OF CHICAGO
RTMENT OF PURCHASES,
RACTS AND SUPPLIES
ROOM 403, CITY HALL, 121 N. LaSALLE ST.

JNCP Form Rev

JUSTIFICATION FOR NON-COMPETITIVE PROCUREMENT

COMPLETE THIS SECTION IF NEW CONTRACT(S)
For contract(s) in this request, answer applicable questions in each of the 4 major subject areas below in accordance with the Instructions for Preparation of Non-Competitive Procurement Form on the reverse side.

Request that negotiations be conducted only with **ESCO** (Name of Person or Firm) . for the product and/or services described herein.

This is a request for:____ (One-Time Contract Per Requisition #_____, copy attached) or X Term Agreement or ____ Delegate Agency (Check one). If Delegate Agency, this request is for "blanket approval" of all contracts within the _____(Program Name) (Attach List)
Pre-Assigned Specification No._____
Pre-Assigned Contract No._____

COMPLETE THIS SECTION IF AMENDMENT OR MODIFICATION TO CONTRACT
Describe in detail the change in terms of dollars, time period, scope of services, etc., is relationship to the original contract and the specific reasons for the change. Indicate both the original and the adjusted contract amount and/or expiration date with this change, as applicable. Attach copy of all supporting documents. Request approval for a contract amendment or modification to the following:

Contract #: _____ Company, or Agency Name: _____
Specification #: _____
Mod #: _____ (Attach List, if multiple) Contract or Program Description: _____

James Szczesniak 773686-3531 _____ Aviation 7/11/06
Originator Name Telephone Signature Department Date

Indicate SEE ATTACHED in each box below if additional space needed:

( ) PROCUREMENT HISTORY **The runways at Midway Airport do not have a standard Runway Safety Area ("RSA") (a clear area 1000' beyond the end of the runway). The Federal Aviation Administration ("FAA"), through Advisory Circular 150-5300-13 and Order 5200.8, requires that the DOA improve the RSA when practicable. The DOA and FAA have found that it is possible to improve the RSA's by installing an arrestor bed system (crushable concrete). ESCO has an arrestor bed system called EMAS that will allow DOA to improve the RSA's.**

( ) ESTIMATED COST

( ) SCHEDULE REQUIREMENTS **The DOA in working with ESCO to procure the material necessary for installation of at least one EMAS system during the fall of 2006. The remaining EMAS systems will be installed in 2007.**

( ) EXCLUSIVE OR UNIQUE CAPABILITY **EMAS is a bed of crushable concrete that is designed to slow an aircraft that overruns the end of a runway. The FAA certifies and approves systems and technology that can be used at the airport. ESCO's EMAS system is the only arrestor bed system that is FAA approved. There are no other substitute systems/products that are FAA approved.**

This sole source request is for the material and technical oversight of the installation. The actual installation work will be competitively bid.

3

( ) OTHER

APPROVED BY: _____ 2/22/06

DEPARTMENT HEAD OR DESIGNEE — DATE

_____ _____

BOARD CHAIRPERSON — DATE

ESCO

EMAS

July 13, 2006

Valerie Walker
City of Chicago
Department of Aviation
O'Hare International Airport
Terminal 2, E/F Mezzanine
Chicago, IL 60666

Re: **Engineered Material Arresting System (EMAS) at Midway Airport**
Disadvantaged Business Enterprise (DBE) Content

Dear Ms. Walker,

The purpose of this correspondence is to provide you with information regarding the availability of DBE content in our proposal for materials and installation support for the EMAS projects at Midway International Airport.

The contract between ESCO and the City of Chicago would essentially be a materials supply contract along with some manufacturer's technical support. The only opportunity for ESCO to provide DBE content would be in the shipping component of our proposal. The typical shipping portion of the contract is in the range of 3% to 5% of the overall contract value. Therefore, any DBE content obtainable would be limited to that percentage.

In the past, ESCO has made good faith efforts to award the shipping component to a DBE owned company. It has been our experience that DBE shipping costs may increase the overall costs associated with the contract. Within the last 12 months, ESCO was pleased to work with DBE certified freight companies for the two EMAS at LaGuardia, one at Boston Logan, and the EMAS repair project at JFK International. Again, the DBE content was limited to approximately 3%-5% of the overall value of the contract.

As for finding DBE opportunities for the overall project, we believe there may be opportunities found within the contracted installation portion of the work. There may also be an opportunity in the City's contracted site preparation work.

Overall, we are very pleased with the City of Chicago's decision to proceed with the EMAS installations to further enhance safety at the airport. We look forward to supporting the City's effort in promptly completing these installations.

Please do not hesitate to contact me at (856) 241-8620 x452 if you have any questions of if I can be of any further assistance.

Sincerely,

Kevin Quan, C.M.
Regional Director, EMAS
EMAS Division

U.S. Department
of Transportation
**Federal Aviation
Administration**

Office of Airport Safety
and Standards

800 Independence Ave., SW.
Washington, DC 20591

May 12, 2006

To Whom It May Concern:

The Federal Aviation Administration Advisory Circular 150/5220-22, Engineered Materials Arresting Systems (EMAS) for Aircraft Overruns, contains standards for arresting systems installed on U.S. civil airports.

As of the date of this letter, Engineered Arresting Systems Company, Inc. (ESCO) is the only enterprise that has demonstrated and validated a design method, material and manufacturing process meeting the Advisory Circular requirements to the satisfaction of the FAA.

Sincerely,

Rick Marinelli

Rick Marinelli, P.E.
Manager, Airport Engineering
Division

ZODIAC

ESCO

EMAS

July 13, 2006

Dave Bowman
City of Chicago
Department of Aviation
O'Hare International Airport
Terminal 2, E/F Mezzanine
Chicago, IL 60666

Subject: **Proposal for production and installation support of four (4) Engineered Material Arresting System (EMAS)**

Ref: **Midway Airport**

Dear Mr. Bowman,

Attached is ESCO's Proposal for the direct purchase of the four (4) EMAS on runway ends 4R, 13C, 22L and 31C. The pricing reflects discounts provided for direct purchase and ship-in-place.

The proposal is based on our best estimates for EMAS arrestor bed sizes and the understanding that all four (4) beds would be installed by the end of calendar year 2007. Please note that our typical lead-time for block production is 6-9 months. Due to the urgency of this project, we will be able to significantly shorten the lead-time for 1-2 beds to meet your goal of installing this fall. We have added provisions to allow the City to pro-rate up or down if the bed sizes should change. As requested, we are also including pricing based on our current fiscal year FY06 (ends 8/31/06), FY07 and FY08.

Also per your request, we are including pricing for maintenance repair materials that will need to be procured through ESCO. Again, it contains pricing up to our fiscal year FY08. Note that pricing for these items does not including any shipping costs.

Please note that ESCO will need to get a fully executed contract NLT middle of August 2006 to be able to hold pricing at our FY06 level, but more importantly to allow sufficient time to produce and deliver blocks for 1-2 beds for fall 2006 installation.

Thank you for the opportunity to make this proposal.

If you have any questions, please feel free to contact me at (856) 241-8620 x452.

Sincerely,

Kevin Quan, C.M.
Regional Director, EMAS
EMAS Division

ENGINEERED ARRESTING SYSTEMS CORPORATION
2239 High Hill Road, Logan Township, NJ 08085
Tel.: 856-241-8620 Fax: 856-241-8621
http://www.esco-usa.com

ESCO

EMAS

EMAS Proposal

ESCO is pleased to offer to produce EMAS materials and provide installation support for the four (4) EMAS for Midway Airport based on the terms and conditions below:

For Runway 4R End	ESCO's FY ends on August 31st		
Bed Size (345 ft long bed X 170 ft wide, 35 ft setback from RW end)	FY06	FY07	FY08
Production (3,515 EMAS blocks, accounting for exclusion of 55 blocks on corner meeting service road)	$ 3,490,395	$ 3,630,995	$ 3,776,116
Shipping	$ 229,708	$ 238,352	$ 248,654
Installation Materials	$ 149,538	$ 155,520	$ 161,740
Installation Technical Support	$ 277,578	$ 288,681	$ 300,228
Bond	$ 91,781	$ 95,452	$ 98,270
Total Price =	**$ 4,239,000**	**$ 4,409,000**	**$ 4,586,000**

For Runway 13C End	FY06	FY07	FY08
Bed Size (210 ft long bed X 170 ft wide, 35 ft setback from RW end)			
Production (2,184 EMAS blocks)	$ 2,168,712	$ 2,256,072	$ 2,345,616
Shipping	$ 163,518	$ 169,527	$ 177,727
Installation Materials	$ 112,015	$ 116,496	$ 121,156
Installation Technical Support	$ 217,814	$ 226,527	$ 235,586
Bond	$ 60,941	$ 63,379	$ 65,914
Total Price =	**$ 2,723,000**	**$ 2,832,000**	**$ 2,946,000**

For Runway 31C End	FY06	FY07	FY08
Bed Size (226 ft long bed X 170 ft wide, 35 ft setback from RW end)			
Production (2,352 EMAS blocks)	$ 2,335,536	$ 2,428,956	$ 2,526,116
Shipping	$ 172,069	$ 179,272	$ 187,084
Installation Materials	$ 117,430	$ 122,128	$ 127,011
Installation Technical Support	$ 226,774	$ 235,845	$ 245,279
Bond	$ 65,191	$ 67,799	$ 70,511
Total Price =	**$ 2,917,000**	**$ 3,034,000**	**$ 3,156,000**

For Runway 22L End	FY06	FY07	FY08
Bed Size (267 ft long bed X 170 ft wide, 35 ft setback from RW end)			
Production (2,772 EMAS blocks)	$ 2,752,596	$ 2,863,476	$ 2,977,428
Shipping	$ 195,642	$ 203,532	$ 212,920
Installation Materials	$ 130,728	$ 135,957	$ 141,396
Installation Technical Support	$ 249,134	$ 259,099	$ 269,463
Bond	$ 75,900	$ 78,936	$ 82,093
Total Price =	**$ 3,404,000**	**$ 3,541,000**	**$ 3,683,000**

ENGINEERED ARRESTING SYSTEMS CORPORATION
2239 High Hill Road, Logan Township, NJ 08085
Tel.: 856-241-8620 Fax: 856-241-8621
http://www.esco-usa.com

ESCO

EMAS

Pricing for Maintenance Materials from ESCO (shipping not included)

Unit pricing does not include shipping

	unit	FY06	FY07	FY08
8' Debris Deflector Panel with hardware	each	$ 891	$ 927	$ 964
Side Coating, Extruded Silicone - 10" Wide x 2mm Thick	linear ft	$ 12	$ 13	$ 14
Silicone Adhesive (for side coat)	tube	$ 7	$ 8	$ 9
C-1 Insta-Seal Butyl Rubber Tape with Tedlar - Gray 2" wide x 1/16" thick	50 ft roll	$ 44	$ 46	$ 48

Terms & Conditions for Proposal

- Pricing shown above is based on estimates on arrestor bed sizes for each location. Any changes in arrestor bed size would result in pro-rating pricing up or down. Individual block pricing can be pro-rated using block-pricing levels of $993 for FY06, $1033 for FY07 and $1074 for FY08. Pricing for other components will be pro-rated by percent of reduction or increase in bed size.
- Price is based on contract for production and installation issued in time to complete EMAS installation and finishing in each fiscal year. ESCO's fiscal year ends on August 31st. There is typically a requirement of 6-9 months for production and shipping in order to allow ESCO time for block production to ensure project/installation can remain on schedule. As a result, ESCO must receive order on or before May of the fiscal year to receive that fiscal year pricing. We are able to provide expedited production for the 1-2 beds planned for installation this fall.
- Extended storage fees (TBD) could apply if installations are delayed from target installation dates (TBD – mutually agreed upon between ESCO and the City). Current target is to have all four (4) beds installed by end of calendar year 2007.
- Proposal is valid for 60 days from date of this proposal letter.
- Blocks and installation materials to be invoiced monthly as stored materials. Blocks will be allocated as stored material in warehouse storage with payment upon allocation at ESCO's Logan Township facility. Shipping to be insured upon shipment to the airport. Installation support to be invoiced based on % completion at time of monthly invoice. Blocks will be invoiced based on number of blocks produced and allocated, with each block invoiced at 1/3515th of the total price for the 4R end, 1/2184th for the 13C end, 1/2352nd for the 31C end, and 1/2772nd for the 22L end.
- Only opportunity available is in the shipping component of this project (value at up to 5% of overall project). ESCO will make an effort to get DBE participation by soliciting DBE contractors. However, there is no guarantee that a DBE contractor would be successful in getting this work. If any DBE content is provided, it will be limited to shipping of blocks.
- No sales tax or other taxes are included in above figures. If any are applicable, airport should add the taxes to ESCO's pricing where applicable.
- Performance and payment bond included, no bid bond.
- Payments net 30 days from issuance of invoice at time of shipping; milestone (progress) payments apply.
- 1 year limited warranty against defects in materials and workmanship provided ESCO produces and installs the arresting system. A copy of the warranty is attached. ESCO will not accept ANY liability, indemnity, consequential or incidental damages or warranty other than as stated in the ESCO warranty. See the warranty for details.
- Liquidated damages of $200 per day will apply to ESCO only where ESCO is responsible for the delay, and only to a maximum of $20,000.
- Airport Work hours-available TBD. Planned work night hours, 5-6 hours per day up to 6 days per week.

