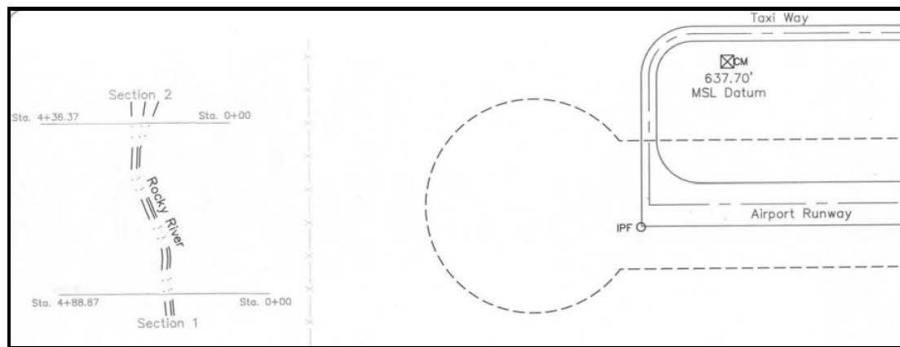
100-Year Stage Comparison
(Feet NGVD)

Cross-Section	Original Flood Insurance Study	Reestablished Base Model	Proposed 240' RSA Extension Model	Difference (feet)
BQ	595.8	595.8	595.8	0.0
1	-	596.3	596.3	0.0
2	-	596.9	596.9	0.0
BR	598.0	598.0	598.0	0.0

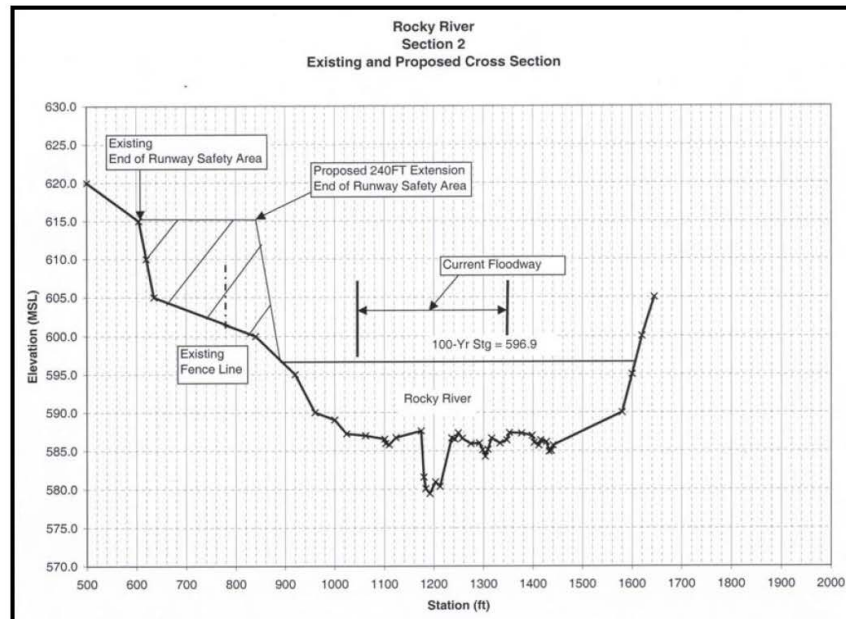
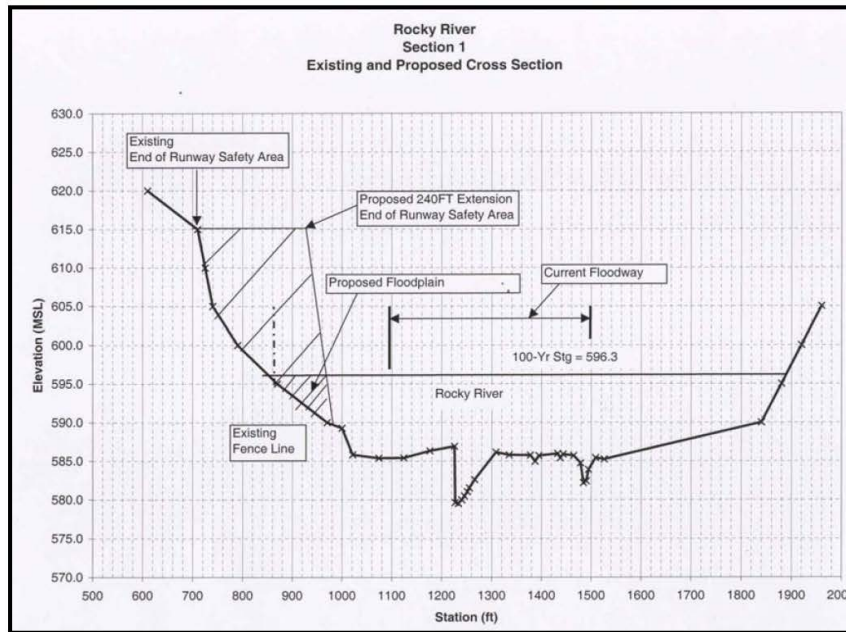
Source: HDR Engineering Inc. of the Carolinas, December 2001.

