Airport Fuel Truck Road

PRE BID

- SOILS RPT
- FAA SPEC
- REQ FOR PRECON

480 620 9261

16801 Westgrove
Addison TX, 75001
Phone: 972-450-2860
Fax: 972-450-2837

Town of Addison

Fax

To: TONY JOHNSTON **From:** Jenny Nicewander

Fax: 972 557 1552 **Date:** 3/18/05

Phone: 972 557 1199 **Pages:** 10

Re: ADDENDUM 1 **CC:**

☐ **Urgent** ☐ **For Review** ☐ **Please Comment** ☐ **Please Reply** ☐ **Please Recycle**

•Comments:

FUEL TRUCK ROAD ADDENDUM

AIRPORT VEHICLE ACCESSROAD
Pavement Reconstruction

Addendum No. 1
March 16, 2005

To all bidders

This addendum becomes part of the "**AIRPORT VEHICLE ACCESS FUEL ROAD**" plans and specifications. Page PF-2 of the contract documents must be filled out by the bidder acknowledging the receipt of this addendum. **Bids will not be accepted if the above instructions are not followed.**

MODIFICATIONS TO THE SPECIFICATIONS

1. Section SP-Special Provisions –
    a. Section 47 - *General Sequence of Construction* – The 2nd paragraph, first sentence, delete the words "temporary pavement markings"
    b. Section 50 – *GRASS REPAIR* will be deleted
2. Section PF – Proposal Form – replace pages PF 5 and PF 6 in their entirety.
3. Section PS – Project Sign –Page PS2, paragraph one, first sentence should read "One (1) Project..." Replace page PS 2 and PS 3 in their entirety.

MODIFICATIONS TO THE PLANS

There have been modifications to the following plan sheets

1. DT1 – detail sheet 1
2. DT2 – detail sheet 2

For Clarification purposes only

Questions from the pre-bid meeting

1. Concrete strength is 4500 PSI, not 5000 PSI as stated in the meeting.
2. Barricades will be required on both sides of the proposed road construction.
3. No temporary pavement markings are required in this contract
4. Silt fence around inlets are acceptable erosion control at the airport
5. There are no irrigation systems with in the airport construction area that will need to be maintained
6. Quantity for street excavation includes pavement removal and assumes a depth of 10-inches.

All samples and tests shall be performed in accordance with the Standard Specifications for Public Works Construction, North Central Texas Council of Governments (3rd Edition, 2002) as amended or supplemented.

All concrete mix designs and supporting data shall be submitted to the Owner for approval and acceptance at least ten (10) days prior to placing concrete. All costs for the field quality control testing shall be paid for by the Town of Addison.

43. LIME TREATMENT

Will not be used in this project.

44. COMPLIANCE WITH GENERAL RULES AND LAWS

Contractor shall familiarize himself with the nature and extent of the specifications, site conditions, traffic and safety requirements, and comply with all federal, state and local laws, ordinances, rules and regulations. Contractor shall determine how compliance with requirements, laws, rules, and regulations will affect his cost, progress or performance of the Work.

45. COMPLIANCE WITH IMMIGRATION LAWS

Contractor shall take all steps necessary to ensure that all of the Contractor's employees are authorized to work in the United States as required by the Immigration Reform and Control Act of 1986.

46.RESOLUTION OF DISPUTES

The parties hereby covenant and agree that in the event of any controversy, dispute, or claim, of whatever nature arising out of, in connection with or in relation to the interpretation, performance or breach of this agreement, including but not limited to any claims based on contract, tort or statute, before filing a lawsuit, the parties agree to submit the matter to Alternative Dispute Resolution pursuant to the laws of the State of Texas. The parties shall select a third party arbitrator or mediator from the current list of neutrals on file with the Alternative Dispute Resolution Administrator of the Dallas County District Courts. All forms of Alternative Dispute Resolution may be used except binding arbitration. The proceedings shall be conducted in accordance with the laws of the State of Texas.

47. GENERAL SEQUENCE OF CONSTRUCTION

Prior to the start of work, the contractor shall develop a detailed construction and sequence of construction schedule using the critical path method, to be submitted to the Town of Addison for approval, that shall cause minimum interference with traffic along, across and adjacent to the project during construction. If the schedule or sequence becomes unworkable or unsatisfactory as work proceeds, adjustments shall be made. During all phases of construction access to all taxiways and taxilanes must be maintained at all times unless otherwise authorized in writing by the Town of Addison.

Barricades, ~~temporary pavement markings~~, and channelizing devices conforming to the current edition of the FAA Advisory Circular No. 150/5370-2E shall be used during all stages of construction to control traffic flow through the work zones.

50. SECTION DELETED ~~GRASS REPAIR~~

~~No separate pay shall be made for repair of damaged grass areas, not indicated on the plans, but such work shall be subsidiary to the various other items bid. Repair shall comply with applicable specifications elsewhere.~~

51. IRRIGATION AND SPRINKLER REPAIR

The contractor shall maintain all existing irrigation systems within the limits of the project during the duration of the contract. The contractor shall employ a licensed irrigator who is responsible for the repair or replacement of any damage to irrigation lines, valves, controllers, sprinklers, wiring and appurtenances which are damaged during construction. This repair is subsidiary to the various other items bid. The contractor will be responsible for any vegetation that dies as a result of damage to the irrigation system and replace it with equal vegetation at his own cost.

52. WORKERS' COMPENSATION INSURANCE COVERAGE

A. **Definitions.**

Certificate of Coverage ("certificate") - A copy of a certificate of insurance, a certificate of authority to self insure issued by the Texas Workers' Compensation Commission (the "TWCC"), or a coverage agreement (TWCC-81, TWCC-82, TWCC-83 or TWCC-84), showing statutory workers' compensation insurance coverage for the person's or entity's employees providing services on a project, for the duration of the project.

Duration of the Project - includes the time from the beginning of the work on the project until the Contractor's/person's work on the project has been completed and accepted by the governmental entity.

Persons Providing Services on the Project ("subcontractor" in Section 406.096 of the Texas Labor Code) - includes all persons or entities performing all or part of the services the Contractor has undertaken to perform on the project, regardless of whether that person contracted directly with the Contractor and regardless of whether that person has employees. This includes, without limitation, independent contractors, subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity or employees of any entity which furnishes persons to provide services on the project. "Services" include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other service related to a project. "Services" does not include activities unrelated to the project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

B. The Contractor shall provide coverage, based on property reporting of classification codes and payroll amounts and filing of any coverage agreement, which meets the statutory requirements of Texas Labor Code, 401.011(44) for all employees of the Contractor providing services on the project, for the duration of the project.

C. The Contractor must provide a certificate of coverage to the Owner prior to being awarded the contract.

ROADWAY QUANTITIES
Airport Vehicle Access Road
Addison Airport

ITEM NO.	NCTCOG NO.	DESCRIPTION & UNIT PRICE IN WORDS	UNIT	UNIT PRICE	EST QTY.	AMOUNT BID
101		Mobilization	LS		1	$
		Complete in Place, for the Sum of _____ _____ Dollars and _____ Cents per unit				
102	3.3.1	Unclassified Street Excavation (channel)	CY		60	$
		Complete in Place, for the Sum of _____ _____ Dollars and _____ Cents per unit				
103	3.3.1	Unclassified Street Excavation	CY		500	$
		Complete in Place, for the Sum of _____ _____ Dollars and _____ Cents per unit				
104	3.7	Embankment	CY		60	$
		Complete in Place, for the Sum of _____ _____ Dollars and _____ Cents per unit				
105	3.9	Sodding	SY		330	$
		Complete in Place, for the Sum of _____ _____ Dollars and _____ Cents per unit				
106	3.12	Temporary Erosion, sediment and Water Pollution Prevention and Control	LS		1	$
		Complete in Place, for the Sum of _____ _____ Dollars and _____ Cents per unit				

ROADWAY QUANTITIES
Airport Vehicle Access Road
Addison Airport

ITEM NO.	NCTCOG NO.	DESCRIPTION & UNIT PRICE IN WORDS	UNIT	UNIT PRICE	EST. QTY.	AMOUNT BID
107	xx	Item Deleted	SY		0	$
		Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit				
108	5.7	Hot Mix Asphalt Concrete Pavement 2 inch surface course	TON		24	$
		Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit				
109	5.7	8" Portland Cement Concrete Pavement 4500 PSI	SY		225	$
		Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit				
110	5.8	10" Portland Cement Concrete Pavement 4500 PSI	SY		1,750	$
		Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit				

TOTAL AMOUNT BID FOR MATERIALS AND SERVICES, SCHEDULE I, ITEMS 101 THROUGH 110, INCLUSIVE $ _____

PROJECT SIGN

1. Quantity:

ONE (1) Project Designation signs will be constructed and installed on the project site as directed by the Owner. It will be the responsibility of the Contractor to maintain the sign in a presentable condition at all times during construction. Maintenance will include painting and repairs as directed by the City Engineer or his appointee. The locations of the signs will be given to the Contractor by the Town of Addison at the pre-construction meeting.

2. Material:

Sign shall be constructed of 3/4-inch thick smooth finish fir ply-wood (Grade A-C, exterior or better).

Sign will be securely mounted to 6" x 6" square posts. Nuts and bolts will not protrude from face of sign. Posts will be mounted to a support system that will provide adequate stabilization to ensure the sign will not fall over in heavy winds. Sand bags or other techniques may be necessary to protect sign.