- Space will be provided at the airport for block storage and staging (to park trucks, containers an stage blocks) at no cost to ESCO.
- Quarterly EMAS inspections for one year by ESCO are included at no additional cost.

ENGINEERED ARRESTING SYSTEMS CORPORATION

Engineered Material Arresting System LIMITED Warranty

ENGINEERED ARRESTING SYSTEMS CORPORATION ("ESCO") warrants to the original purchaser (the "Owner") of the ESCO Engineered Material Arresting System ("EMAS") that, for a period of one year from the earlier of the date of acceptance, as evidenced by a final acceptance document signed by the Owner or 30 days from date ESCO notifies Owner that the EMAS is ready for acceptance, and subject to the limitations stated herein, the EMAS arrestor bed (excludes base surface preparation) conforms to the product specifications contained in the documents listed under section entitled Applicable Documents. This Warranty is expressly conditioned on the Owner's satisfying all of the following requirements:

MAINTENANCE: ESCO requires that the Owner initiate and follow a preventative maintenance program in accordance with the ESCO Inspection, Maintenance and Repair Manual listed under the clause "Applicable Documents".

RIGHT OF INSPECTION: The Owner shall provide ESCO with reasonable access to the EMAS after its installation for the purpose of conducting quarterly inspections. Reasonable access shall include, without limitation, access during daylight hours to permit careful visual assessment of the condition of the EMAS and access to all records of maintenance carried out by the Owner.

INSTALLATION: The EMAS must be installed by an ESCO-authorized EMAS contractor in strict compliance with ESCO's specifications, and project drawings and submittals approved by ESCO. There must be no deviations from ESCO's specifications or the approved project drawings and submittals, without the prior written approval of ESCO. During the entire installation process and upon completion of the installation, the work must be inspected and approved by a technical representative of ESCO as conforming with ESCO's specifications and approved project drawings and submittals.

NOTIFICATION: If the Owner believes that it has a claim arising from the failure of the EMAS to conform with this Warranty, the Owner must notify ESCO of the claim, within ten (10) days after discovering the conditions giving rise to the claim, and in any case before the Warranty period has expired. All such notices shall be given by certified mail addressed to **Director of Quality Assurance, Attention: Warranty Claim** Engineered Arresting Systems Corporation, 2550 Market Street, Aston, PA 19014-3426, USA.

Failure to adhere to any of the conditions stated above shall void this Warranty.

WARRANTY REMEDY If the Warranty set forth above is breached, ESCO will, at its sole option, either (1) correct the non-conformity at its own cost within a reasonable time after receiving notice of the breach, or (2) replace the non-conforming portion of the EMAS at its own cost within a reasonable time after receiving notice of the breach. The Owner

shall give ESCO reasonable access to the EMAS that allows ESCO to perform its warranty obligations on its most cost-effective basis possible.

EXCLUSIONS

ESCO shall not be liable for any damage to the EMAS or other property attributable to any of the following (or any combination thereof):

1. Standing water in and around the EMAS bed,
2. Vehicular traffic,
3. Aircraft traffic in contact with the EMAS bed,
4. Acts of nature, including, but not limited to, lightning, flood, winds in excess of 100 mph, earthquake, hurricane, tornado, hail storm, or impact of objects or other violent storm or casualty,
5. Repairs or alterations of the EMAS, unless performed by personnel trained and qualified by ESCO and in a manner meeting the ESCO specifications and procedures listed under the clause "Applicable Documents",
6. Excessive build up of debris in and around the EMAS bed,
7. Impact or contact with other objects, spilled liquids or immersion in liquids (including fuel dropped from over-flying aircraft),
8. Use of the EMAS for purposes other than those for which it is customarily used,
9. Improper maintenance, abuse or other neglect,
10. Exposure to chemicals other than de-icers and aircraft engine exhaust,
11. Jet Blast in excess of 100 mph, and
12. Damage or defect due to faulty or improper workmanship, including installation of the product that is not in accordance with ESCO's published specifications and installation recommendations in effect at the time of installation.
13. Damage to the EMAS arrestor bed related to or caused by the base surface not being constructed per the drawings and specifications. ESCO must check and accept the base surface prior to the start of EMAS arrestor bed installation.
14. Any subsequent failure of the base surface whether or not originally constructed per the drawings and specifications.

APPLICABLE DOCUMENTS

Project Installation Drawing No. _____
Item P-555 Rev____ EMAS Bed Installation by Prime Contractor
EMAS Quality Control plan for EMAS installation at San Diego International Airport, with associated Quality Control Instructions.
SM-____, Inspection, Maintenance and Repair Manual
P.O./Contract number _____

WARRANTY EXCLUSIVE/LIMITATION OF LIABILITY

THE EXPRESS WARRANTY SET FORTH ABOVE IS EXCLUSIVE AND NO OTHER WARRANTIES OF ANY KIND, WHETHER STATUTORY, ORAL, WRITTEN, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, SHALL APPLY. THE OWNER'S EXCLUSIVE REMEDIES AND ESCO'S ONLY OBLIGATIONS

ARISING OUT OF OR IN CONNECTION WITH DEFECTS OR NON-CONFORMITIES IN THE EMAS, WHETHER BASED ON WARRANTY, CONTRACT, TORT (INCLUDING NEGLIGENCE) OR OTHERWISE, SHALL BE THOSE STATED HEREIN. NOTWITHSTANDING ANY PROVISION TO THE CONTRARY IN ANY CONTRACT DOCUMENT, ESCO'S TOTAL LIABILITY TO THE OWNER ARISING FROM OR RELATING TO DEFECTS OR NON-CONFORMITIES IN THE EMAS SHALL BE LIMITED TO THE ORIGINAL PURCHASE PRICE OF THE EMAS PAID TO ESCO. ESCO SHALL HAVE NO LIABILITY TO THE OWNER FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES. REGARDLESS OF ANY STATUTORY LIMITATION PERIODS, ESCO SHALL NOT BE LIABLE FOR ANY BREACH OF WARRANTY OF WHICH IT IS NOT NOTIFIED AS REQUIRED BEFORE THE WARRANTY PERIOD HAS EXPIRED.

NO WARRANTY MODIFICATIONS

This Warranty may not be modified except in a writing signed by ESCO's President. No representative, employee, or agent of ESCO, or any person, other than the President of ESCO, has the authority to assume for ESCO any additional liability or responsibility in connection with the EMAS or this Warranty.

To ensure registration of this Warranty, please return a signed copy to:

Manager of Quality Assurance
Engineered Arresting Systems Corporation
2239 High Hill Road
Logan Township, NJ 08085
Phone (856) 241-8620
Fax (856) 241-8621

Name (Please Print) of Authorized Airport Individual:_____

Signature: _____ Date: _____

CITY OF CHICAGO
ECONOMIC DISCLOSURE STATEMENT
AND AFFIDAVIT

SECTION I -- GENERAL INFORMATION

A. Legal name of Disclosing Party submitting this EDS. Include d/b/a/ if applicable:

Engineered Arresting Systems Corporation

Check ONE of the following three boxes:

Indicate whether Disclosing Party submitting this EDS is:

1. [X] the Applicant
   OR

2. [ ] a legal entity holding a direct or indirect interest in the Applicant. State the legal name of the Applicant in which Disclosing Party holds an interest: _____
   OR

3. [ ] a specified legal entity with a right of control (see Section II.B.1.b.) State the legal name of the entity in which Disclosing Party holds a right of control: _____

B. Business address of Disclosing Party: **2239 High Hill Road**

Logan Township, NJ 08085

C. Telephone: **856-241-8620** Fax: **856-241-8621** Email: **kquan@esco.zodiac.com**

D. Name of contact person: **Kevin Quan, Regional Director**

E. Federal Employer Identification No. (if you have one): **22-3667589**

F. Brief description of contract, transaction or other undertaking (referred to below as the "Matter") to which this EDS pertains. (Include project number and location of property, if applicable):

Midway Airport runway safety area improvements and EMAS installation.

G. Which City agency or department is requesting this EDS? **Aviation**

If the Matter is a contract being handled by the City's Department of Procurement Services, please complete the following:

Specification # _____ and Contract # _____

SECTION II – DISCLOSURE OF OWNERSHIP INTERESTS

A. NATURE OF DISCLOSING PARTY

1. Indicate the nature of the Disclosing Party:

[ ] Person
[X] Publicly registered business corporation
[ ] Privately held business corporation
[ ] Sole proprietorship
[ ] General partnership*
[ ] Limited partnership*
[ ] Trust
[ ] Limited liability company*
[ ] Limited liability partnership*
[ ] Joint venture*
[ ] Not-for-profit corporation
(Is the not-for-profit corporation also a 501(c)(3)
[ ] Yes [ ] No
[ ] Other (please specify)

* Note B.1.b below.

2. For legal entities, the state (or foreign country) of incorporation or organization, if applicable:

State of Delaware

3. For legal entities not organized in the State of Illinois: Has the organization registered to do business in the State of Illinois as a foreign entity?

[ ] Yes [X] No [ ] N/A

B. IF THE DISCLOSING PARTY IS A LEGAL ENTITY:

1.a. List below the full names and titles of all executive officers and all directors of the entity. For not-for-profit corporations, also list below all members, if any, which are legal entities. If there are no such members, write "no members." For trusts, estates or other similar entities, list below the legal titleholder(s).

Name	Title
Spencer Hoos	**President & CEO**
T. Ladson Webb	**Vice President – Marketing and Intl. Ops.**
Peter T. Mahal	**Executive Vice President**
Nicholas M. Gallogly	**Vice President & CFO**
Daniel Edmondson, Esq.	**Secretary**

1.b. If you checked "General partnership," "Limited partnership," "Limited liability company," "Limited liability partnership" or "Joint venture" in response to Item A.1. above (Nature of Disclosing Party), list below the name and title of each general partner, managing member, manager or

Name Title any other person or entity that controls the day-to-day management of the Disclosing Party. **NOTE**: Each legal entity listed below must submit an EDS on its own behalf.

Name Title

2. Please provide the following information concerning each person or entity having a direct or indirect beneficial interest (including ownership) in excess of 7.5% of the Disclosing Party. Examples of such an interest include shares in a corporation, partnership interest in a partnership or joint venture, interest of a member or manager in a limited liability company, or interest of a beneficiary of a trust, estate or other similar entity. If none, state "None." **NOTE**: Pursuant to Section 2-154-030 of the Municipal Code of Chicago ("Municipal Code"), the City may require any such additional information from any applicant which is reasonably intended to achieve full disclosure.

Name	Business Address	Percentage Interest in the Disclosing Party
Zodiac, SA	**2 rue Maurice Mallet Issy les Monlineaux 92137 France**	**100%**

SECTION III -- BUSINESS RELATIONSHIPS WITH CITY ELECTED OFFICIALS

Has the Disclosing Party had a "business relationship," as defined in Chapter 2-156 of the Municipal Code, with any City elected official in the 12 months before the date this EDS is signed?

[ ] Yes [**X**] No

If yes, please identify below the name(s) of such City elected official(s) and describe such relationship(s):

SECTION IV -- DISCLOSURE OF SUBCONTRACTORS AND OTHER RETAINED PARTIES

The Disclosing Party must disclose the name and business address of each subcontractor, attorney, lobbyist, accountant, consultant and any other person or entity whom the Disclosing Party has retained or expects to retain in connection with the Matter, as well as the nature of the relationship, and the total

amount of the fees paid or estimated to be paid. The Disclosing Party is not required to disclose employees who are paid solely through the Disclosing Party's regular payroll.

"Lobbyist" means any person or entity who undertakes to influence any legislative or administrative action on behalf of any person or entity other than: (1) a not-for-profit entity, on an unpaid basis, or (2) himself. "Lobbyist" also means any person or entity any part of whose duties as an employee of another includes undertaking to influence any legislative or administrative action.

If the Disclosing Party is uncertain whether a disclosure is required under this Section, the Disclosing Party must either ask the City whether disclosure is required or make the disclosure.

Name (indicate whether retained or anticipated to be retained)	Business Address	Relationship to Disclosing Party (subcontractor, attorney, lobbyist, ect.)	Fees (indicate whether paid or estimated)

(Add sheets if necessary)

[**X**] Check here if the Disclosing party has not retained, nor expects to retain, any such persons or entities.

SECTION V – CERTIFICATIONS

A. COURT-ORDERED CHILD SUPPORT COMPLIANCE

Under Municipal Code Section 2-92-415, substantial owners of business entities that contract with the City must remain in compliance with their child support obligations throughout the term of the contract.

Has any person who directly or indirectly owns 10% or more of the Disclosing Party been declared in arrearage on any child support obligations by any Illinois court of competent jurisdiction?

[ ] Yes [ ] No [**X**] No person owns 10% or more of the Disclosing Party.

If "Yes," has the person entered into a court-approved agreement for payment of all support owed and is the person in compliance with that agreement?