Since the floodway HEC-2 data set was not available, reproducing the original floodway limits was not possible. However as shown in the cross-sections on pages 3 and 4, encroachment does not occur into the current floodway limit and would therefore have no impact on the floodway.

In accordance with Article 4 of the Concord Unified Development Ordinance, the Runway 2 RSA extension would encroach approximately 2.5 acre-feet below the 100-year flood stage, thus requiring a compensation volume of the same in the vicinity of the encroachment. In addition, Article 4 of the Ordinance requires at least a 50-foot buffer from the edge of the Rocky River to the proposed 240-foot RSA extension. There would be approximately 200-feet from the edge of the River to the edge of the proposed RSA extension; thus complying with Ordinance requirements.



RUNWAY SAFETY AREA ANALYSIS



RUNWAY SAFETY AREA ANALYSIS

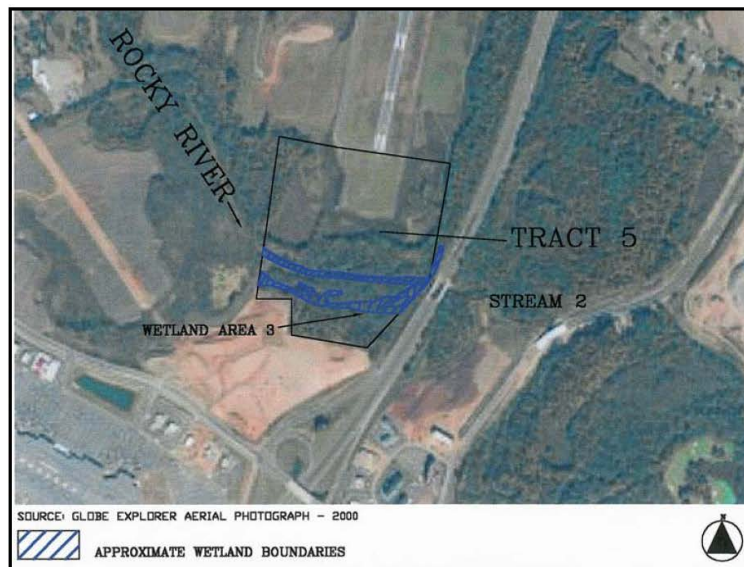


Wetland Analysis

Rocky River runs west to east for approximately 1,400 feet across the central portion of the Runway 2 RSA extension study area. A low-grade alluvial floodplain surrounds the River corridor. The River is approximately 15- to 20-feet wide. Based on assessment of on-site conditions, the following jurisdictional wetland was identified within the area of the proposed action:^{4, 5}

- Wetland Area 3 — this wetland area is a “back-water slough” located near the southern side of the Rocky River within the Runway 2 RSA extension study area. The wetland is dissected by multiple drainage patterns, many of which were dry at the time of the field visit. One of the drainage features had a steady flow of water and joined the Rocky River near its junction with I-85. When the Rocky River reaches “bank-full stage” in storm events, water spills onto the adjacent floodplain and is trapped in this low area behind an alluvial berm located next to the River (refer to the illustration on page 6).

Field verification of the extent of the wetland edge indicated that on the north side of the Rocky River, the wetland area is confined along the riverbank and would not be impacted if the RSA was extended 240-feet.



⁴ S&ME (December 2001). Jurisdictional Wetland Delineation Concord Regional Airport – Tracts 2, 3 & 5 Cabarrus County, North Carolina. Prepared for Talbert & Bright, Inc.