3. Dimensions:

Size of sign will be four feet tall and six feet wide. The height and arrangement of the lettering shall be in accordance with the attached detail.

4. Paint:

Sign will be one-sided and will have a white background. Text will be black, except for the word "Addison!" which will be a blue color approved by the City Engineer. The paint will be an outdoor paint and will be maintained throughout the project in proper order. The quality of the paint, painting, lettering on the signs shall be approved by the City Engineer or his appointee.

5. Payment:

Signs will not be a separate pay item, but will be subsidiary to other bid items. This will include all labor, equipment, tools, and incidentals necessary to complete and install the work.

The Town of Addison!

PLEASE PARDON THE TEMPORARY INCONVENIENCE DURING THIS PROJECT

AIRPORT VEHICLE ACCESS ROAD:

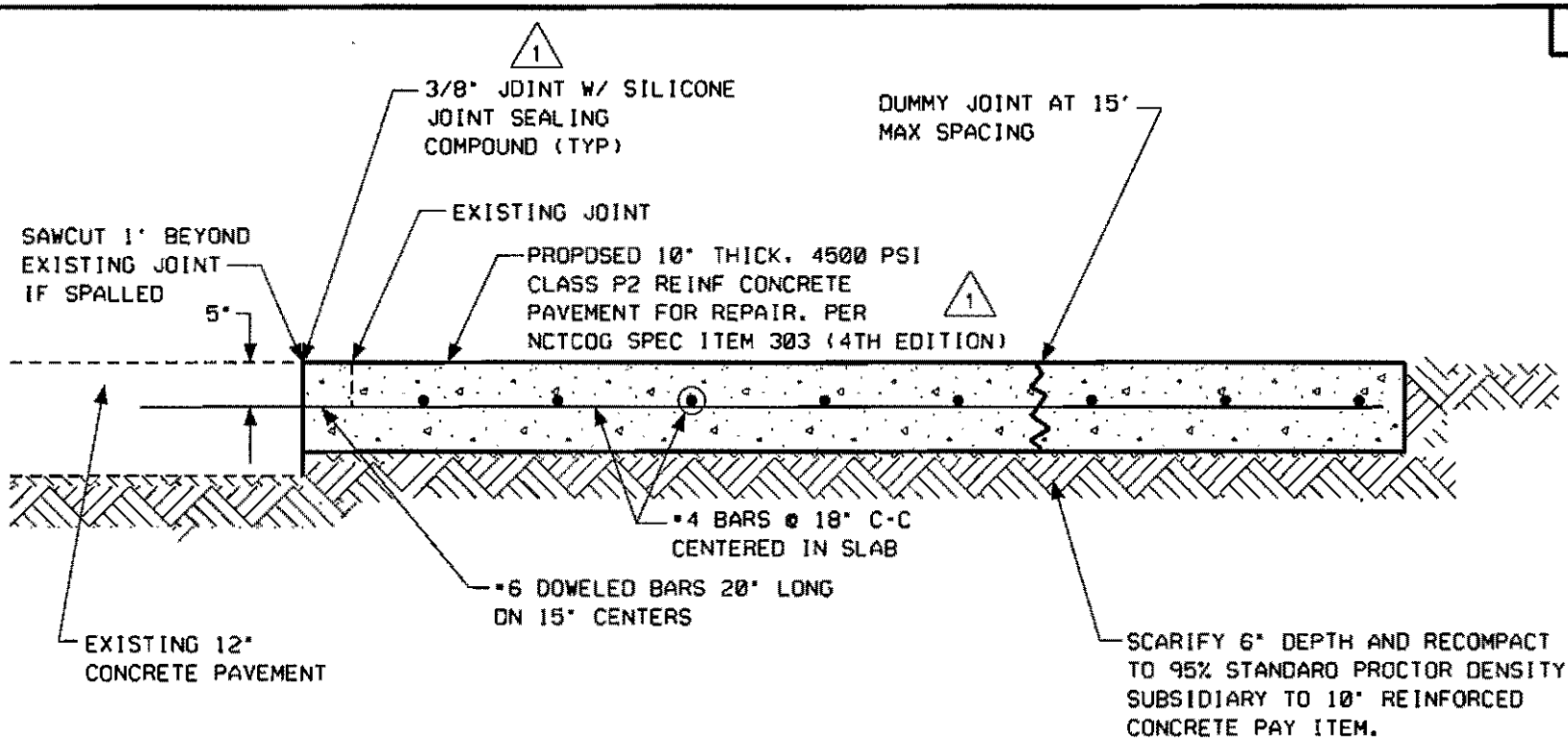
-- PAVING IMPROVEMENTS ON AIRFIELD VEHICLE ACCESS ROAD

CONTRACTOR:
ESTIMATED COMPLETION DATE: Fall, 2005

AN ADDISON PROJECT
FOR MORE INFORMATION, PLEASE CALL 972-450-2871

$$$$$$SYTIME$$$$$
$$$$$$$$$$$$DGNSPEC$$$$$$$$$$$$$$$

NOT TO SCALE



SECTION A-A

REPAIR AREAS SHALL BE LEVELED TO MATCH EXISTING GRADE OF ADJACENT CONCRETE OR ASPHALT PAVEMENT.

IF ADDITIONAL FILL MATERIAL IS NEEDED, FLEXIBLE BASE MEETING THE REQUIREMENTS OF NCTCOG STANDARD SPECIFICATIONS 301.5 SHALL BE USED. ADDITIONAL FILL MATERIAL SHALL BE SUBSIDIARY TO BID ITEMS.

CONTRACTOR WILL SOD DISTURBED AREA. 1

REMOVED PAVEMENT SHALL BE DISPOSED OF BY CONTRACTOR AND CONSIDERED SUBSIDIARY TO OTHER BID ITEMS.

1 ADDENDUM 1 - MARCH 16, 2005

THE SEAL ON THIS DOCUMENT WAS AUTHORIZED BY J. S. NICEWANDER P.E.# 87843 ON March 4, 2005

DT-1

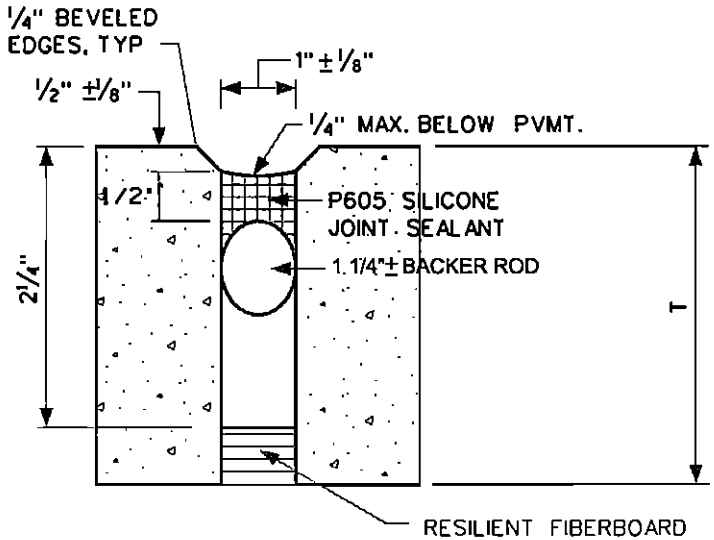
ADDISON AIRPORT

AIRPORT VEHICLE ACCESS ROAD

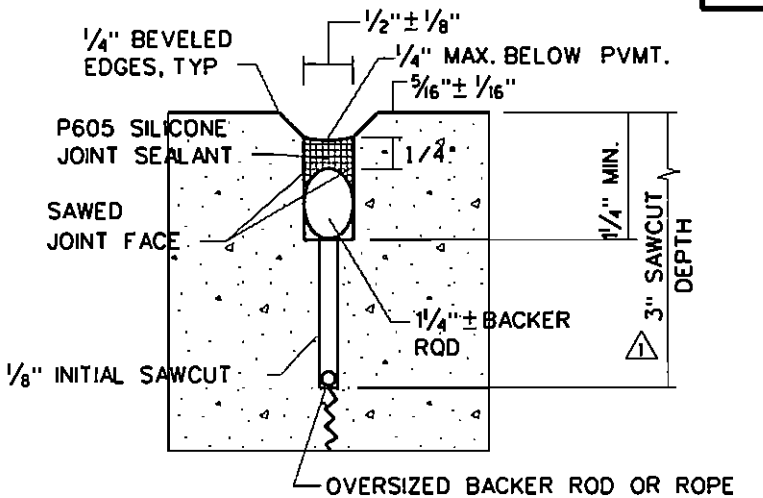
TYPICAL SECTION
CONCRETE PAVEMENT REPLACEMENT
ADJACENT TO CONCRETE

$$$$$$SYTIME$$$$$
$$$$$$$$$$$DGNSPEC$$$$$$$$$$$$$$$

NOT TO SCALE



DETAIL 1
EXPANSION JOINT
NOT TO SCALE



DETAIL 2
DUMMY JOINT
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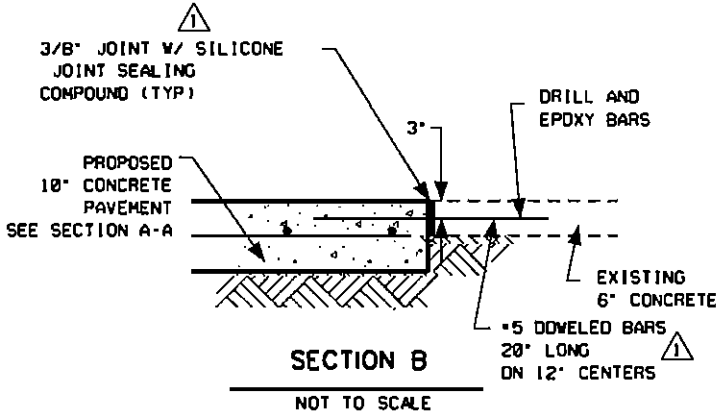