[ ] Yes [ ] No

B. FURTHER CERTIFICATIONS

1. The Disclosing Party and, if the Disclosing Party is a legal entity, all of those persons or entities identified in Section II.B.1. of this EDS:

a. are not presently debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded from any transactions by any federal, state or local unit of government;

b. have not, within a five-year period preceding the date of this EDS, been convicted of a criminal offense, adjudged guilty, or had a civil judgment rendered against them in connection with: obtaining, attempting to obtain, or performing a public (federal, state or local) transaction or contract under a public transaction; a violation of federal or state antitrust statutes; fraud; embezzlement; theft; forgery; bribery; falsification or destruction of records; making false statements; or receiving stolen property;

c. are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (federal, state or local) with commission of any of the offenses enumerated in clause B.1.b. of this Section V;

d. have not, within a five-year period preceding the date of this EDS, had one or more public transactions (federal, state or local) terminated for cause or default; and

e. have not, within a five-year period preceding the date of this EDS, been convicted, adjudged guilty, or found liable in a civil proceeding, or in any criminal or civil action, including actions concerning environmental violations, instituted by the City or by the federal government, any state, or any other unit of local government.

2. The certifications in subparts 2, 3 and 4 concern:

• the Disclosing Party;
• any "Applicable Party" (meaning any party participating in the performance of the Matter, including but not limited to any persons or legal entities disclosed under Section IV, "Disclosure of Subcontractors and Other Retained Parties");
• any "Affiliated Entity" (meaning a person or entity that, directly or indirectly: controls the Disclosing Party, is controlled by the Disclosing Party, or is, with the Disclosing Party, under common control of another person or entity. Indicia of control include, without limitation: interlocking management or ownership; identity of interests among family members, shared facilities and equipment; common use of employees; or organization of a business entity following the ineligibility of a business entity to do business with federal or state or local government, including the City, using substantially the same management, ownership, or principals as the ineligible entity); with respect to Applicable Parties, the term Affiliated Entity means a person or entity that directly or indirectly controls the Applicable Party, is controlled by it, or, with the Applicable Party, is under common control of another person or entity;

• any responsible official of the Disclosing Party, any Applicable Party or any Affiliated Entity or any other official, agent or employee of the Disclosing Party, any Applicable Party or any Affiliated Entity, acting pursuant to the direction or authorization of a responsible official of the Disclosing Party, any Applicable Party or any Affiliated Entity (collectively "Agents").

Neither the Disclosing Party, nor any Applicable Party, nor any Affiliated Entity of either the Disclosing Party or any Applicable Party nor any Agents have, during the five years before the date this EDS is signed, or, with respect to an Applicable Party, an Affiliated Entity, or an Affiliated Entity of an Applicable Party during the five years before the date of such Applicable Party's or Affiliated Entity's contract or engagement in connection with the Matter:

a. bribed or attempted to bribe, or been convicted or adjudged guilty of bribery or attempting to bribe, a public officer or employee of the City, the State of Illinois, or any agency of the federal government or of any state or local government in the United States of America, in that officer's or employee's official capacity;

b. agreed or colluded with other bidders or prospective bidders, or been a party to any such agreement, or been convicted or adjudged guilty of agreement or collusion among bidders or prospective bidders, in restraint of freedom of competition by agreement to bid a fixed price or otherwise; or

c. made an admission of such conduct described in a. or b. above that is a matter of record, but have not been prosecuted for such conduct; or

d. violated the provisions of Municipal Code Section 2-92-610 (Living Wage Ordinance).

3. Neither the Disclosing Party, Affiliated Entity or Applicable Party, or any of their employees, officials, agents or partners, is barred from contracting with any unit of state or local government as a result of engaging in or being convicted of (1) bid-rigging in violation of 720 ILCS 5/33E-3; (2) bid-rotating in violation of 720 ILCS 5/33E-4; or (3) any similar offense of any state or of the United States of America that contains the same elements as the offense of bid-rigging or bid-rotating.

4. Neither the Disclosing Party nor any Affiliated Entity is listed on any of the following lists maintained by the Office of Foreign Assets Control of the U.S. Department of the Treasury or the Bureau of Industry and Security of the U.S. Department of Commerce or their successors: the Specially Designated Nationals List, the Denied Persons List, the Unverified List, the Entity List and the Debarred List.

5. The Disclosing Party understands and shall comply with (1) the applicable requirements of the Governmental Ethics Ordinance of the City, Title 2, Chapter 2-156 of the Municipal Code; and (2) all the applicable provisions of Chapter 2-56 of the Municipal Code (Office of the Inspector General).

6. If the Disclosing Party is unable to certify to any of the above statements in this Part B (Further Certifications), the Disclosing Party must explain below:
None.

If the letters "NA," the word "None," or no response appears on the lines above, it will be conclusively presumed that the Disclosing Party certified to the above statements.

C. CERTIFICATION OF STATUS AS FINANCIAL INSTITUTION

For purposes of this Part C, under Municipal Code Section 2-32-455(b), the term "financial institution" means a bank, savings and loan association, thrift, credit union, mortgage banker, mortgage broker, trust company, savings bank, investment bank, securities broker, municipal securities broker, securities dealer, municipal securities dealer, securities underwriter, municipal securities underwriter, investment trust, venture capital company, bank holding company, financial services holding company, or any licensee under the Consumer Installment Loan Act, the Sales Finance Agency Act, or the Residential Mortgage Licensing Act. However, "financial institution" specifically shall not include any entity whose predominant business is the providing of tax deferred, defined contribution, pension plans to public employees in accordance with Sections 403(b) and 457 of the Internal Revenue Code. (Additional definitions may be found in Municipal Code Section 2-32-455(b).)

1. CERTIFICATION

The Disclosing Party certifies that the Disclosing Party (check one)

[ ] is [**X**] is not

a "financial institution" as defined in Section 2-32-455(b) of the Municipal Code.

2. If the Disclosing Party IS a financial institution, then the Disclosing Party pledges:

"We are not and will not become a predatory lender as defined in Chapter 2-32 of the Municipal Code. We further pledge that none of our affiliates is, and none of them will become, a predatory lender as defined in Chapter 2-32 of the Municipal Code. We understand that becoming a predatory lender or becoming an affiliate of a predatory lender may result in the loss of the privilege of doing business with the City."

If the Disclosing Party is unable to make this pledge because it or any of its affiliates (as defined in Section 2-32-455(b) of the Municipal Code) is a predatory lender within the meaning of Chapter

2-32 of the Municipal Code, explain here (attach additional pages if necessary):

If the letters "NA," the word "None," or no response appears on the lines above, it will be conclusively presumed that the Disclosing Party certified to the above statements.

D. CERTIFICATION REGARDING INTEREST IN CITY BUSINESS

Any words or terms that are defined in Chapter 2-156 of the Municipal Code have the same meanings when used in this Part D.

1. In accordance with Section 2-156-110 of the Municipal Code: Does any official or employee of the City have a financial interest in his or her own name or in the name of any other person or entity in the Matter?

[ ] Yes [X] No

NOTE: If you checked "Yes" to Item D.1., proceed to Items D.2. and D.3. If you checked "No" to Item D.1., proceed to Part E.

2. Unless sold pursuant to a process of competitive bidding, or otherwise permitted, no City elected official or employee shall have a financial interest in his or her own name or in the name of any other person or entity in the purchase of any property that (i) belongs to the City, or (ii) is sold for taxes or assessments, or (iii) is sold by virtue of legal process at the suit of the City (collectively, "City Property Sale"). Compensation for property taken pursuant to the City's eminent domain power does not constitute a financial interest within the meaning of this Part D.

Does the Matter involve a City Property Sale?

[ ] Yes [ ] No

3. If you checked "Yes" to Item D.1., provide the names and business addresses of the City officials or employees having such interest and identify the nature of such interest:

Name	Business Address	Nature of Interest

4. The Disclosing Party further certifies that no prohibited financial interest in the Matter will be acquired by any City official or employee.

E. CERTIFICATION REGARDING SLAVERY ERA BUSINESS

The Disclosing Party has searched any and all records of the Disclosing Party and any and all predecessor entities for records of investments or profits from slavery, the slave industry, or slaveholder insurance policies from the slavery era (including insurance policies issued to slaveholders that provided coverage for damage to or injury or death of their slaves) and has disclosed in this EDS any and all such records to the City. In addition, the Disclosing Party must disclose the names of any and all slaves or slaveholders described in those records. Failure to comply with these disclosure requirements may make the Matter to which this EDS pertains voidable by the City.

Please check either 1. or 2. below. If the Disclosing Party checks 2., the Disclosing Party must disclose below or in an attachment to this EDS all requisite information as set forth in that paragraph 2.

__X__ 1. The Disclosing Party verifies that (a) the Disclosing Party has searched any and all records of the Disclosing Party and any and all predecessor entities for records of investments or profits from slavery, the slave industry, or slaveholder insurance policies, and (b) the Disclosing Party has found no records of investments or profits from slavery, the slave industry, or slaveholder insurance policies and no records of names of any slaves or slaveholders.

____ 2. The Disclosing Party verifies that, as a result of conducting the search in step 1(a) above, the Disclosing Party has found records relating to investments or profits from slavery, the slave industry, or slaveholder insurance policies and/or the names of any slaves or slaveholders. The Disclosing Party verifies that the following constitutes full disclosure of all such records:

_____

_____

_____

_____

SECTION VI -- CERTIFICATIONS FOR FEDERALLY-FUNDED MATTERS

NOTE: If the Matter is federally funded, complete this Section VI. If the Matter is not federally funded, proceed to Section VII.

A. CERTIFICATION REGARDING LOBBYING

1. List below the names of all persons or entities registered under the federal Lobbying Disclosure Act of 1995 who have made lobbying contacts on behalf of the Disclosing Party with respect to the Matter: (Begin list here, add sheets as necessary):

None

_____

_____

(If no explanation appears or begins on the lines above, or if the letters "NA" or if the word "None" appear, it will be conclusively presumed that the Disclosing Party means that NO persons or entities registered under the Lobbying Disclosure Act of 1995 have made lobbying contacts on behalf of the Disclosing Party with respect to the Matter.)

2. The Disclosing Party has not spent and will not expend any federally appropriated funds to pay any person or entity listed in Paragraph A.1. above for his or her lobbying activities or to pay any person or entity to influence or attempt to influence an officer or employee of any agency, as defined by applicable federal law, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress, in connection with the award of any federally funded contract, making any federally funded grant or loan, entering into any cooperative agreement, or to extend, continue, renew, amend, or modify any federally funded contract, grant, loan, or cooperative agreement.

3. The Disclosing Party will submit an updated certification at the end of each calendar quarter in which there occurs any event that materially affects the accuracy of the statements and information set forth in paragraphs A.1. and A.2. above.

If the Matter is federally funded and any funds other than federally appropriated funds have been or will be paid to any person or entity for influencing or attempting to influence an officer or employee of any agency (as defined by applicable federal law), a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with the Matter, the Disclosing Party must complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions. The form may be obtained online from the federal Office of Management and Budget (OMB) web site at http://www.whitehouse.gov/omb/grants/sflllin.pdf, linked on the page http://www.whitehouse.gov/omb/grants/grants_forms.html.

4. The Disclosing Party certifies that either: (i) it is not an organization described in section 501(c)(4) of the Internal Revenue Code of 1986; or (ii) it is an organization described in section 501(c)(4) of the Internal Revenue Code of 1986 but has not engaged and will not engage in "Lobbying Activities".

5. If the Disclosing Party is the Applicant, the Disclosing Party must obtain certifications equal in form and substance to paragraphs A.1. through A.4. above from all subcontractors before it awards any subcontract and the Disclosing Party must maintain all such subcontractors' certifications for the duration of the Matter and must make such certifications promptly available to the City upon request.

B. CERTIFICATION REGARDING EQUAL EMPLOYMENT OPPORTUNITY

If the Matter is federally funded, federal regulations require the Applicant and all proposed subcontractors to submit the following information with their bids or in writing at the outset of negotiations.

Is the Disclosing Party the Applicant?

[X] Yes [ ] No

If "Yes," answer the three questions below:

1. Have you developed and do you have on file affirmative action programs pursuant to applicable federal regulations? (See 41 CFR Part 60-2.)

[X] Yes [ ] No

2. Have you filed with the Joint Reporting Committee, the Director of the Office of Federal Contract Compliance Programs, or the Equal Employment Opportunity Commission all reports due under the applicable filing requirements?

[X] Yes [ ] No

3. Have you participated in any previous contracts or subcontracts subject to the equal opportunity clause?

[X] Yes [ ] No

If you checked "No" to question 1. or 2. above, please provide an explanation:

SECTION VII -- ACKNOWLEDGMENTS, CONTRACT INCORPORATION, COMPLIANCE, PENALTIES, DISCLOSURE

The Disclosing Party understands and agrees that:

A. By completing and filing this EDS, the Disclosing Party acknowledges and agrees, on behalf of itself and the persons or entities named in this EDS, that the City may investigate the creditworthiness of some or all of the persons or entities named in this EDS.

B. The certifications, disclosures, and acknowledgments contained in this EDS will become part of any contract or other agreement between the Applicant and the City in connection with the Matter, whether procurement, City assistance, or other City action, and are material inducements to the City's execution of any contract or taking other action with respect to the Matter. The Disclosing Party understands that it must comply with all statutes, ordinances, and regulations on which this EDS is based.

C. The City's Governmental Ethics and Campaign Financing Ordinances, Chapters 2-156 and 2-164 of the Municipal Code, impose certain duties and obligations on persons or entities seeking City contracts, work, business, or transactions. The full text of these ordinances and a training program is available on line at www.cityofchicago.org/Ethics, and may also be obtained from the City's Board of Ethics, 740 N.