⁵ S&ME (January 2002). Wetlands Assessment & Jurisdictional Delineation Concord Regional Airport Tracts 2, 3 & 5 Cabarrus County, North Carolina. Prepared for Talbert & Bright, Inc.

RUNWAY SAFETY AREA ANALYSIS



DISPLACING RUNWAY 2 THRESHOLD

The RSA for Runway 20 extends 600-feet beyond the end of the runway. The airport reference code for Concord Regional Airport is a C-II and FAA AC 150/5300-13 states that the RSA should extend 1,000-feet beyond the end of the runway for a C-II airport. Currently, the following declared distances cover the deficiency of the RSA.

DESCRIPTION	RUNWAY 2	RUNWAY 20
TORA	7,400'	7,400'
TODA	7,400'	7,400'
ASDA	7,400'	7,000'
LDA	7,400'	6,350'

TORA – Takeoff Run Available; TODA – Takeoff Distance Available;
ASDA – Accelerate Stop Distance Available; LDA – Landing Distance Available

In order to comply with FAA AC 150/5300-13, Runway 2 threshold would have to be displaced 400-feet. However, FAA AC 150/5300-13 also states threshold displacement should be undertaken only after a full evaluation reveals that displacement is the only practical alternative. Displacement of the threshold will reduce the length of Runway 2 landing distance available from 7,400' to 7,000'. However, there would be no change to the other declared distances.

The displacement of the threshold can be reduced by re-grading the end of Runway 2 to extend the RSA to 840-feet (refer to Section 1.1). The threshold would then need to be displaced 160-feet to completely comply with FAA AC 150/5300-13.

Displacing the threshold would require numerous expenses. In order to achieve a runway with uniform markings, the entire runway would need to be completely stripped of the existing airfield pavement markings and new pavement markings painted. It would also require new threshold lights and changing the lenses on existing threshold lights and runway lights to indicate the displaced threshold. The existing runway end indicator lights (REIL) and precision approach path indicator (PAPI) would also need to be relocated due to the new threshold position.

GROOVING RUNWAY 2/20

Grooving a runway provides increased skid resistance for a shorter braking distance of an aircraft on wet pavement. The grooves





RUNWAY SAFETY AREA ANALYSIS

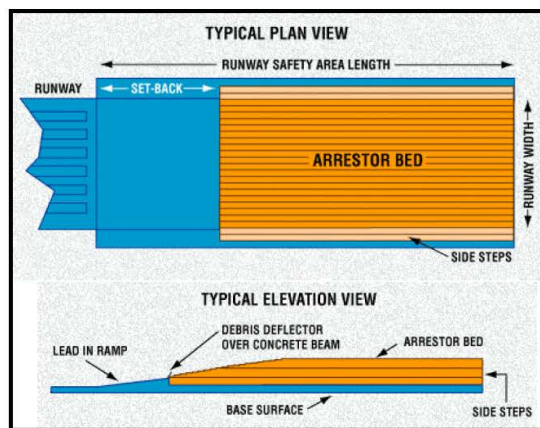
- help to drain the runway ten times faster than an ungrooved runway;
- provide the most effective method of increasing the friction coefficient of the pavement;
- reduce the stopping distance to nearly dry performance;
- prevent hydroplaning during aircraft landings and take-offs during inclement weather;
- remove oil, molten rubber, and other materials from the tire footprint; and
- provide interruptions in the pavement surface to facilitate the dispersion of thin ice from the tire path.

Based on continued studies with the military, the FAA has indicated that they want all runways over 4,000-feet in length that receive turbojets grooved to decrease the potential of hydroplaning.⁶

The runway is scheduled for grooving as part of the runway overlay project, and should be complete by March 2010.

ENGINEERED MATERIAL ARRESTING SYSTEMS (EMAS) ANALYSIS

An EMAS is designed to stop an overrunning aircraft by exerting predictable deceleration forces on its landing gear as the EMAS material crushes. An EMAS is located beyond the end of the runway; centered on the extended runway centerline; beginning some distance (100-feet or more) from the end of the runway to avoid damage because of jet blast or short landings. The minimum width of the EMAS is the width of the runway. The system is designed to arrest aircraft types using a runway at exit speeds of up to 70 knots. EMAS uses a patented



⁶ Personal communication with Mr. David Cross, FAA (202-267-8744), December 4, 2001.