SECTION B
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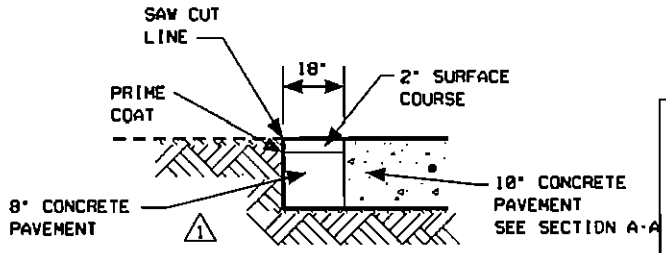

SECTION C
NOT TO SCALE

STATE OF TEXAS
J. S. NICEWANDER
87843
REGISTERED PROFESSIONAL ENGINEER

THE SEAL ON THIS DOCUMENT WAS AUTHORIZED BY J. S. NICEWANDER P.E.# 87843 ON March 4, 2005

DT-2

ADDISON AIRPORT

AIRPORT VEHICLE ACCSS ROAD

PAVING JOINT DETAILS

1 ADDENDUM 1 MARCH 16, 2005

...\TECHPROD\Sheets\ftdt03ADD1.dgn 03/16/2005 02:19:16 PM

WOL - Waiver of Lien - Take out completely ✓ TOC too

Geotech Report - We don't want to have to furnish this thick document to every bidder -

Para 49 - See comments (Sy 15)
Lets say a complete copy of this report is available for review in Shamas office & Butler Wks office

---

Specs - Need Concrete, asphalt - - -
put on plans! Make sure everything shown on the plans has a spec.
Call out concrete finish
Call out fine grading before sodding
Call out ~~GB~~ dust, dirt, gravel control

05-13 Airport Vehicle Access Road
Pre Bid Meeting
March 15, 2005 @ 2:00 PM

Company	Name	Address	Phone	Fax	Email
Gibson & Assoc	Tony Johnston	Balch Springs Tx 75180 11210 Ridgecrest	972-557-1199	972-557-1552	tonyj@gibsonassoc.net
Tiseo Paving	Rick Howard	419 E Hwy 80 Mesquite 75150	972 ~~489~~ 289 0723	972 329 0047	rhoward@tiseopaving.com
Teske Const.	Steve Teske	PO Box 59025 Dallas TX 75229	972 620 2248	972 620 9852	sjes21@AOL.com
Site Concrete	Bryan Piper	3346 Roy Orr G.P. Tx 75050	972-313-0733	972-513-0061	BPiper@siteconcrete.com

05-13 Airport Vehicle Access Road
Pre Bid Meeting
March 15, 2005 @ 2:00 PM

Company	Name	Address	Phone	Fax	Email
Airport	Dave Foster		972-392-4852		David.Foster@dfwint.com
Texas Standard	Steve Cooper		214-330-5225		
JRI Paving	Ron Davis		940-320-6340		
Ed A. Wilson	Beverly Farren		817-923-6400	817-923-6242	bfarren@edawilson.com
Steve Chutcham	Town of Addison		972 450 2886	972 450 2837	—

Pre-Bid Meeting
Airport Vehicle Access Road
March 15, 2005
2:00 PM

Introductions
Project Overview
A+B Bidding – Incentive/disincentive $500 dollars per day, Max Incentive $5000.00

- A Part – Bid tab items
- B Part – Number of days bid to complete project @ $500/day
- Bid Award based on "A" + "B" amount
- Contract is based on "A" portion

Airport Safety Requirements of Contractor

1. Work adjacent to non-movement area
2. Driving school
3. Radio's required
4. Staging area and site access

Construction Schedule – Town of Addison Events

1. Kaboom Town – safety barriers around haul road
2. A+B bidding – includes holidays

Expectations of Contractor for Pre-Construction meeting

1. Schedule
2. Traffic Control Plan will be required 5-days prior to construction

Handouts

1. Soils Report
2. FAA Spec –AC 150/5370-2E Operational Safety on Airports during Construction
3. Sign in Sheet

Miscellaneous

1. Read General Notes in specs on page SP-19

Field Trip

Pre-Bid Meeting
Airport Vehicle Access Road
March 15, 2005
2:00 PM

Addison!

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Airport Safety Requirements of Contractor

1. Work adjacent to non-movement area
2. Driving school
3. Radio's required – NO
4. Staging area and site access

- Barricades on Both sides
- NO TEMP PVMT MARKINGS
- Hay Bales a Silt fence
- SP-16 goes away
- no irrigation

Construction Schedule – Town of Addison Events

1. Kaboom Town – safety barriers around haul road
2. A+B bidding – includes holidays

Expectations of Contractor for Pre-Construction meeting

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3. Sign in Sheet

- Channel excavation
- embankment

DT- Hot Pour
DT2 Silicon

Miscellaneous

1. Read General Notes in specs on page SP-19

DT detail - 3000 PSI

Field Trip

- forms detail no flex base use conc instead

- detail 2 5" deep cut

- Section B dowel size (bring down)

- Direct

05-13 Airport Vehicle Access Road
Pre Bid Meeting
March 15, 2005 @ 2:00 PM

Company	Name	Address	Phone	Fax	Email
Gibson Assoc	Tony Johnston	11210 Ryliecrest Balch Springs Tx 75180	972-557-1199	972-557-1552	tonyj@gibsonassoc.net
Tiseo Paving	Rick Howard.	419 E Hwy 80 Mesquite 75150	972 ~~489~~ 289 0723	972 329 0047	rhoward@tiseopaving.com
Jeske Const.	Steve Jeske	PO Box 59025 Dallas TX 75229	972 620 2248	972 620 9852	sjes21@AOL.com
Site Concrete	Bryan Piper	3349 Roy Orr G.P. TX 75050	972-313-0733	972-513-[illegible]	BPiper@SiteConcrete.com

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Pre Bid Meeting
March 15, 2005 @ 2:00 PM

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Ed A. Wilson	Beverly Farren		817-923-6400	817-923-6242	bfarren@edawilson.com
Steve Chutcham	Town of Addison		972 450 2886	972 450 2837	

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Airport Vehicle Access Road
March 15, 2005
2:00 PM

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1. Read General Notes in specs on page SP-19

Field Trip

Pre-Bid Meeting
Airport Vehicle Access Road
March 15, 2005
2:00 PM

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3. Sign in Sheet

Miscellaneous

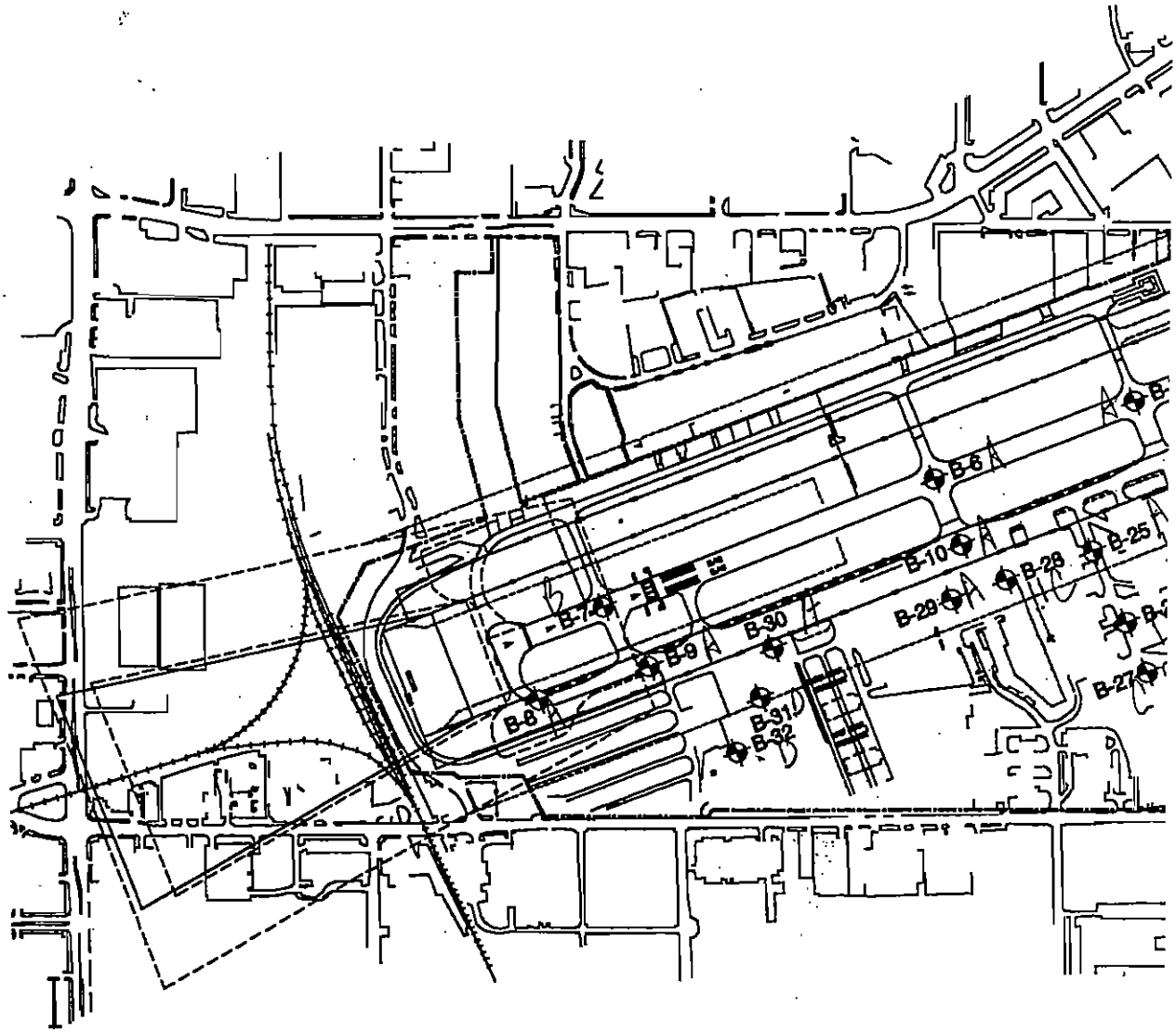
1. Read General Notes in specs on page SP-19