Sedgwick St., Suite 500, Chicago, IL 60610, (312) 744-9660. The Disclosing Party must comply fully with the applicable ordinances.

D. If the City determines that any information provided in this EDS is false, incomplete or inaccurate, any contract or other agreement in connection with which it is submitted may be rescinded or be void or voidable, and the City may pursue any remedies under the contract or agreement (if not rescinded, void or voidable), at law, or in equity, including terminating the Disclosing Party's participation in the Matter and/or declining to allow the Disclosing Party to participate in other transactions with the City. Remedies at law for a false statement of material fact may include incarceration and an award to the City of treble damages.

E. It is the City's policy to make this document available to the public on its Internet site and/or upon request. Some or all of the information provided on this EDS and any attachments to this EDS may be made available to the public on the Internet, in response to a Freedom of Information Act request, or otherwise. By completing and signing this EDS, the Disclosing Party waives and releases any possible rights or claims which it may have against the City in connection with the public release of information contained in this EDS and also authorizes the City to verify the accuracy of any information submitted in this EDS.

F. The information provided in this EDS must be kept current. In the event of changes, the Disclosing Party must supplement this EDS up to the time the City takes action on the Matter. If the Matter is a contract being handled by the City's Department of Procurement Services, the Disclosing Party must update this EDS as the contract requires.

The Disclosing Party represents and warrants that:

G. The Disclosing Party has not withheld or reserved any disclosures as to economic interests in the Disclosing Party, or as to the Matter, or any information, data or plan as to the intended use or purpose for which the Applicant seeks City Council or other City agency action.

For purposes of the certifications in H.1. and H.2. below, the term "affiliate" means any person or entity that, directly or indirectly: controls the Disclosing Party, is controlled by the Disclosing Party, or is, with the Disclosing Party, under common control of another person or entity. Indicia of control include, without limitation: interlocking management or ownership; identity of interests among family members; shared facilities and equipment; common use of employees; or organization of a business entity following the ineligibility of a business entity to do business with the federal government or a state or local government, including the City, using substantially the same management, ownership, or principals as the ineligible entity.

H.1. The Disclosing Party is not delinquent in the payment of any tax administered by the Illinois Department of Revenue, nor are the Disclosing Party or its affiliates delinquent in paying any fine, fee, tax or other charge owed to the City. This includes, but is not limited to, all water charges, sewer charges, license fees, parking tickets, property taxes or sales taxes.

H.2 If the Disclosing Party is the Applicant, the Disclosing Party and its affiliates will not use, nor permit their subcontractors to use, any facility on the U.S. EPA's List of Violating Facilities in

connection with the Matter for the duration of time that such facility remains on the list.
H.3 If the Disclosing Party is the Applicant, the Disclosing Party will obtain from any contractors/subcontractors hired or to be hired in connection with the Matter certifications equal in form and substance to those in H.1. and H.2. above and will not, without the prior written consent of the City, use any such contractor/subcontractor that does not provide such certifications or that the Disclosing Party has reason to believe has not provided or cannot provide truthful certifications.

NOTE: If the Disclosing Party cannot certify as to any of the items in H.1., H.2. or H.3. above, an explanatory statement must be attached to this EDS.

CERTIFICATION

Under penalty of perjury, the person signing below: (1) warrants that he/she is authorized to execute this EDS on behalf of the Disclosing Party, and (2) warrants that all certifications and statements contained in this EDS are true, accurate and complete as of the date furnished to the City.

Engineered Arresting Systems Corporation Date: MAY 11, 2006

(Print or type name of Disclosing Party)

By: _____

(sign here)

Peter T. Mahal

(Print or type name of person signing)

Executive Vice President

(Print or type title of person signing)

Signed and sworn to before me on (date) May 11, 2006, by PETER T. MAHAL, at GLOUCESTER County, NEW JERSEY (state).

_____ Notary Public.

Commission expires: November 12, 2009.

SUSAN T LOPEZ
Notary Public
State of New Jersey
My Commission Expires Nov 12, 2009

Chapter 3. RUNWAY DESIGN

300. INTRODUCTION. This chapter presents standards for runways and runway associated elements such as shoulders, blast pads, runway safety areas, obstacle free zones (OFZ), object free areas (OFA), clearways, and stopways. Tables 3-1, 3-2, and 3-3 present the standard widths and lengths for runway and runway-associated elements. Also included are design standards and recommendations for rescue and firefighting access roads. At new airports, the RSA and ROFA lengths and the RPZ location standards are tied to runway ends. At existing constrained airports, these criteria may, on a case-by-case basis, be applied with respect to declared distances ends. See appendix 14.

301. RUNWAY LENGTH. AC 150/5325-4 and airplane flight manuals provide guidance on runway lengths for airport design, including declared distance lengths. The computer program cited in appendix 11 may be used to determine the recommended runway length for airport design.

302. RUNWAY WIDTH. Tables 3-1, 3-2, and 3-3 present runway width standards that consider operations conducted during reduced visibility.

303. RUNWAY SHOULDERS. Runway shoulders provide resistance to blast erosion and accommodate the passage of maintenance and emergency equipment and the occasional passage of an airplane veering from the runway. Tables 3-1, 3-2, and 3-3 present runway shoulder width standards. A natural surface, e.g., turf, normally reduces the possibility of soil erosion and engine ingestion of foreign objects. Soil with turf not suitable for this purpose requires a stabilized or low cost paved surface. Refer to chapter 8 for further discussion. Figure 3-1 depicts runway shoulders.

304. RUNWAY BLAST PAD. Runway blast pads provide blast erosion protection beyond runway ends. Tables 3-1, 3-2, and 3-3 contain the standard length and width for blast pads for takeoff operations requiring blast erosion control. Refer to chapter 8 for further discussion. Figure 3-1 depicts runway blast pads.

305. RUNWAY SAFETY AREA (RSA). The runway safety area is centered on the runway centerline. Tables 3-1, 3-2, and 3-3 present runway safety area dimensional standards. Figure 3-1 depicts the runway safety area. Appendix 8 discusses the runway safety area's evolution.

a. Design Standards. The runway safety area shall be:

(1) cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations;

(2) drained by grading or storm sewers to prevent water accumulation;

(3) capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and firefighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft; and

(4) free of objects, except for objects that need to be located in the runway safety area because of their function. Objects higher than 3 inches (7.6 cm) above grade should be constructed, to the extent practicable, on low impact resistant supports (frangible mounted structures) of the lowest practical height with the frangible point no higher than 3 inches (7.6 cm) above grade. Other objects, such as manholes, should be constructed at grade. In no case should their height exceed 3 inches (7.6 cm) above grade.

b. Construction Standards. Compaction of runway safety areas shall be to FAA specification P-152 found in AC 150/5370-10.

c. Sub-standard RSAs. RSA standards cannot be modified or waived like other airport design standards. The dimensional standards remain in effect regardless of the presence of natural or man-made objects or surface conditions that might create a hazard to aircraft that leave the runway surface. Facilities, including NAVAIDs, that would not normally be permitted in an RSA should not be installed inside the standard RSA dimensions even when the RSA does not meet standards in other respects. A continuous evaluation of all practicable alternatives for improving each sub-standard RSA is required until it meets all standards for grade, compaction, and object frangibility. FAA Order 5200.8, Runway Safety Area Program, explains the process for conducting this evaluation. Each FAA regional Airports division manager has a written determination of the best practicable alternative(s) for improving each RSA. Therefore, runway and RSA improvement projects must comply with the determination of the FAA regional Airports division manager.

d. Threshold Displacement. Incremental improvements that involve the displacement of a landing threshold need to be carefully planned so that they do not incur unnecessary costs or create situations that could compromise operational safety.

(1) Runway thresholds that are displaced temporarily pending the planned relocation of objects (such as Localizer antennas) should consider the extra costs associated with re-arranging the runway lights, approach lights and navigational aids.

(2) The displacement of a threshold that does not also include relocation of the lead-in taxiway can create an undesirable and confusing operating environment for the pilot. (See paragraph 204.)

e. Allowance for Navigational Aids. The RSA is intended to enhance the margin of safety for landing or departing aircraft. Accordingly, the design of an RSA must account for navigational aids that might impact the effectiveness of the RSA:

(1) RSA grades sometimes require approach lights to be mounted on massive towers that could create a hazard for aircraft. Therefore, consider any practicable RSA construction to a less demanding grade than the standard grade to avoid the need for massive structures.

(2) Instrument landing system (ILS) facilities (glide slopes and localizers) are not usually required to be located inside the RSA. However, they do require a graded area around the antenna. (See chapter 6 for more information on the siting of ILS facilities.) RSA construction that ends abruptly in a precipitous drop-off can result in design proposals where the facility is located inside the RSA. Therefore, consider any practicable RSA construction beyond the standard dimensions that could accommodate ILS facilities if and when they are installed.

306. OBSTACLE FREE ZONE (OFZ). The OFZ clearing standard precludes taxiing and parked airplanes and object penetrations, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function. The runway OFZ and, when applicable, the precision OFZ, the inner-approach OFZ, and the inner-transitional OFZ comprise the obstacle free zone (OFZ). Figures 3-2, 3-3, 3-4, 3-5,and 3-6 show the OFZ.

a. Runway OFZ (ROFZ). The runway OFZ is a defined volume of airspace centered above the runway centerline. The runway OFZ is the airspace above a surface whose elevation at any point is the same as the elevation of the nearest point on the runway centerline. The runway OFZ extends 200 feet (60 m) beyond each end of the runway. Its width is as follows:

(1) For runways serving small airplanes exclusively:

(a) 300 feet (90 m) for runways with lower than 3/4-statute mile (1 200 m) approach visibility minimums.

(b) 250 feet (75 m) for other runways serving small airplanes with approach speeds of 50 knots or more.

(c) 120 feet (36 m) for other runways serving small airplanes with approach speeds of less than 50 knots.

(2) For runways serving large airplanes, 400 feet (120 m).

b. Inner-approach OFZ. The inner-approach OFZ is a defined volume of airspace centered on the approach area. It applies only to runways with an approach lighting system. The inner-approach OFZ begins 200 feet (60 m) from the runway threshold at the same elevation as the runway threshold and extends 200 feet (60 m) beyond the last light unit in the approach lighting system. Its width is the same as the runway OFZ and rises at a slope of 50 (horizontal) to 1 (vertical) from its beginning.

c. Inner-transitional OFZ. The inner-transitional OFZ is a defined volume of airspace along the sides of the runway OFZ and inner-approach OFZ. It applies only to runways with lower than 3/4-statute mile (1 200 m) approach visibility minimums.

(1) For runways serving small airplanes exclusively, the inner-transitional OFZ slopes 3 (horizontal) to 1 (vertical) out from the edges of the runway OFZ and inner-approach OFZ to a height of 150 feet (45 m) above the established airport elevation.

(2) For runways serving large airplanes, separate inner-transitional OFZ criteria apply for Category (CAT) I and CAT II/III runways.

(a) For CAT I runways, the inner-transitional OFZ begins at the edges of the runway OFZ and inner-approach OFZ, then rises vertically for a height "H", and then slopes 6 (horizontal) to 1 (vertical) out to a height of 150 feet (45 m) above the established airport elevation.

1) In U.S. customary units,
$H_{feet} = 61 - 0.094(S_{feet}) - 0.003(E_{feet})$.

2) In SI units,
$H_{meters} = 18.4 - 0.094(S_{meters}) - 0.003(E_{meters})$.

3) S is equal to the most demanding wingspan of the airplanes using the runway and E is equal to the runway threshold elevation above sea level.

(b) For CAT II/III runways, the inner-

transitional OFZ begins at the edges of the runway OFZ and inner-approach OFZ, then rises vertically for a height "H", then slopes 5 (horizontal) to 1 (vertical) out to a distance "Y" from runway centerline, and then slopes 6 (horizontal) to 1 (vertical) out to a height of 150 feet (45 m) above the established airport elevation.

1) In U.S. customary units,
$H_{feet} = 53 - 0.13(S_{feet}) - 0.0022(E_{feet})$ and distance
$Y_{feet} = 440 + 1.08(S_{feet}) - 0.024(E_{feet})$.

2) In SI units,
$H_{meters} = 16 - 0.13(S_{meters}) - 0.0022(E_{meters})$ and distance
$Y_{meters} = 132 + 1.08(S_{meters}) - 0.024(E_{meters})$.

3) S is equal to the most demanding wingspan of the airplanes using the runway and E is equal to the runway threshold elevation above sea level. Beyond the distance "Y" from runway centerline the inner-transitional CAT II/III OFZ surface is identical to that for the CAT I OFZ.

d. Precision OFZ. The Precision Obstacle Free Zone (POFZ) is defined as a volume of airspace above an area beginning at the runway threshold, at the threshold elevation, and centered on the extended runway centerline, 200 feet (60m) long by 800 feet (240m) wide. See figure 3-6.

The surface is in effect only when all of the following operational conditions are met:

(1) Vertically guided approach
(2) Reported ceiling below 250 feet and/or visibility less than ¾ statute mile (or RVR below 4000 feet)
(3) An aircraft on final approach within two (2) miles of the runway threshold.

When the POFZ is in effect, a wing of an aircraft holding on a taxiway waiting for runway clearance may penetrate the POFZ; however neither the fuselage nor the tail may infringe on the POFZ.