RUNWAY SAFETY AREA ANALYSIS

cellular-cement system jointly developed and tested by Engineered Arresting Systems Corporation and FAA. Costs for EMAS vary greatly depending on the condition of the existing overrun, mix of aircraft to be controlled, available run-out distance, cost and availability of support labor, and on-site storage space available at the airport. Typical EMAS installation costs vary from \$2 million to \$4 million plus site preparation costs.

In an effort to determine the size of the EMAS required at Concord Regional Airport, Engineered Arresting Systems Corporation was provided the proposed aircraft mix (including a small number of 727s, 737s, and DC-9s) used to analyze potential noise impacts.⁷

Based on the existing 600-foot runway safety area, with localizer at the back, it was determined that an EMAS could provide the 70-knot performance targeted by FAA *AC 150/5220-22*. The preliminary modeling performed by Engineered Arresting Systems Corporation used the Gulfstream III and Learjet 35 (critical aircraft) at 70 knots and resulted in the location of the EMAS arrestor bed approximately 350-feet from the end of the runway for a length of approximately 250-feet. The projected 727, 737, and DC-9 aircraft would also achieve performances of 60 to 70 knots using an EMAS.

The cost, based on the 100-foot-wide runway, would be approximately \$2 million for the arrestor bed. Design and site preparation costs would add an additional \$0.5 million to \$1 million — for an anticipated total cost of between \$2.5 million and \$3.0 million.

Business jets drive the need for a 1,000-foot runway safety area. For the small general aviation aircraft, the EMAS would probably not provide stopping benefits. General aviation aircraft require only 240- or 600-foot runway safety areas, and thus the safety area, with or without EMAS would meet FAA requirements for those aircraft. However, the paving on the first 350 feet of the runway safety area would offer benefit even to small planes. Installation of an EMAS would offer the opportunity to meet FAA standards (which FAA has stated meets Part 139 safety area requirements) and vastly improve safety at Concord Regional Airport.

⁷ Engineered Arresting Systems Corporation (December 2001). Preliminary EMAS modeling performed by G. Kent Thompson, P.E.

RUNWAY SAFETY AREA ANALYSIS



SUMMARY

The following table illustrates the potential cost for each of the alternatives evaluated to extend the runway safety area for Runway 2 to comply with FAA standards.

Comparison of Runway 2 Runway Safety Area Extension Alternatives	
Alternative	Estimated Cost
Alternative 1	
240' Runway Safety Area Extension	
Construction	\$1,857,000
Floodplain Encroachment Mitigation	\$100,000
Total	\$1,957,000
Alternative 2	
Runway 2 Displaced Threshold 400'	\$421,000
Total	\$421,000
Alternative 3	
EMAS	\$2,519,000
Total	\$2,519,000
Alternative 4	
240' Runway Safety Area Extension	
Construction	\$1,857,000
Floodplain Encroachment Mitigation	\$100,000
Runway 2 Displaced Threshold 160'	\$418,000
Total	\$2,375,000
Source: Talbert & Bright, Inc., October 2009	

Alternate 1 would extend the ERSa to 840', but would not achieve FAA's required 1,000' ERSa. Additionally, there would be environmental impacts with this alternative. Alternate 2 displaces the threshold of Runway 2 400' which reduces the LDA for Runway 2 from 7,400' to 7,000', and does not improve the ASDA or LDA for Runway 20. Alternate 3 involves the installation of an EMAS that will meet FAA's requirements for ERSa. This alternate also increases the LDA for Runway 20 from 6,350' to 6,750', and the ASDA for Runway 20 would increase from 7,000' to 7,400'. Alternate 4 would extend the ERSa to 840' and requires a 160' displacement of the threshold for Runway 2. This alternative has environmental impacts, and reduces the LDA for Runway 2 from 7,400' to 7,240'.

Based on the alternatives evaluated, the proposed alternative is the EMAS (Alternate 3). This alternative achieves the FAA's required RSA. Additionally, this alternative would not impact the Rocky River floodplain and therefore has no environmental impacts. The LDA for Runway 20 would increase from 6,350' to 6,750', and the ASDA for Runway 20 would increase from 7,000' to 7,400'.