Field Trip

PROJECT NO. 8614
REPORT NO. 1
MARCH, 2002

GEOTECHNICAL INVESTIGATION
ADDISON AIRPORT
RUNWAY AND TAXIWAYS
ADDISON, TEXAS

Presented To:
COFFMAN ASSOCIATES
PHOENIX, ARIZONA


B-6
B-10
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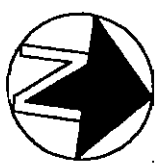
B-31
B-32
B-27

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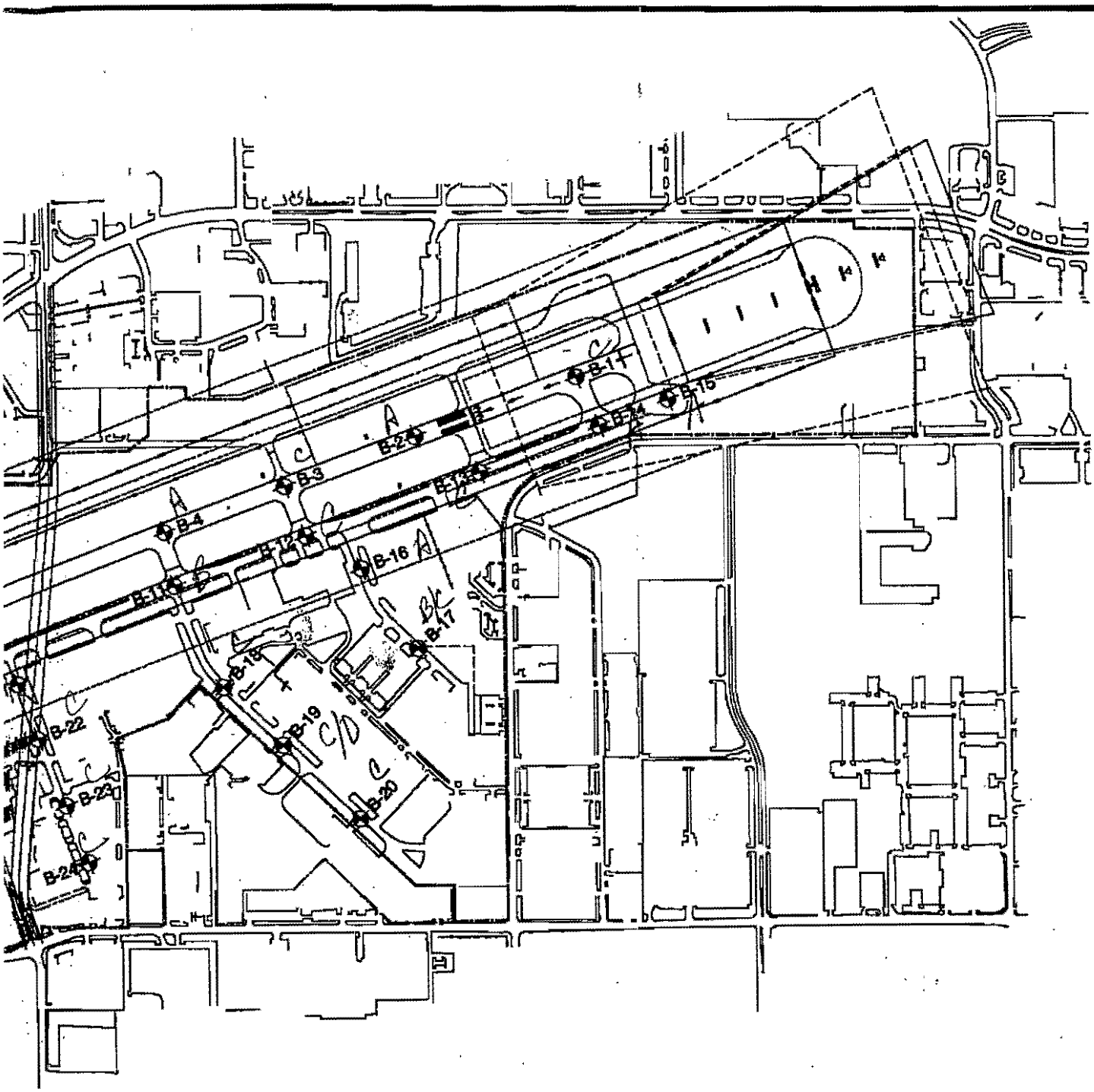
800'



REED ENGINEERING GROUP
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

PLAN OF BORINGS

Addison Airport

Runway & Taxiways
Addison, Texas

PLATE 1

reed engineering GROUP

Project No. 8614

Date: 02-10-02

Addison Airport
Runway and Taxiways
Addison, Texas

Location: See Plate 1

DEPTH, feet	DESCRIPTIVE SYMBOLS	SAMPLES	CORE % REC.	CORE % ROD	DESCRIPTION OF STRATA
0					ASPHALT (5.8")
					LIMESTONE FRAGMENTS, yellowish-brown, fine- to coarse-grained, angular, w/clay (Fill) (GP)
					Total Depth = 7 feet
5					
10					
15					
20					

Pocket Penetrometer Readings
Tons Per Sq. Ft: -*
Standard Penetration Tests
Blows per Foot - +

* +	1 10	2 20	3 30	4 40	4.5+ 50	4.5++ 60

BORING LOG B-30

PLATE 31

reed engineering GROUP

Project No: 8614

Date: 02-10-02

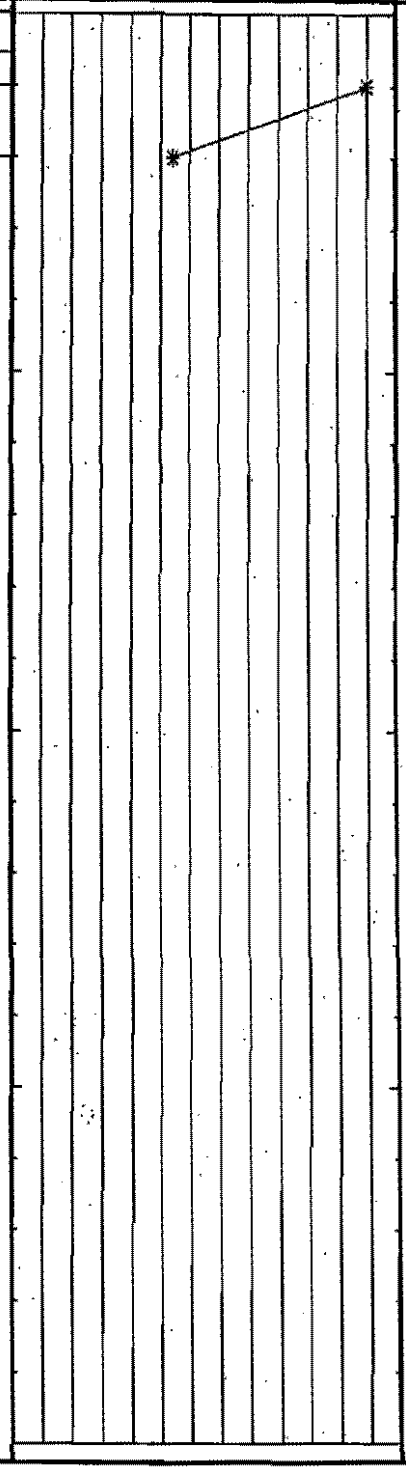
Addison Airport
Runway and Taxiways
Addison, Texas

Location: See Plate 1

DEPTH, feet	DESCRIPTIVE SYMBOLS	SAMPLES	CORE % REC.	CORE % RQD	DESCRIPTION OF STRATA
0					ASPHALT (6.3")
					CLAYEY GRAVEL, brown, well-rounded, fine- to medium-grained, siliceous & calcareous, w/fine- to coarse-grained, sub-rounded to sub-angular sand (Fill) (GP)
					CLAY, dark gray, very stiff (CH)
5					Total Depth = 2 feet
10					
15					
20					

Pocket Penetrometer Readings
Tons Per Sq. Ft. - *
Standard Penetration Tests
Blows per Foot - +