The POFZ is applicable at all runway ends including displaced thresholds.

Note: POFZ takes effect no later than January 1, 2007 for all runway ends at which it applies.

307. OBJECT FREE AREA. The runway object free area (OFA) is centered on the runway centerline. The runway OFA clearing standard requires clearing the OFA of above ground objects protruding above the runway safety area edge elevation. Except where precluded by other clearing standards, it is acceptable to place objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes and to taxi and hold aircraft in the OFA. Objects non-essential for air navigation or aircraft ground maneuvering purposes are not to be placed in the OFA. This includes parked airplanes and agricultural operations. Tables 3-1, 3-2, and 3-3 specify the standard dimensions of the runway OFA. Extension of the OFA beyond the standard length to the maximum extent feasible is encouraged. See figure 2-3.

308. CLEARWAY STANDARDS. The clearway (See figure 3-7) is a clearly defined area connected to and extending beyond the runway end available for completion of the takeoff operation of turbine-powered airplanes. A clearway increases the allowable airplane operating takeoff weight without increasing runway length.

a. Dimensions. The clearway must be at least 500 feet (150 m) wide centered on the runway centerline. The practical limit for clearway length is 1,000 feet (300 m).

b. Clearway Plane Slope. The clearway plane slopes upward with a slope not greater than 1.25 percent.

c. Clearing. Except for threshold lights no higher than 26 inches (66 cm) and located off the runway sides, no object or terrain may protrude through the clearway plane. The area over which the clearway lies need not be suitable for stopping aircraft in the event of an aborted takeoff.

d. Control. An airport owner interested in providing a clearway should be aware of the requirement that the clearway be under its control, although not necessarily by direct ownership. The purpose of such control is to ensure that no fixed or movable object penetrates the clearway plane during a takeoff operation.

e. Notification. When a clearway is provided, the clearway length and the declared distances, as specified in appendix 14, paragraph 7, shall be provided in the Airport/Facility Directory (and in the Aeronautical Information Publication (AIP), for international airports) for each operational direction.

309. STOPWAY STANDARDS. A stopway is an area beyond the takeoff runway, centered on the extended runway centerline, and designated by the airport owner for use in decelerating an airplane during an aborted takeoff. It must be at least as wide as the runway and able to support an airplane during an aborted takeoff without causing structural damage to the airplane. Their limited use and high construction cost, when compared to a full-strength runway that is usable in both directions, makes their construction less cost effective. See figure 3-8. When a stopway is provided, the stopway length and the declared distances, as specified in appendix 14, paragraph 7, shall be provided in the Airport/Facility Directory (and in the Aeronautical Information Publication for international airports) for each operational direction.

310. RESCUE AND FIREFIGHTING ACCESS. Rescue and firefighting access roads are normally needed to provide unimpeded two-way access for rescue and firefighting equipment to potential accident areas. Connecting these access roads, to the extent practical, with the operational surfaces and other roads will facilitate aircraft rescue and firefighting operations.

a. Recommendation. It is recommended that the entire runway safety area (RSA) and runway protection zone (RPZ) be accessible to rescue and firefighting vehicles so that no part of the RSA or RPZ is more than 330 feet (100 m) from either an all weather road or a paved operational surface. Where an airport is adjacent to a body of water, it is recommended that boat launch ramps with appropriate access roads be provided.

b. All Weather Capability. Rescue and firefighting access roads are all weather roads designed to support rescue and firefighting equipment traveling at normal response speeds. Establish the widths of the access roads on a case-by-case basis considering the type(s) of rescue and firefighting equipment available and planned at the airport. The first 300 feet (90 m) adjacent to a paved operational surface should be paved. Where an access road crosses a safety area, the safety area standards for smoothness and grading control. For other design and construction features, use local highway specifications.

c. Road Usage. Rescue and firefighting access roads are special purpose roads that supplement but do not duplicate or replace sections of a multi-purpose road system. Restricting their use to rescue and firefighting access equipment precludes their being a hazard to air navigation.

311. to 399. RESERVED.

Table 3-1. Runway design standards for aircraft approach category A & B visual runways and runways with not lower than 3/4-statute mile (1 200 m) approach visibility minimums (Refer also to Appendix 16 for the establishment of new approaches)

ITEM	DIM[1]	AIRPLANE DESIGN GROUP				
		I[2]	I	II	III	IV
Runway Length	A	- Refer to paragraph 301 -				
Runway Width	B	60 ft 18 m	60 ft 18 m	75 ft 23 m	100 ft 30 m	150 ft 45 m
Runway Shoulder Width		10 ft 3 m	10 ft 3 m	10 ft 3 m	20 ft 6 m	25 ft 7.5 m
Runway Blast Pad Width		80 ft 24 m	80 ft 24 m	95 ft 29 m	140 ft 42 m	200 ft 60 m
Runway Blast Pad length		60 ft 18 m	100 ft 30 m	150 ft 45 m	200 ft 60 m	200 ft 60 m
Runway Safety Area Width	C	120 ft 36 m	120 ft 36 m	150 ft 45 m	300 ft 180 m	500 ft 150 m
Runway Safety Area Length Prior to Landing Threshold		240 ft 72 m	240 ft 72 m	300 ft 90 m	600 ft 180 m	600 ft 180 m
Runway Safety Area Length Beyond RW End[3]	P	240 ft 72 m	240 ft 72 m	300 ft 90 m	600 ft 180 m	1,000 ft 300 m
Obstacle Free Zone Width and length		- Refer to paragraph 306 -				
Runway Object Free Area Width	Q	250 ft 75 m	400 ft 120 m	500 ft 150 m	800 ft 240 m	800 ft 240
Runway Object Free Area Length Beyond RW End[3]	R	240 ft 72 m	240 ft 72 m	300 ft 90 m	600 ft 180 m	1,000 ft 300 m

1/ Letters correspond to the dimensions on figures 2-1 and 2-3.

2/ These dimensional standards pertain to facilities for small airplanes exclusively.

3/ The runway safety area and runway object free area lengths begin at each runway end when stopway is not provided. When stopway is provided, these lengths begin at the stopway end. The runway safety area length and the object free area length are the same for each runway end. Use the table (3-1 or 3-2) that results in the longest dimension. RSA length beyond the runway end standards may be met by provision of an Engineered Materials Arresting System or other FAA approved arresting system providing the ability to stop the critical aircraft using the runway exiting the end of the runway at 70 knots. See AC 150/5220-22.

Table 3-2. Runway design standards for aircraft approach categories A & B runways with lower than 3/4-statute mile (1 200 m) approach visibility minimums
(Refer also to Appendix 16 for the establishment of new approaches)

ITEM	DIM[1]	AIRPLANE DESIGN GROUP				
		I [2]	I	II	III	IV
Runway Length	A	- Refer to paragraph 301 -				
Runway Width	B	75 ft 23 m	100 ft 30 m	100 ft 30 m	100 ft 30 m	150 ft 45 m
Runway Shoulder Width		10 ft 3 m	10 ft 3 m	10 ft 3 m	20 ft 6 m	25 ft 7.5 m
Runway Blast Pad Width		95 ft 29 m	120 ft 36 m	120 ft 36 m	140 ft 42 m	200 ft 60 m
Runway Blast Pad length		60 ft 18 m	100 ft 30 m	150 ft 45 m	200 ft 60 m	200 ft 60 m
Runway Safety Area Width	C	300 ft 90 m	300 ft 90 m	300 ft 90 m	400 ft 120 m	500 ft 150 m
Runway Safety Area Length Prior to Landing Threshold		600 ft 180 m	600 ft 180 m	600 ft 180 m	600 ft 180 m	600 ft 180 m
Runway Safety Area Length Beyond RW End[3]	P	600 ft 180 m	600 ft 180 m	600 ft 180 m	800 ft 240 m	1,000 ft 300 m
Obstacle Free Zone Width and length	- Refer to paragraph 306 -					
Runway Object Free Area Width	Q	800 ft 240 m	800 ft 240 m	800 ft 240 m	800 ft 240 m	800 ft 240
Runway Object Free Area Length Beyond RW End[3]	R	600 ft 180 m	600 ft 180 m	600 ft 180 m	800 ft 240 m	1,000 ft 300 m

1/ Letters correspond to the dimensions on figures 2-1 and 2-3.

2/ These dimensional standards pertain to facilities for small airplanes exclusively.

3/ The runway safety area and runway object free area lengths begin at each runway end when stopway is not provided. When stopway is provided, these lengths begin at the stopway end. The runway safety area length and the object free area length are the same for each runway end. Use the table (3-1 or 3-2) that results in the longest dimension. RSA length beyond the runway end standards may be met by provision of an Engineered Materials Arresting System or other FAA approved arresting system providing the ability to stop the critical aircraft using the runway exiting the end of the runway at 70 knots. See AC 150/5220-22.

Table 3-3. Runway design standards for aircraft approach categories C & D
(Refer also to Appendix 16 for the establishment of new approaches)

ITEM	DIM[1]	AIRPLANE DESIGN GROUP					
		I	II	III	IV	V	VI
Runway Length	A	- Refer to paragraph 301 -					
Runway Width	B	100 ft 30 m	100 ft 30 m	100 ft[2] 30 m[2]	150 ft 45 m	150 ft 45 m	200 ft 60 m
Runway Shoulder Width[3]		10 ft 3 m	10 ft 3 m	20 ft[2] 6 m[2]	25 ft 7.5 m	35 ft 10.5 m	40 FT 12 M
Runway Blast Pad Width		120 ft 36 m	120 ft 36 m	140 ft[2] 42 m[2]	200 ft 60 m	220 ft 66 m	280 ft 84 m
Runway Blast Pad length		100 ft 30 m	150 ft 45 m	200 ft 60 m	200 ft 60 m	400 ft 120 m	400 ft 120 m
Runway Safety Area Width[4]	C	500 ft 150 m	500 ft 150 m	500 ft 150 m	500 ft 150 m	500 ft 150 m	500 ft 150 m
Runway Safety Area Length Prior to Landing Threshold		600 ft 180 m	600 ft 180 m	600 ft 180 m	600 ft 180 m	600 ft 180 m	600 ft 180 m
Runway Safety Area Length Beyond RW End[5]	P	1,000 ft 300 m	1,000 ft 300 m	1,000 ft 300 m	1,000 ft 300 m	1,000 ft 300 m	1,000 ft 300 m
Obstacle Free Zone Width and length		- Refer to paragraph 306 -					
Runway Object Free Area Width	Q	800 ft 240 m	800 ft 240 m	800 ft 240 m	800 ft 240 m	800 ft 240	800 ft 240
Runway Object Free Area Length Beyond RW End[5]	R	1000 ft 300 m	1000 ft 300 m	1000 ft 300 m	1000 ft 300 m	1,000 ft 300 m	1000 ft 300

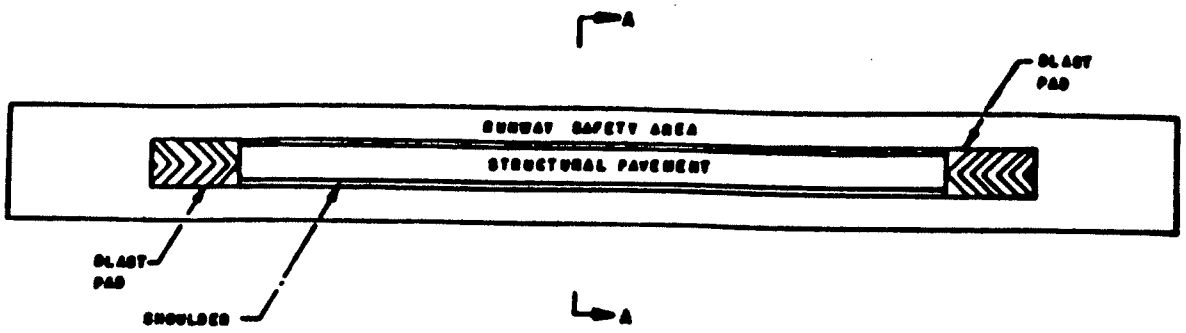
1/ Letters correspond to the dimensions on figures 2-1 and 2-3.

2/ For Airplane Design Group III serving airplanes with maximum certificated takeoff weight greater than 150,000 pounds (68 100 kg), the standard runway width is 150 feet (45 m), the shoulder width is 25 feet (7.5 m), and the runway blast pad width is 200 feet (60 m).