* +	1 10	2 20	3 30	4 40	4.5+ 50	4.5++ 60



BORING LOG B-31

PLATE 32

reed engineering GROUP

Project No. 8614

Date: 02-10-02

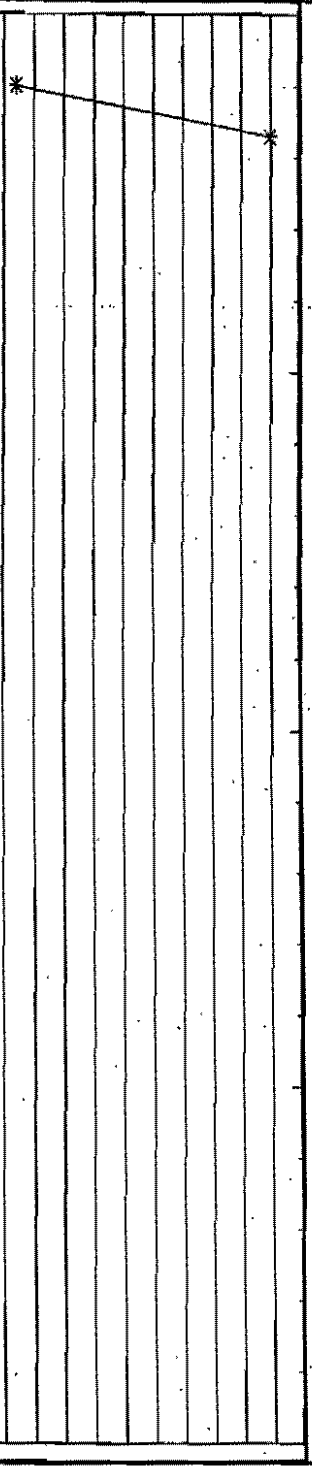
Addison Airport
Runway and Taxiways
Addison, Texas

Location: See Plate 1

DEPTH, feet	DESCRIPTIVE SYMBOLS	SAMPLES	CORE % REC.	CORE % RQD	DESCRIPTION OF STRATA
0					ASPHALT (7.4")
					CLAY, dark brown & dark gray, stiff to hard, w/fine- to medium- grained, soft, weathered limestone fragments (Fill) (CH)
					gray limestone @ 1-1/2'
5					Total Depth = 1-1/2 feet
10					
15					
20					

Pocket Penetrometer Readings
Tons Per Sq. Ft. - *
Standard Penetration Tests
Blows per Foot - +

* +	1 10	2 20	3 30	4 40	4.5+ 50	4.5++ 60



BORING LOG B-32

PLATE 33

SOIL PROPERTIES

COHESIONLESS SOILS

SPT N-Values (blows/foot)	Relative Density
0 – 4	Very Loose
4 –10	Loose
10–30	Medium Dense
30–50	Dense
50 +	Very Dense

COHESIVE SOILS

Pocket Penetrometer (T.S.F.)	Consistency
<0.25	Very Soft
0.25–0.50	Soft
0.50–1.00	Medium Stiff
1.00–2.00	Stiff
2.00–4.00	Very Stiff
4.00 +	Hard

ROCK PROPERTIES

HARDNESS	DIAGNOSTIC FEATURES
Very Soft	Can be dented with moderate finger pressure.
Soft	Can be scratched easily with fingernail.
Moderately Hard	Can be scratched easily with knife but not with fingernail.
Hard	Can be scratched with knife with some difficulty; can be broken by light to moderate hammer blow.
Very Hard	Cannot be scratched with knife; can be broken by repeated heavy hammer blows.

DEGREE OF WEATHERING	DIAGNOSTIC FEATURES
Slightly Weathered	Slight discoloration inwards from open fractures.
Weathered	Discoloration throughout; weaker minerals decomposed; strength somewhat less than fresh rock; structure preserved.
Severely Weathered	Most minerals somewhat decomposes; much softer than fresh rock; texture becoming indistinct but fabric and structure preserved.
Completely Weathered	Minerals decomposed to soil; rock fabric and structure destroyed (residual soil).

GEOTECHNICAL INVESTIGATION
ADDISON AIRPORT
RUNWAY AND TAXIWAYS
ADDISON, TEXAS
(Continued)

Summary of Classification and Index Property Tests

Boring No.	Depth (feet)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (PI)	Percent Passing No. 200 Sieve
B-30	0.4 - 0.7	--	--	--	17
B-31	1.0 - 2.0	66	26	40	--
B-32	0.5 - 1.0	56	22	34	--

U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION

Date: 1/17/03
Initiated by: AAS-300

AC No: 150/5370-2E
Change:

1. THE PURPOSE OF THIS ADVISORY CIRCULAR (AC).

Aviation safety is the primary consideration at airports, especially during construction. This AC sets forth guidelines for operational safety on airports during construction. It contains major changes to the following areas: "Runway Safety Area," paragraph 3-2; "Taxiway Safety Areas/Object-Free Areas," paragraph 3-3; "Overview," paragraph 3-4; "Marking Guidelines for Temporary Threshold," paragraph 3-5; and "Hazard Marking and Lighting," paragraph 3-9.

2. WHAT THIS AC CANCELS.

This AC cancels AC 150/5370-2D, *Operational Safety on Airports During Construction*, dated May 31, 2002.

3. READING MATERIAL RELATED TO THIS AC.

Appendix 1 contains a list of reading materials on airport construction, design, and potential safety hazards during construction, as well as instructions for ordering these documents. Many of them, including this AC, are available on the Federal Aviation Administration (FAA) Web site.

4. WHO THIS AC AFFECTS.

This AC assists airport operators in complying with 14 Code of Federal Regulations (CFR), part 139, Certification and Operation: Land Airports Serving Certain Air Carriers, and with the requirements of airport construction projects receiving funds under the Airport Improvement Program or from the Passenger Facility Charge Program. While the FAA does not require noncertificated airports without grant agreements to adhere to these guidelines, we recommend that they do so as it will help these airports maintain a desirable level of operational safety during construction.

5. ADDITIONAL BACKGROUND INFORMATION.

Appendix 2 contains definitions of terms used in this AC. Appendix 3 provides airport operators with boilerplate format and language for developing a safety plan for an airport construction project. Appendix 4 is a sample Notice to Airmen form.

6. HAZARD LIGHTING IMPLEMENTATION TIME LINE.

Supplemental hazard lighting must be red in color by October 1, 2004. See paragraph 3-9 for more information.

DAVID L. BENNETT

Director, Office of Airport Safety and Standards

CONTENTS

Appendices

CHAPTER 1. GENERAL SAFETY REQUIREMENTS AND RESPONSIBILITIES

1-1. OVERVIEW.

Hazardous practices and marginal conditions created by construction activities can decrease or jeopardize operational safety on airports. To minimize disruption of normal aircraft operations and to avoid situations that compromise the airport's operational safety, the airport operator must carefully plan, schedule, and coordinate construction activities. While the guidance in this AC is primarily used for construction operations, some of the methods and procedures described may also enhance day-to-day maintenance operations.

1-2. WHO IS RESPONSIBLE FOR SAFETY DURING CONSTRUCTION.

An airport operator has overall responsibility for construction activities on an airport. This includes the predesign, design, preconstruction, construction, and inspection phases. Additional information on these responsibilities can be found throughout this AC.

a. Airport operator's responsibilities—

(1) Develop internally or approve a construction safety plan developed by an outside consultant/contractor that complies with the safety guidelines in Chapter 2, "Safety Plans," and Appendix 3, "Airport Construction Safety Planning Guide," of this AC.

(2) Require contractors to submit plans indicating how they intend to comply with the safety requirements of the project.

(3) Convene a meeting with the construction contractor, consultant, airport employees, and, if appropriate, tenant sponsor to review and discuss project safety before beginning construction activity.

(4) Ensure contact information is accurate for each representative/point of contact identified in the safety plan.

(5) Hold weekly or, if necessary, daily safety meetings to coordinate activities.

(6) Notify users, especially aircraft rescue and fire fighting (ARFF) personnel, of construction activity and conditions that may adversely affect the operational safety of the airport via Notices to Airmen (NOTAMs) or other methods, as appropriate. Convene a meeting for review and discussion if necessary.

(7) Ensure that construction personnel know of any applicable airport procedures and of changes to those procedures that may affect their work.

(8) Ensure that construction contractors and subcontractors undergo training required by the safety plan.

(9) Develop and/or coordinate a construction vehicle plan with airport tenants, the airport traffic control tower (ATCT), and construction contractors. Include the vehicle plan in the safety plan. See Chapter 2, section 2, of this AC for additional information.

(10) Ensure tenants and contractors comply with standards and procedures for vehicle lighting, marking, access, operation, and communication.

(11) At certificated airports, ensure that each tenant's construction safety plan is consistent with 14 CFR part 139, Certification and Operations: Land Airports Serving Certain Air Carriers.

(12) Conduct frequent inspections to ensure construction contractors and tenants comply with the safety plan and that altered construction activities do not create potential safety hazards.

(13) Resolve safety deficiencies immediately.

(14) Ensure construction access complies with the security requirements of 49 CFR part 1542, Airport Security.

(15) Notify appropriate parties when conditions exist that invoke provisions of the safety plan (e.g., implementation of low-visibility operations).

b. Construction contractor's responsibilities—

(1) Submit plans to the airport operator on how to comply with the safety requirements of the project.

(2) Have available a copy of the project safety plan.