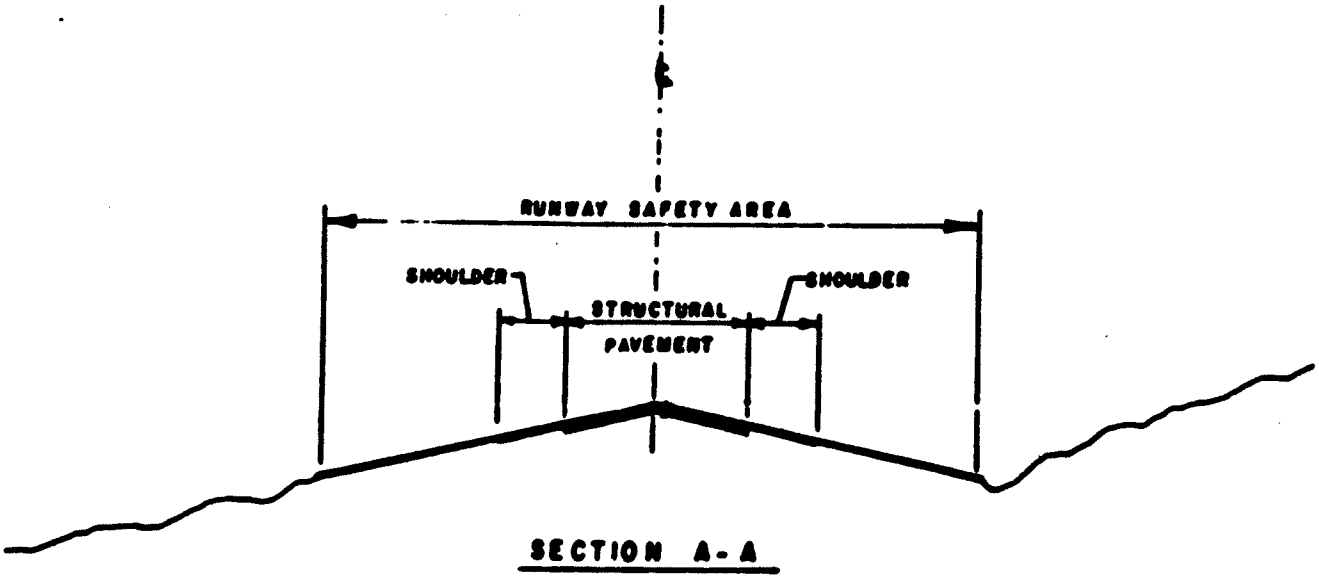
3/ Design Groups V and VI normally require stabilized or paved shoulder surfaces.

4/ For Airport Reference Code C-I and C-II, a runway safety area width of 400 feet (120 m) is permissible. For runways designed after 2/28/83 to serve Aircraft Approach Category D, the runway safety area width increases 20 feet (6 m) for each 1,000 feet (300 m) of airport elevation above MSL. Refer to paragraph 305.

5/ The runway safety area and runway object free area lengths begin at each runway end when stopway is not provided. When stopway is provided, these lengths begin at the stopway end. The runway safety area length and the object free area length are the same for each runway end. Use the table (3-1 or 3-2) that results in the longest dimension. RSA length beyond the runway end standards may be met by provision of an Engineered Materials Arresting System or other FAA approved arresting system providing the ability to stop the critical aircraft using the runway exiting the end of the runway at 70 knots. See AC 150/5220-22.



PLAN



SECTION A-A

Figure 3-1. Runway safety area

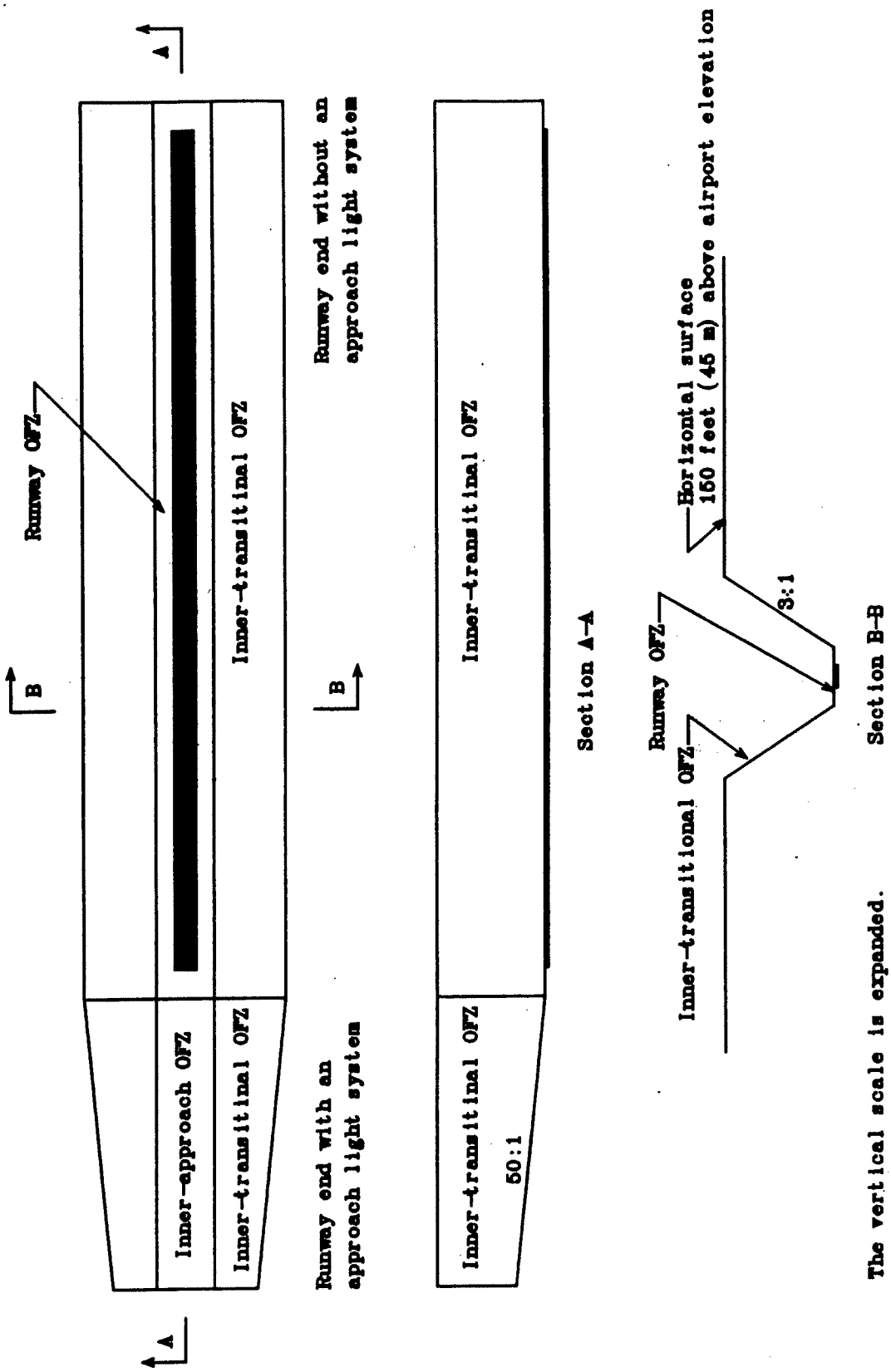


Figure 3-3. Obstacle free zone (OFZ) for runways serving small airplanes exclusively with lower than 3/4-statute mile (1 200 m) approach visibility minimums

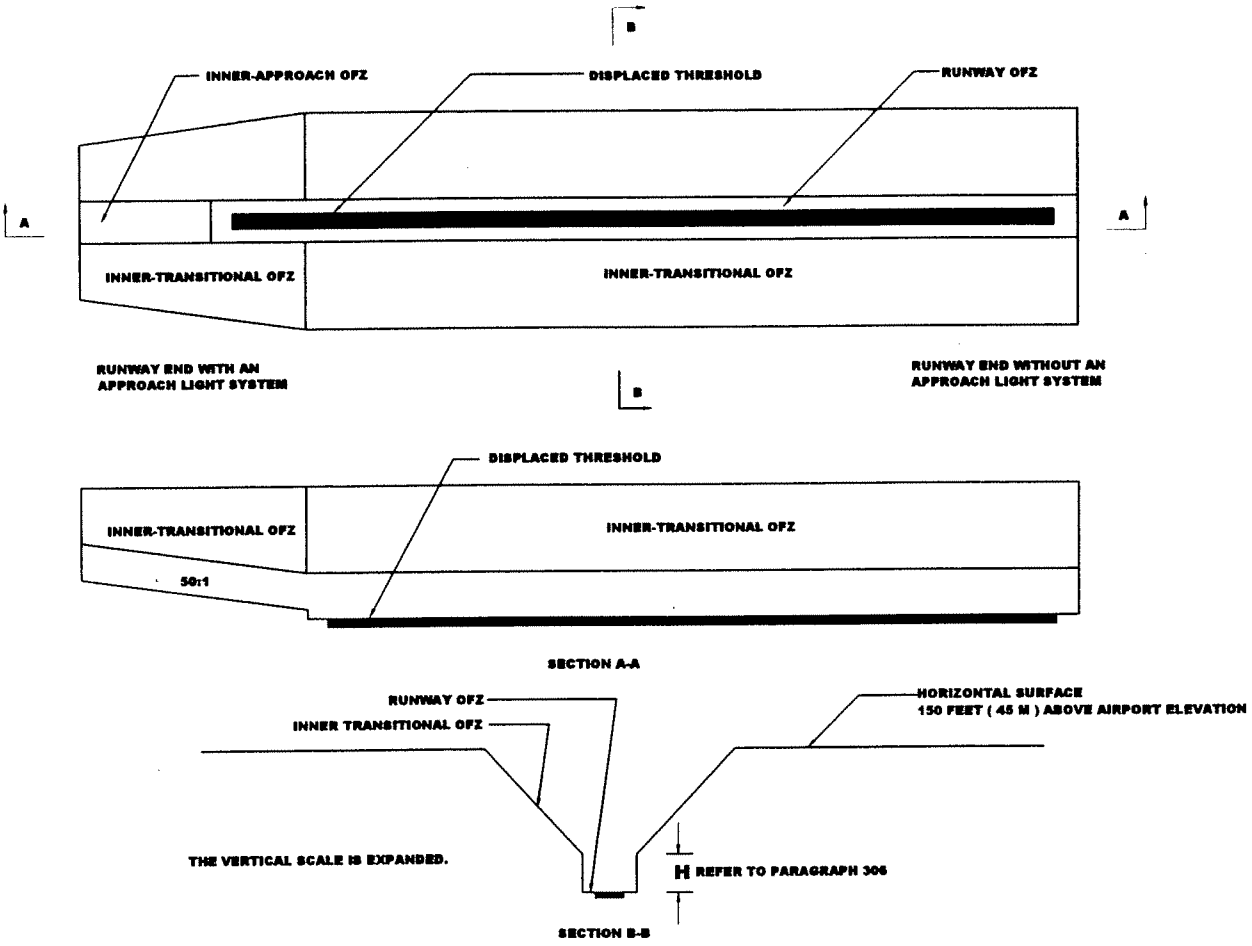


FIGURE 3-5. OBSTACLE FREE ZONE (OFZ) FOR RUNWAYS SERVING LARGE AIRPLANES WITH LOWER THAN 3/4-STATUTE MILE (1 200 M) APPROACH VISIBILITY MINIMUMS AND DISPLACED THRESHOLD

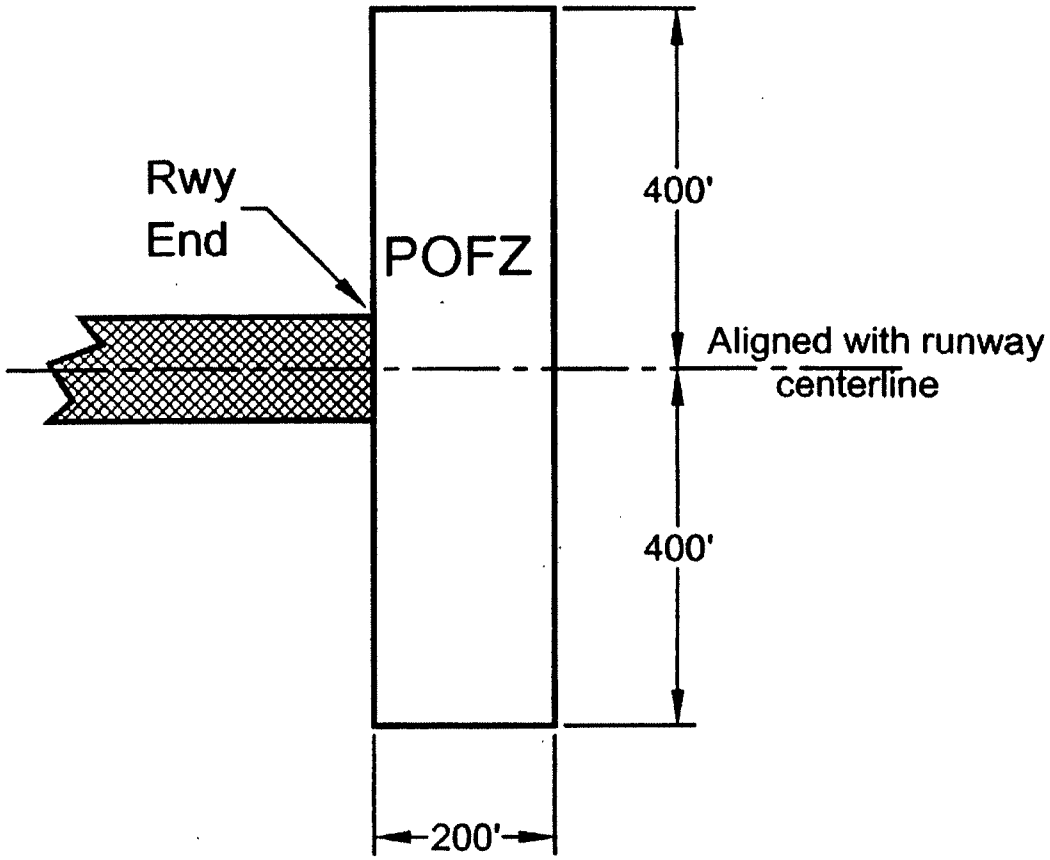


Figure 3-6. Precision Obstacle Free Zone

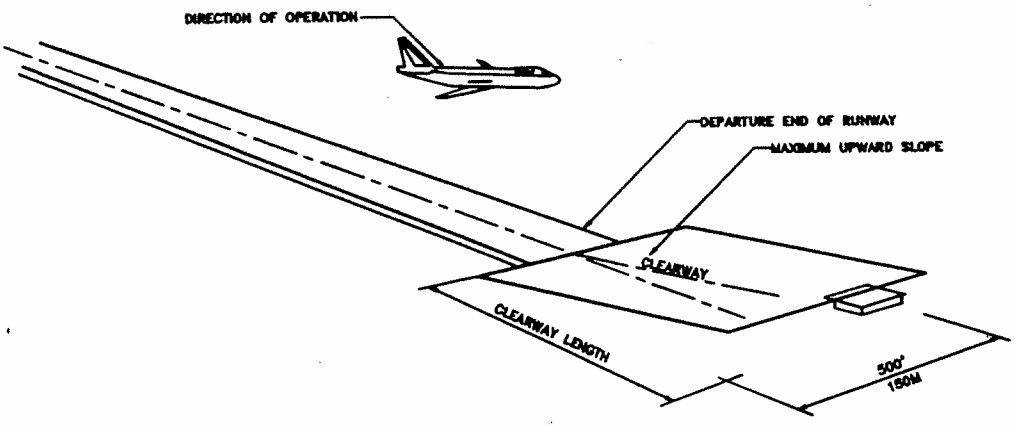


Figure 3-7. Clearway

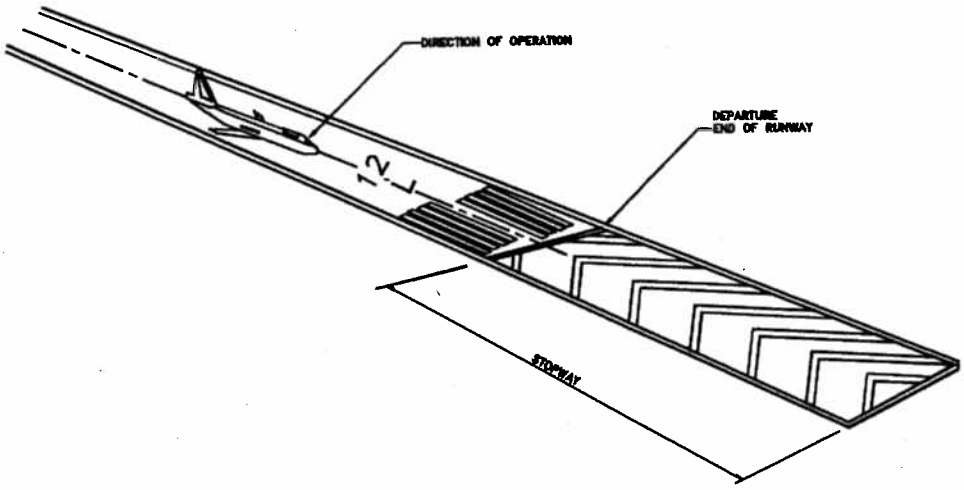


Figure 3-8. Stopway

ORDER

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

5200.8

SUBJ: RUNWAY SAFETY AREA PROGRAM

1. PURPOSE.
This order establishes

a. The Federal Aviation Administration's (FAA) Runway Safety Area (RSA) Program and

b. The procedures that FAA employees will follow in implementing that program.

2. DISTRIBUTION.
This order is distributed to the division level in the Office of Airport Safety and Standards and the Office of Airport Planning and Programming; to the division level in the regional Flight Standards, Airway Facilities, and Air Traffic Divisions; to the branch level in the regional Airports Divisions; and a standard distribution to all Airport District Offices.

3. EFFECTIVE DATE. October 1, 1999

4. BACKGROUND.
The RSA is an integral part of the runway environment. RSA dimensions are established in AC 150/5300-13, *Airport Design* and are based on the Airport Reference Code (ARC). The RSA is intended to provide a measure of safety in the event of an aircraft's excursion from the runway by significantly reducing the extent of personal injury and aircraft damage during overruns, undershoots and veer-offs.

5. OBJECTIVE
The objective of the Runway Safety Area Program is that all RSAs at federally obligated airports and all RSAs at airports certificated under 14 Code of Federal regulations (CFR) part 139 shall conform to the standards contained in AC 150/5300-13 *Airport Design*, to the extent practicable.

6. RESPONSIBILITY AND DELEGATION OF AUTHORITY.

a. The Regional Airports Division Manager ensures that the program is implemented in accordance with the procedures provided in this directive.

b. The Regional Airports Division Manager approves all RSA determinations required by Paragraph 8.0 of this order. This authority may be delegated to the ADO Manager, only when it is determined practicable to obtain the RSA.

7. RSA INVENTORY.
Each regional airports division shall collect and maintain data on the RSA for each runway at federally obligated airports and airports certificated under part 139 within their geographic purview. The data will include the current width of each RSA and the length that the RSA extends beyond each runway end. The data will also contain the standards that apply to each RSA at the airport. In addition, all objects within the area that comprises a standard RSA shall be documented. Appendix 1, Runway Safety Area Database, provides a format for this data collection.

8. RSA DETERMINATIONS.
a. Supporting Documentation. The region/ADO shall prepare documentation for each RSA. Appendix 2, Supporting Documentation for RSA Determinations, provides guidance that must be adhered to in preparing this documentation. The Regional Airports Division will decide the level of detail required for all planning, environmental, and engineering factors that are to be incorporated in analyzing the practicable alternatives. The objective is to assure that accurate and complete information supports the decision making process on RSA determinations.

(1) For an RSA that does not meet current standards, the Regional Airports Division Manager will make a determination as required in paragraph 8b, based on this documentation.

(2) Determinations are based on the best, current, available information. However, information that becomes available at a later date can effect changes or revisions to a determination and, as a result, updates the determination. For example, the final determination may depend on the outcome of an Environmental Assessment process. Until that outcome is known, a determination is made on the best, current, available information.

(3) Although for data collection purposes it is convenient to describe the RSA in terms of runway ends, the determination shall be made for the entire RSA, i.e., both runway ends as well as the full width.

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

(1) The existing RSA meets the current standards contained in AC 150/5300-13.

(2) The existing RSA does not meet standards but it is practicable to improve the RSA so that it will meet current standards.

(3) The existing RSA can be improved to enhance safety, but the RSA will still not meet current standards.

(4) The existing RSA does not meet current standards, and it is not practicable to improve the RSA.

c. Form of Determination. The RSA determination will be signed and dated by the Regional Airports Division Manager and kept on file along with the supporting documentation in the regional office or ADO. The determination and its date will also be included in the RSA database. See Appendix 1.

d. Revision to Determination. If new information becomes available, the Regional Airports Division Manager may issue a revised determination. The revised determination shall be in a form required by Paragraph 8(c) and supported by documentation required by Paragraph 8(a). The date of the revised determination shall be recorded in the RSA database.

9. TIMING OF DATA COLLECTION AND DETERMINATION.

The RSA inventory and RSA determinations specified in paragraph 7 and 8 will be completed in accordance with the following schedule:

a. For runways used by air carriers at airports certificated under 14 CFR Part 139, the RSA inventory and determination will be completed by June 30, 2000.

b. For all other runways at federally obligated airports, the RSA inventory and determination can be done at any time, but will normally be done during the master planning process. However, the inventory and determination must be completed prior to any project for runway construction, reconstruction, or significant expansion that involves Federal funds.

10. IMPLEMENTATION OF RSA IMPROVEMENTS.

a. A project to improve an RSA in accordance with the determination made in Paragraph 8 may be initiated at any time.

b. Whenever a project for a runway involves construction, reconstruction (includes overlays), or significant expansion, the project shall also provide for improving the RSA in accordance with the determination made in Paragraph 8. Reconstruction and significant expansion are construed as any project that results in changing the capability of the airport or the load-bearing strength of the pavement, restores the original design life of the pavement, or changes the actual or potential design aircraft use.

(1) The requirement to upgrade RSA under Paragraph 10b is applicable at part 139 airports regardless of the funding source for the runway project.

(2) The requirement to upgrade RSA under Paragraph 10b is applicable at federally obligated airport, if Federal or Passenger Facility Charge (PFC) funds are used for the project.

11. OVERSIGHT.

The Airport Office of Safety and Standards (AAS) is the office of primary interest. This office may selectively review RSA analyses or the entire program on a periodic basis to assure consistency. The office also provides consulting and guidance in judging the merits of a specific alternative.

David L. Bennett
Director of Airport Safety and Standards

Appendix 1. RUNWAY SAFETY AREA DATA BASE

A national data base that is accessible on the Intranet is being developed as part of this program. The following pages provide sample copies of the formats to be used for entering RSA information into this data base. The electronic version of this Appendix, along with accompanying instructions, is available on the FAA intranet and is to be used for transmitting the above information. As AAS-100 and AAS-300 gain experience in using the data that are collected through these forms, modifications and/or clarifications may be necessary. The latest version of this Appendix will always be found on the Intranet.

Locid: Airport: Region:

City/State: ADO:

Runway: Runway Ends:

Length:
Width:
Part 139: ☐

Actual RSA Length:
Actual RSA Width:
RSA Grade (+/- 5%): ☐ ☐
Dimensional Uniformity: ☐ ☐

CRITICAL AIRCRAFT:
Approach Category:
Design Group:

Visibility Minimums:

~~RSA Determination~~

Currently Meets Standards	○	○
Practicable to Meet Standards	○	○
Can be Improved But Will Not Meet Standards	○	○
Not Practicable to Improve	○	○

Date of Determination (month/year):

PUBLISHED RUNWAY SAFETY AREA STANDARDS:
Length:
Width:

~~Planned Improvements~~

RSA to Design Standards Obtainable:	☐	☐
Runway Realignment or Relocation:	☐	☐
Shift Runway From Present Alignment:	☐	☐
Use Declared Distances:	☐	☐
Use EMAS:	☐	☐
Other:	☐	☐

Scheduled Completion (year):
Remaining Costs:

Uniformity Comments:

Improvement Comments:

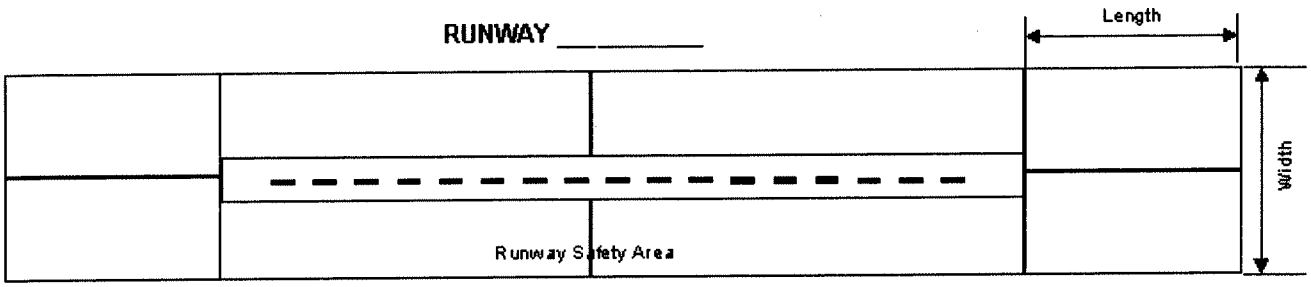
Object Form

Runway Safety Area Data Sheet

Locid: Airport: Region:

City/State: ADO:

RUNWAY _____



Object Identification			Object Location				Object Status						
No.	Type	Name	Rwy End	Rwy End Dist	L/R	L/R Dist	Fixed By Function	Can Be Relocated	Frangible	Frangible to 3 inches	High Mass	Owner	Connecting Object

Appendix 2. Supporting Documentation for RSA Determinations

1. GENERAL.

RSA determinations must be supported by documentation that provides the rationale upon which the determination was based. The extent of the documentation will vary, depending upon the circumstances. For example, in cases where the RSA already meets the current standards through a traditional graded area surrounding the runway a simple statement to this effect will suffice. Where declared distances have been implemented to obtain the RSA, the documentation would contain a statement to this effect and also identify the graded area that exists beyond each runway end. In contrast, in cases where it is not practicable to improve a safety area to meet current standards, the documentation must address the alternatives that were considered and explain the reasons why one was selected over the others.

2. CONSIDERATIONS IN EVALUATING ALTERNATIVES.

In evaluating alternatives for obtaining or improving RSAs, there are many factors that could affect the viability of the alternative. What may be viable at one airport may not be viable at another. Factors to be considered include:

a. Historical records of airport accidents/incidents.

b. The airport plans as reflected in current and forecast volume of passengers, number of operations, design aircraft and percent runway use, both for all weather and IFR operations,

c. The extent to which the existing RSA complies with the standard. High performance aircraft, operating at higher loads and speeds have greater requirements than small, low performance aircraft.

d. Site constraints. These include, for example, precipitous terrain drop-off, the existence of bodies of water, wetlands, a major highway, a railroad at a runway end, etc.

e. Weather and climatic conditions. These include conditions such as low visibility, rain, snow, and ice and the frequency of these conditions. Overruns on contaminated runways constitute a significant percentage of runway excursions.

f. Availability of visual and electronic aids for landing.