(3) Comply with the safety plan associated with the construction project and ensure that construction personnel are familiar with safety procedures and regulations on the airport.

(4) Provide a point of contact who will coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport.

(5) Provide a safety officer/construction inspector familiar with airport safety to monitor construction activities.

(6) Restrict movement of construction vehicles to construction areas by flagging and barricading, erecting temporary fencing, or providing escorts, as appropriate.

(7) Ensure that no construction employees, employees of subcontractors or suppliers, or other persons enter any part of the air operations areas (AOAs) from the construction site unless authorized.

c. Tenant's responsibilities if planning construction activities on leased property—

(1) Develop a safety plan, and submit it to the airport operator for approval prior to issuance of a Notice to Proceed.

(2) Provide a point of contact who will coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport.

(3) Ensure that no tenant or construction employees, employees of subcontractors or suppliers, or any other persons enter any part of the AOA from the construction site unless authorized.

(4) Restrict movement of construction vehicles to construction areas by flagging and barricading or erecting temporary fencing.

CHAPTER 2. SAFETY PLANS

Section 1. Basic Safety Plan Considerations

2-1. OVERVIEW.

Airport operators should coordinate safety issues with the air carriers, FAA Airway Facilities, and other airport tenants before the design phase of the project. The airport operator should identify project safety concerns, requirements, and impacts before making arrangements with contractors and other personnel to perform work on an airport. These safety concerns will serve as the foundation for the construction safety plan and help maintain a high level of aviation safety during the project.

The airport operator should determine the level of complexity of the safety plan that is necessary for each construction project and its phases. The safety plan may be detailed in the specifications included in the invitation for bids, or the invitation for bid may specify that the contractor develop the safety plan and the airport operator approve it. In the latter case, the invitation for bid should contain sufficient information to allow the contractor to develop and determine the costs associated with the safety plan. In either case, safety plan costs should be incorporated into the total cost of the project. The airport operator has final approval authority and responsibility for all safety plans.

Coordination will vary from formal predesign conferences to informal contacts throughout the duration of the construction project.

Details of a specified safety plan, or requirements for a contractor-developed safety plan, should be discussed at the predesign and preconstruction conferences and should include the following, as appropriate:

a. Actions necessary before starting construction, including defining and assigning responsibilities.

b. Basic responsibilities and procedures for disseminating instructions about airport procedures to the contractor's personnel.

c. Means of separating construction areas from aeronautical-use areas.

d. Navigational aid (NAVAID) requirements and weather.

e. Marking and lighting plan illustrations.

f. Methods of coordinating significant changes in airport operations with all the appropriate parties.

2-2. SAFETY PLAN CHECKLIST.

To the extent applicable, the safety plan should address the following:

a. Scope of work to be performed, including proposed duration of work.

b. Runway and taxiway marking and lighting.

c. Procedures for protecting all runway and taxiway safety areas, obstacle-free zones (OFZs), object-free areas (OFAs), and threshold citing criteria outlined in AC 150/5300-13, *Airport Design,* and as described in this AC. This includes limitations on equipment height and stockpiled material.

d. Areas and operations affected by the construction activity, including possible safety problems.

e. NAVAIDs that could be affected, especially critical area boundaries.

f. Methods of separating vehicle and pedestrian construction traffic from the airport movement areas. This may include fencing off construction areas to keep equipment operators in restricted areas in which they are authorized to operate. Fencing, or some other form of restrictive barrier, is an operational necessity in some cases.

g. Procedures and equipment, such as barricades (identify type), to delineate closed construction areas from the airport operational areas, as necessary.

h. Limitations on construction.

i. Required compliance of contractor personnel with all airport safety and security measures.

j. Location of stockpiled construction materials, construction site parking, and access and haul roads.

k. Radio communications.

l. Vehicle identification.

m. Trenches and excavations and cover requirements.

n. Procedures for notifying ARFF personnel if water lines or fire hydrants must be deactivated or if emergency access routes must be rerouted or blocked.

o. Emergency notification procedures for medieal and police response.

p. Use of temporary visual aids.

q. Wildlife management.

r. Foreign object debris (FOD) control provisions.

s. Hazardous materials (HAZMAT) management.

t. NOTAM issuance.

u. Inspection requirements.

v. Procedures for locating and protecting existing underground utilities, cables, wires, pipelines, and other underground facilities in excavation areas.

w. Procedures for contacting responsible representatives/points of contact for all involved parties. This should include off-duty contact information so an immediate response may be coordinated to correct any construction-related activity that could adversely affect the operational safety of the airport. Particular care should be taken to ensure that appropriate Airways Facilities personnel are identified in the event that an unanticipated utility outage or cable cut occurs that impacts FAA NAVAIDs.

x. Vehicle operator training.

y. Penalty provisions for noncompliance with airport rules and regulations and the safety plan (e.g., if a vehicle is involved in a runway incursion).

z. Any special conditions that affect the operation of the airport and will require a portion of the safety plan to be activated (e.g., low-visibility operations, snow removal).

Section 2. Safety and Security Measures

2-3. OVERVIEW.

Airport operators are responsible for closely monitoring tenant and construction contractor activity during the construction project to ensure continual compliance with all safety and security requirements. Airports subject to 49 CFR part 1542, Airport Security, must meet standards for access control, movement of ground vehicles, and identification of construction contractor and tenant personnel. In addition, airport operators should use safety program standards, as described in Chapter 3 of this AC, to develop specific safety measures to which tenants and construction contractors must adhere throughout the duration of construction activities.

General safety provisions are contained in AC 150/5370-10, *Standards for Specifying Construction of Airports,* paragraphs 40-05, "Maintenance of Traffic"; 70-08, "Barricades, Warning Signs, and Hazard Markings"; and 80-04, "Limitation of Operations." At any time during construction, aircraft operations, weather, security, or local airport rules may dictate more stringent safety measures. The airport operator should ensure that both general and specific safety requirements are coordinated with airport tenants and ATCT personnel. The airport operator should also include these parties in the coordination of all bid documents, construction plans, and specifications for on-airport construction projects.

2-4. VEHICLE OPERATION AND MARKING AND PEDESTRIAN CONTROL.

Vehicle and pedestrian access routes for airport construction projects must be controlled to prevent inadvertent or unauthorized entry of persons, vehicles, or animals onto the AOA. This includes aircraft movement and nonmovement areas. The airport operator should develop and coordinate a construction vehicle plan with airport tenants, contractors, and the ATCT. The safety plan or invitation for bid should include specific vehicle and pedestrian requirements.

The vehicle plan should contain the following items:

a. Airport operator's rules and regulations for vehicle marking, lighting, and operation.

b. Requirements for marking and identifying vehicles in accordance with AC 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport.*

c. Description of proper vehicle operations on movement and nonmovement areas under normal, lost communications, and emergency conditions.

d. Penalties for noncompliance with driving rules and regulations.

e. Training requirements for vehicle drivers to ensure compliance with the airport operator's vehicle rules and regulations.

f. Provisions for radio communication training for construction contractor personnel engaged in construction activities around aircraft movement areas. Some drivers,

such as construction drivers under escort, may not require this training.

g. Escort procedures for construction vehicles requiring access to aircraft movement areas. A vehicle in the movement area must have a working aviation-band, two-way radio unless it is under escort. Vehicles can be in closed areas without a radio if the closed area is properly marked and lighted to prevent incursions and a NOTAM regarding the closure is issued.

h. Monitoring procedures to ensure that vehicle drivers are in compliance with the construction vehicle plan.

i. Procedures for, if appropriate, personnel to control access through gates and fencing or across aircraft movement areas.

2-5. CONSTRUCTION EMPLOYEE PARKING AREAS.

Designate in advance vehicle parking areas for contractor employees to prevent any unauthorized entry of persons or vehicles onto the airport movement area. These areas should provide reasonable contractor employee access to the job site.

2-6. CONSTRUCTION VEHICLE EQUIPMENT PARKING.

Construction employees must park and service all construction vehicles in an area designated by the airport operator outside the runway safety areas and OFZs and never on a closed taxiway or runway. Employees should also park construction vehicles outside the OFA when not in use by construction personnel (e.g., overnight, on weekends, or during other periods when construction is not active). Parking areas must not obstruct the clear line of sight by the ATCT to any taxiways or runways under air traffic control nor obstruct any runway visual aids, signs, or navigational aids. The FAA must also study those areas to determine effects on 14 CFR part 77, *Objects Affecting Navigable Airspace*, surfaces (see paragraph 2-13 for further information).

2-7. RADIO COMMUNICATION TRAINING.

The airport operator must ensure that tenant and construction contractor personnel engaged in activities involving unescorted operation on aircraft movement areas observe the proper procedures for communications, including using appropriate radio frequencies at airports with and without ATCTs. Training of contractors on proper communication procedures is essential for maintaining airport operational safety. When operating vehicles on or near open runways or taxiways, construction personnel must understand the critical importance of maintaining radio contact with airport operations, ATCT, or the Common Traffic Advisory Frequency, which may include UNICOM, MULTICOM, or one of the FAA Flight Service Stations (FSS), as directed by airport management.

Vehicular traffic crossing active movement areas must be controlled either by two-way radio with the ATCT, escort, flagman, signal light, or other means appropriate for the particular airport. Vehicle drivers must confirm by personal observation that no aircraft is approaching their position when given clearance to cross a runway. In addition, it is the responsibility of the escort vehicle driver to verify the movement/position of all escorted vehicles at any given time.