3. ALTERNATIVES TO BE CONSIDERED.

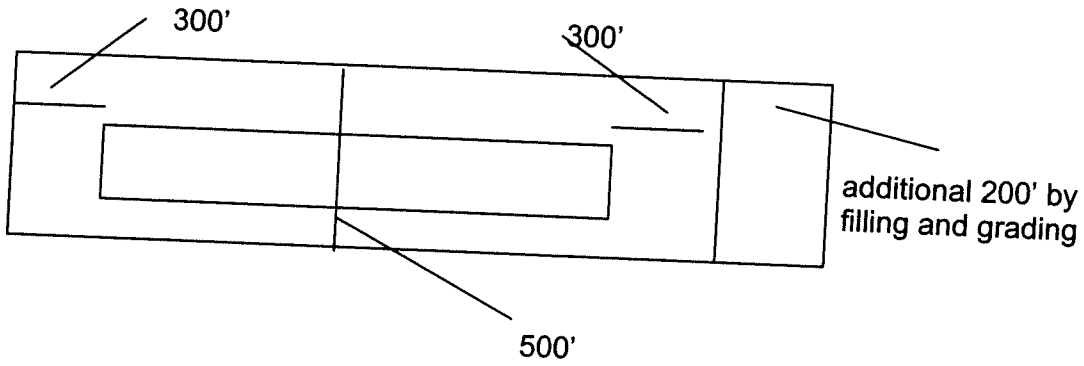
The first alternative to be considered in every case is constructing the traditional graded area surrounding the runway. Where it is not practicable to obtain the entire safety area in this manner, as much as possible should be obtained. Then, the following alternatives shall be addressed in the supporting documentation. The applicability of these alternatives will vary, depending on the location.

a. Relocation, shifting, or realignment of the runway.

b. Reduction in runway length where the existing runway length exceeds that which is required for the existing or projected design aircraft,

c. A combination of runway relocation, shifting, grading, realignment, or reduction
d. Declared distances.
e. Engineered Materials Arresting Systems (EMAS).

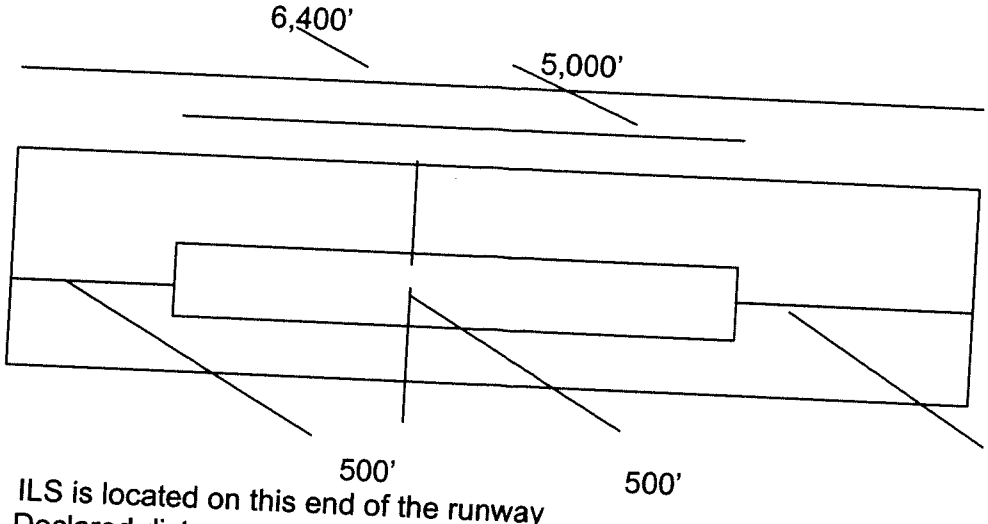
4. CONSIDERATIONS IN ASSESSING ALTERNATIVES.
When making determinations about the practicability of obtaining the RSA, the first attempt shall consist of investigating fully the possibility of obtaining RSA that meets the current standards through a traditional graded area surrounding the runway. Land acquisition, grading requirements as well as environmental conditions must be examined. Any portion of land that will increase the RSA, even if it is but an incremental increase (see Paragraph 4a below) and will not result in meeting the standard fully, is preferable and will serve as a starting point for the consideration of additional alternatives (see paragraphs 4b through 4f below).
a. Incremental gains must be obtained whenever possible. The gain may be relatively very little, but any gain is valuable. The following example illustrates this.
The design standard for an RSA beyond the runway end, 1,000' by 500', is not met. The dimensions are 300' by 500' on each of the ends. By filling and grading, another 200' could be gained on one end. This should be accomplished as an incremental gain, even though it will not provide the design standard. Other alternatives (see Paragraphs 4b through 4f below) would then be considered for obtaining the remainder of the safety area.



b. When obtaining a standard RSA is not practicable through traditional means (*e.g.* land acquisition, grading, fill, etc.), alternatives must be explored. During some types of projects, it may be feasible to relocate, realign, shift, or change a runway in such a way that the RSA may be obtained. It is recognized that the costs of this kind of adjustment may be justified only in an extensive project, but the concept should be evaluated to determine if it is a practicable alternative.

c. Another alternative to be addressed is a reduction in runway length. This is a viable option if the current critical aircraft requires less than what is presently available, or the use of other runways, if available, will accommodate the larger aircraft.

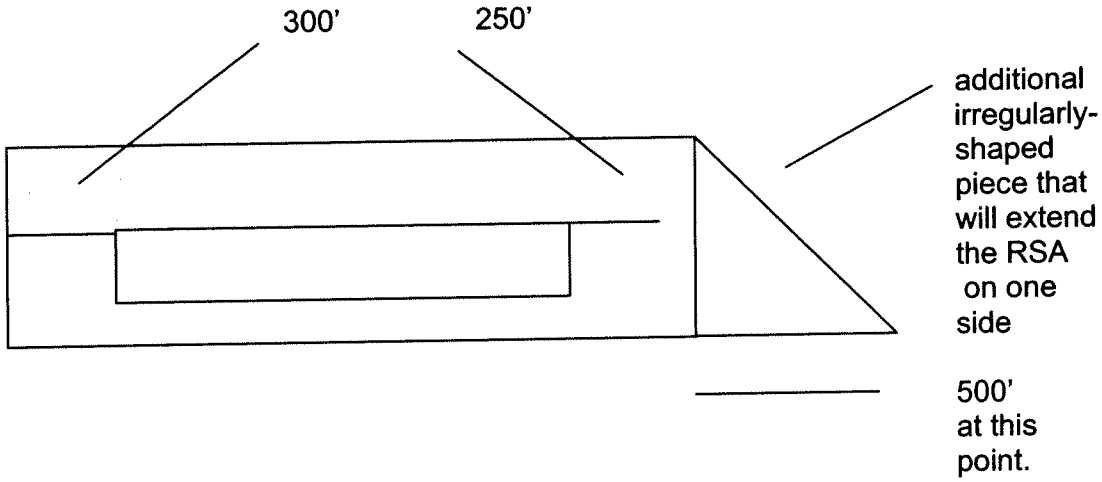
d. When considering the configuration of RSA, if the total RSA area available is less that the total required to meet the design standard, an appropriate balance may be achieved by allocating a greater portion of RSA to one runway end. The factors to consider in this allocation are: navaids (ILS, PAPI, PLASI, VASIs), which provide vertical guidance and lessen the likelihood of an undershoot; predominant direction of runway use by air carrier aircraft, and historical data on overruns on the runway. For example, the total available RSA below is 1400'. Because there is an ILS for air carrier use, a determination is made to allocate 900' to the departure end of this runway and 500' to the approach end of the runway



e. Declared distances present another alternative that may provide an acceptable means of providing RSA. This requires a thorough understanding of user needs and views, since their cooperation is an integral factor in selecting this alternative. However, the airport, in conjunction with FAA, will determine the final disposition of this type of situation.

f. At any time, when it is not practicable to obtain a safety area that meets current standards, consideration should be given to enhancing the safety of the area beyond the runway end with the installation of EMAS. The AC 150/5220-22, *Engineered Materials Arresting Systems (EMAS) for Aircraft Overruns,* pertaining to the installation and use of EMAS, provides details on design to be considered in determining feasibility of this alternative.

g. When it is not practicable to obtain an RSA that meets current standards through the measures identified in Paragraphs 4a through 4e, the feasibility of increasing the size of the RSA by including additional land parcels should be considered, even if their inclusion will result in an RSA with an irregular shape. This alternative should be explored, irrespective of a decision to install EMAS in the RSA. For example, the design standard for an RSA beyond the runway end is not met. However, a parcel of land is available and would lengthen the RSA on one side only. This should be accomplished and noted in the comment section provided in the database. The following example illustrates this.



U. S. Department
of Transportation

**Federal Aviation
Administration**

Great Lakes Region
Illinois, Indiana, Michigan,
Minnesota, North Dakota
Ohio, South Dakota
Wisconsin

2300 E Devon Avenue
Des Plaines, Illinois 60018

June 14, 2006

Ms. Nuria I. Fernandez, Commissioner
Department of Aviation
Chicago O'Hare International Airport
P.O. Box 66142
Chicago, Illinois 60666

Dear Ms. Fernandez:

Chicago Midway International Airport
Chicago, Illinois
Runway Safety Area Practicability Study
and Supplemental Information Review

The Federal Aviation Administration (FAA) is in receipt of the Runway Safety Area (RSA) Practicability Study supplemental information, dated April 4, 2006, submitted by the City of Chicago (City). The supplemental information focused on the two main runways at Midway International Airport, Runway 13C/31C and Runway 4R/22L. The City requested that the FAA review the Runway Safety Area Practicability Study transmitted by letter dated May 21, 2004, together with the supplemental information dated April 4, 2006 and determine the practicability and feasibility of the proposed Engineered Materials Arresting System (EMAS) on each main runway end.

Please see below for comments regarding the RSA Practicability Study as supplemented:

Full RSA Compliance
Full RSA compliance would require a 500-foot wide clear area extending 1,000 feet beyond each main runway end. The implementation of this alternative would require the relocation of four major roads surrounding Midway and the acquisition of hundreds of parcels of land.

The supplemented study included a summary of the land acquisition costs necessary to provide a full RSA for each main runway. The land acquisition costs are estimated at $200 million to $300 million, these costs do not include the actual construction costs that would be required to relocate the roads surrounding Midway. In accordance with the supplemental information and FAA Order 5200.9, paragraph 9 (c), the estimated land acquisition cost alone for this alternative indicates that it is not a feasible option, although improvements to the RSA short of the full standard would have a lower cost.

Runway Relocation/Realignment
Combination of Runway Realignment/Reduction
The existing runways at Midway are already aligned for optimum length and wind coverage; any runway realignment would reduce the amount of runway length available. Any reduction in Runway 13C/31C or Runway 4R/22L length at Midway would have significant adverse effects on operations. Runway relocation would require the relocation of major roads and the acquisition of hundreds of parcels of land. It is expected that runway relocation would have similar costs ($200 - $300 million) as full RSA compliance. In consideration of all of the reasons mentioned above, the total cost and impact of these alternatives indicates that they are not feasible options.

Reduction in Runway Length
Implementation of Declared Distances
As mentioned above, any reduction in Runway 13C/31C or Runway 4R/22L length at Midway would have significant adverse effects on operations. The implementation of declared distances would effectively reduce the runway length for operations in each direction. Given the impact of shorter runway lengths on air carrier operations at Midway, this option would not be considered practicable.

Engineered Material Arresting Systems (EMAS)
The FAA concurs with the City that it appears a feasible alternative available at this time for improving the RSAs at Midway is the implementation of EMAS. Because of the area available beyond each runway end, it may not be possible to provide a standard EMAS installation as identified in FAA Advisory Circular 150/5220-22A. However, it does appear feasible to install a non-standard length EMAS bed at each main runway end at Midway. The FAA recommends that the City follow the guidance in FAA Advisory Circular 150/5220-22A, *Engineered Material Arresting Systems (EMAS) for Aircraft Overruns*, dated September 30, 2005, for the work associated with the implementation of this alternative. The FAA will work with the City to relocate existing localizers where feasible, to provide the longest possible EMAS bed.

Summary
At this time, it appears technically feasible to provide at least incremental improvement to the Runway 13C/31C and the Runway 4R/22L Safety Areas at Midway by implementing EMAS at each end of both runways. We agree with the City's conclusion and recommendation that EMAS is the feasible alternative for RSA improvement at this time. We note that the implementation of EMAS on the two main runways at Midway should be considered one aspect of the overall RSA improvement plan. We encourage the City to continue to consider other possible improvements to the RSA. These additional improvements could include, but would not be limited to, object removal, grading and land acquisition.

The FAA strongly supports the City's efforts to improve the RSAs at Midway, and we look forward to working with you to achieve that goal. The FAA also looks forward to future opportunities to work with the City to explore new procedures and technologies as they become available.

Sincerely,

Larry Ladendorf, Acting Manager
Chicago Airports District Office

cc: Mr. Patrick J. Harney, First Deputy Commissioner
Ms. Erin O'Donnell, Managing Deputy Commissioner
Illinois Department of Transportation – Division of Aeronautics