Even though radio communication is maintained, escort vehicle drivers must also familiarize themselves with ATCT light gun signals in the event of radio failure (see the FAA safety placard "Ground Vehicle Guide to Airport Signs and Markings"). This safety placard may be ordered through the Runway Safety Program Web site at **http://www.faarsp.org** or obtained from the Regional Airports Division Office.

2-8. FENCING AND GATES.

Airport operators and contractors must take care to maintain a high level of safety and security during construction when access points are created in the security fencing to permit the passage of construction vehicles or personnel. Temporary gates should be equipped so they can be securely closed and locked to prevent access by animals and people (especially minors). Procedures should be in place to ensure that only authorized persons and vehicles have access to the AOA and to prohibit "piggybacking" behind another person or vehicle. The Department of Transportation (DOT) document DOT/FAA/AR-00/52, *Recommended Security Guidelines for Airport Planning and Construction*, provides more specific information on fencing. A copy of this document can be obtained from the Airport Consultants Council, Airports Council International, or American Association of Airport Executives.

Section 3. Notification of Construction Activities

2-9. GENERAL.

In order to maintain the desired levels of operational safety on airports during construction activities, the safety plan should contain the notification actions described below.

2-10. ENSURING PROMPT NOTIFICATIONS.

The airport operator should establish and follow procedures for the immediate notification of airport users and the FAA of any conditions adversely affecting the operational safety of an airport.

2-11. NOTICES TO AIRMEN (NOTAMS).

The airport operator must provide information on closed or hazardous conditions on airport movement areas to the FSS so it can issue a NOTAM. The airport operator must coordinate the issuance, maintenance, and cancellation of NOTAMs about airport conditions resulting from construction activities with tenants and the local air traffic facility (control tower, approach control, or air traffic control center. Refer to AC 150/5200-28, *Notices to Airmen (NOTAMs) for Airport Operators,* and Appendix 4 in this AC for a sample NOTAM form. Only the FAA may issue or cancel NOTAMs on shutdown or irregular operation of FAA-owned facilities. Only the airport operator or an authorized representative may issue or cancel NOTAMs on airport conditions. (The airport owner/operator is the only entity that can close or open a runway.) The airport operator must file and maintain this list of authorized representatives with the FSS. Any person having reason to believe that a NOTAM is missing, incomplete, or inaccurate must notify the airport operator.

2-12. AIRCRAFT RESCUE AND FIRE FIGHTING (ARFF) NOTIFICATION.

The safety plan must provide procedures for notifying ARFF personnel, mutual aid providers, and other emergency services if construction requires shutting off or otherwise disrupting any water line or fire hydrant on the airport or adjoining areas and if contractors work with hazardous material on the airfield. Notification procedures must also be developed for notifying ARFF and all other emergency personnel when the work performed will close or affect any emergency routes. Likewise, the procedures must address appropriate notifications when services are restored.

2-13. NOTIFICATION TO THE FAA.

For certain airport projects, 14 CFR part 77 requires notification to the FAA. In addition to applications made for Federally funded construction, 14 CFR part 157, Notice of Construction, Alteration, Activation, and Deactivation of Airports, requires that the airport operator notify the FAA in writing whenever a non-Federally funded project involves the construction of a new airport; the construction, realigning, altering, activating, or abandoning of a runway, landing strip, or associated taxiway; or the deactivation or abandoning of an entire airport. Notification involves submitting FAA Form 7480-1, Notice of Landing Area Proposal, to the nearest FAA Regional Airports Division Office or Airports District Office.

Also, any person proposing any kind of construction or alteration of objects that affect navigable airspace, as defined in 14 CFR part 77 must notify the FAA. This includes construction equipment and proposed parking areas for this equipment (i.e., cranes, graders, etc.). FAA Form 7460-1, Notice of Proposed Construction or Alteration, can be used for this purpose and submitted to the FAA Regional Airports Division Office or Airports District Office. (See AC 70/7460-2, *Proposed Construction or Alteration of Objects that May Affect the Navigable Airspace.*)

If construction operations require a shutdown of an airport owned NAVAID from service for more than 24 hours or in excess of 4 hours daily on consecutive days, we recommend a 45-day minimum notice prior to facility shutdown. Coordinate work for a FAA owned NAVAID shutdown with the local FAA Airways Facilities Office. In addition, procedures that address unanticipated utility outages and cable cuts that could impact FAA NAVAIDs must be addressed.

2-14. WORK SCHEDULING AND ACCOMPLISHMENT.

Airport operators—or tenants having construction on their leased properties—should use predesign, prebid, and preconstruction conferences to introduce the subject of airport operational safety during construction (see AC 150/5300-9, *Predesign, Prebid, and Preconstruction Conferences for Airport Grant Projects).* The airport operator, tenants, and construction contractors should integrate operational safety requirements into their planning and work schedules as early as practical. Operational safety should be a standing agenda item for discussion during progress meetings throughout the project. The contractor and airport operator should carry out onsite inspections throughout the project and immediately remedy any deficiencies, whether caused by negligence, oversight, or project scope change.

CHAPTER 3. SAFETY STANDARDS AND GUIDELINES

Section 1. Runway and Taxiway Safety Areas, Obstacle-Free Zones, and Object-Free Areas

3-1. OVERVIEW.

Airport operators must use these safety guidelines when preparing plans and specifications for construction activities in areas that may interfere with aircraft operations. The safety plan should recognize and address these standards for each airport construction project. However, the safety plan must reflect the specific needs of a particular project, and for this reason, these safety guidelines should not be incorporated verbatim into project specifications. For additional guidance on meeting safety and security requirements, refer to the planning guide template included in Appendix 3 of this AC.

3-2. RUNWAY SAFETY AREA (RSA)/ OBSTACLE-FREE ZONE (OFZ).

A runway safety area is the defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway (see AC 150/5300-13, *Airport Design*). Construction activities within the standard RSA are subject to the following conditions:

a. Runway edges.

(1) No construction may occur closer than 200 feet (60m) from the runway centerline unless the runway is closed or restricted to aircraft operations, requiring an RSA that is equal to the RSA width available during construction, or 400 feet, whichever is less (see AC 150/5300-13, Tables 3-1 through 3-3).

(2) Personnel, material, and/or equipment must not penetrate the OFZ, as defined in AC 150/5300-13.

(3) The airport operator must coordinate the construction activity in the RSA as permitted above with the ATCT and the FAA Regional Airports Division Office or appropriate Airports District Office and issue a local NOTAM.

b. Runway ends.

(1) An RSA must be maintained of such dimensions that it extends beyond the end of the runway a distance equal to that which existed before construction activity, unless the runway is closed or restricted to aircraft operations for which the reduced RSA is adequate (see AC 150/5300-13). The temporary use of declared distances and/or partial runway closures may help provide the necessary RSA. In addition, all personnel, materials, and/or equipment must remain clear of the applicable threshold siting surfaces, as defined in Appendix 2, "Threshold Siting Requirements," of AC 150/5300-13.[1] Consult with the appropriate FAA Regional Airports Division Office or Airports District Office to determine the appropriate approach surface required.

(2) Personnel, material, and/or equipment must not penetrate the OFZ, as defined in AC 150/5300-13.

(3) The safety plan must provide procedures for ensuring adequate distance for blast protection, if required by operational considerations.

(4) The airport operator must coordinate construction activity in this portion of the RSA with the ATCT and the FAA Regional Airports Division Office or appropriate Airports District Office and issue a local NOTAM.

c. Excavations.

(1) Construction contractors must prominently mark open trenches and excavations at the construction site with red or orange flags, as approved by the airport operator, and light them with red lights during hours of restricted visibility or darkness.

(2) Open trenches or excavations are not permitted within 200 feet (60m) of the runway centerline and at least the existing RSA distance from the runway threshold while the runway is open. If the runway must be opened before excavations are backfilled, cover the excavations appropriately. Coverings for open trenches or excavations must be of sufficient strength to support the weight of the heaviest aircraft operating on the runway.

3-3. TAXIWAY SAFETY AREAS/OBJECT-FREE AREAS.

a. Unrestricted construction activity is permissible adjacent to taxiways when the taxiway is restricted to aircraft such that the available taxiway safety area is equal

[1] If a full safety area cannot be obtained through declared distances and partial closures, or other methods such as alternate runway use, construction activity may operate in the RSA as long as conditions cited in paragraph 3-1b(2) thru (4) are met. In addition, various surfaces outlined in AC 150/5300-13 and Terminal Instrument Procedures (TERPS) must be protected through an aeronautical study.

to at least ½ of the widest wingspan of the aircraft expected to use the taxiway and the available taxiway object-free area is equal to at least .7 times the widest wingspan plus 10 feet. (See AC 150/5300-13 for guidance on taxiway safety and object-free areas.)

Construction activity may be accomplished closer to a taxiway, subject to the following restrictions:

(1) The activity is first coordinated with the airport operator.

(2) Appropriate NOTAMs are issued.

(3) Marking and lighting meeting the provisions of paragraph 3-9 are implemented.

(4) Adequate clearance is maintained between equipment and materials and any part of an aircraft. If such clearance can only be maintained if an aircraft does not have full use of the entire taxiway width (with its main landing gear at the edge of the pavement), then it will be necessary to move personnel and equipment for each passing aircraft. In these situations, flag persons will be used to direct construction equipment, and wing walkers may be necessary to guide aircraft. Wing walkers should be airline/aviation personnel rather than construction workers.

b. Construction contractors must prominently mark open trenches and excavations at the construction site, as approved by the airport operator, and light them with red lights during hours of restricted visibility or darkness

c. Excavations and open trenches may be permitted up to the edge of a structural taxiway and apron pavement provided the dropoff is marked and lighted per paragraph 3-9, "Hazard Marking and Lighting."

Section 2. Temporary Runway Thresholds

3-4. OVERVIEW.

Construction activity in a runway approach area may result in the need to partially close a runway or displace the existing runway threshold. In either case, locate the threshold in accordance with Appendix 2 of AC 150/5300-13, *Airport Design*. Objects that do not penetrate these surfaces may still be obstructions to air navigation and may affect standard instrument approach procedures. Coordinate these objects with the FAA's Regional Airports Office or appropriate Airports District Office, as necessary. Refer to the current edition of AC 150/5300-13 for guidance on threshold siting requirements. The partial runway closure, the displacement of the runway threshold, as well as closures of the complete runway and other portions of the movement area also requires coordination with appropriate ATCT personnel and airport users.

Caution regarding partial runway closures: When filing a NOTAM for a partial runway closure, clearly state to FSS personnel that the portion of pavement located prior to the threshold is not available for landing and departing traffic. In this case, the threshold has been moved for both landing and takeoff purposes (this is different than a displaced threshold).

Example NOTAM: "North 1,000 feet of Runway 18/36 is closed; 7,000 feet remain available on Runway 18 and Runway 36 for arrivals and departures." There may be situations where the portion of closed runway is available for taxiing only. If so, the NOTAM must reflect this condition.

Caution regarding displaced thresholds: Implementation of a displaced threshold affects runway length available for aircraft landing over the displacement. Depending on the reason for the displacement (to provide obstruction clearance or RSA), such a displacement may also require an adjustment in the landing distance available and accelerate-stop distance available in the opposite direction. If project scope includes personnel, equipment, excavation, etc. within the RSA of any usable runway end, we do not recommend a displaced threshold unless arrivals and departures toward the construction activity are prohibited. Instead, implement a partial closure.

3-5. MARKING GUIDELINES FOR TEMPORARY THRESHOLD.

Ensure that markings for temporary displaced thresholds are clearly visible to pilots approaching the airport to land. When construction personnel and equipment are located close to any threshold, a temporary visual NAVAID, such as runway end identifier lights (REIL), may be required (even on unlighted runways) to define the new beginning of the runway clearly. A visual vertical guidance device, such as a visual approach slope indicator (VASI), pulse light approach slope indicator (PLASI), or precision approach path indicator (PAPI), may be necessary to assure landing clearance over personnel, vehicles, equipment, and/or above-grade stockpiled materials. If such devices are installed, ensure an appropriate descriptive NOTAM is issued to inform pilots of these conditions. The current edition of AC 150/5340-1, *Standards for Airport Markings*, describes standard marking colors and layouts. In addition, we recommend that a temporary runway threshold be marked using the following guidelines:

a. Airport markings must be clearly visible to pilots; not misleading, confusing, or deceptive; secured in place to prevent movement by prop wash, jet blast, wing vortices, or other wind currents; and constructed of

materials that would minimize damage to an aircraft in the event of inadvertent contact.

(1) Pavement markings for temporary closed portions of the runway should consist of yellow chevrons to identify pavement areas that are unsuitable for takeoff/landing (see AC 150/5340-1). If unable to paint the markings on the pavement, construct them from any of the following materials: double-layered painted snow fence, colored plastic, painted sheets of plywood, or similar materials. They must be properly configured and secured to prevent movement by prop wash, jet blast, or other wind currents.

(2) It may be necessary to remove or cover runway markings, such as runway designation markings and aiming point markings, depending on the length of construction and type of activity at the airport.

(3) When threshold markings are needed to identify the temporary beginning of the runway that is available for landing, use a white threshold bar of the dimensions specified in AC 150/5340-1.

(4) If temporary outboard elevated or flush threshold bars are used, locate them outside of the runway pavement surface, one on each side of the runway. They should be at least 10 feet (3m) in width and extend outboard from each side of the runway so they are clearly visible to landing and departing aircraft. These threshold bars are white. If the white threshold bars are not discernable on grass or snow, apply a black background with appropriate material over the ground to ensure the markings are clearly visible.

(5) A temporary threshold may also be marked with the use of retroreflective, elevated markers. One side of such markers is green to denote the approach end of the runway; the side that is seen by pilots on rollout is red. See AC 150/5345-39, *FAA Specification L-853, Runway and Taxiway Retroreflective Markers.*

(6) At 14 CFR part 139 certificated airports, temporary elevated threshold markers must be mounted with a frangible fitting (see 14 CFR part 139.309). However, at noncertificated airports, the temporary elevated threshold markings may either be mounted with a frangible fitting or be flexible. See AC 150/5345-39.

b. The application rate of the paint to mark a short-term temporary runway threshold may deviate from the standard (see Item P-620, "Runway and Taxiway Painting," in AC 150/5370-10, *Standards for Specifying Construction of Airports*), but the dimensions must meet the existing standards, unless coordinated with the appropriate offices.

c. When a runway is partially closed, the distance remaining signs for aircraft landing in the opposite direction should be covered or removed during the construction.

3-6. LIGHTING GUIDELINES FOR TEMPORARY THRESHOLD.

A temporary runway threshold must be lighted if the runway is lighted and it is the intended threshold for night landings or instrument meteorological conditions. We recommend that temporary threshold lights and related visual NAVAIDs be installed outboard of the edges of the full-strength pavement with bases at grade level or as low as possible, but not to exceed 3 inches (7.6cm) above ground. When any portion of a base is above grade, place properly compacted fill around the base to minimize the rate of gradient change so aircraft can, in an emergency, cross at normal landing or takeoff speeds without incurring significant damage (see AC 150/5370-10). We recommend that the following be observed when using temporary runway threshold lighting:

a. Maintain threshold and edge lighting color and spacing standards as described in AC 150/5340-24, *Runway and Taxiway Edge Lighting System.* Battery-powered, solar, or portable lights that meet the criteria in AC 150/5345-50, *Specification for Portable Runway Lights,* may be used. These systems are intended primarily for visual flight rules (VFR) aircraft operation but may be used for instrument flight rules (IFR) aircraft operations, upon individual approval from the Flight Standards Division of the applicable FAA Regional Office.

b. When the runway has been partially closed, disconnect edge and threshold lights with associated isolation transformers on that part of the runway at and behind the threshold (i.e., the portion of the runway that is closed). Alternately, cover the light fixture in such a way as to prevent light leakage. Avoid removing the lamp from energized fixtures because an excessive number of isolation transformers with open secondaries may damage the regulators and/or increase the current above its normal value.

c. Secure, identify, and place any temporary exposed wiring in conduit to prevent electrocution and fire ignition sources.

d. Reconfigure yellow lenses (caution zone), as necessary. If the runway has centerline lights, reconfigure the red lenses, as necessary, or place the centerline lights out of service.

e. Relocate the visual glide slope indicator (VGSI), such as VASI and PAPI; other airport lights, such as REIL; and approach lights to identify the temporary threshold. Another option is to disable the VGSI or any equipment that would give misleading indications to pilots as to the new threshold location. Installation of temporary visual aids may be necessary to provide adequate guidance to pilots on approach to the affected runway. If the FAA owns and operates the VGSI,

coordinate its installation or disabling with the local Airway Facilities Systems Management Office.

f. Issue a NOTAM to inform pilots of temporary lighting conditions.

Section 3. Other Construction Marking and Lighting Activities

3-7. OVERVIEW.

Ensure that construction areas, including closed runways, are clearly and visibly separated from movement areas and that hazards, facilities, cables, and power lines are identified prominently for construction contractors. Throughout the duration of the construction project, verify that these areas remain clearly marked and visible at all times and that marking and lighting aids remain in place and operational. Routine inspections must be made of temporary construction lighting, especially battery-powered lighting since weather conditions can limit battery life.

3-8. CLOSED RUNWAY AND TAXIWAY MARKING AND LIGHTING.

Closed runway markings consist of a yellow "X" in compliance with the standards of AC 150/5340-1, *Standards for Airport Markings*. A very effective and preferable visual aid to depict temporary closure is the lighted "X" signal placed on or near the runway designation numbers. This device is much more discernible to approaching aircraft than the other materials described. If the lighted "X" is not available, construct the marking of any of the following materials: double-layered painted snow fence, colored plastic, painted sheets of plywood, or similar materials. They must be properly configured and secured to prevent movement by prop wash, jet blast, or other wind currents. In addition, the airport operator may install barricades, traffic cones, activate stop bars, or other acceptable visual devices at major entrances to the runways to prevent aircraft from entering a closed portion of runway. The placement of even a single reflective barricade with a "do not enter" sign on a taxiway centerline can prevent an aircraft from continuing onto a closed runway. If the taxiway must remain open for aircraft crossings, barricades or markings, as described above or in paragraph 3-9, should be placed on the runway.

a. Permanently closed runways.

For runways and taxiways that have been permanently closed, disconnect the lighting circuits. For runways, obliterate the threshold marking, runway designation marking, and touchdown zone markings, and place "X's" at each end and at 1,000-foot (300-m) intervals. For taxiways, place an "X" at the entrance of the closed taxiway.

b. Temporarily closed runway and taxiways.

For runways that have been temporarily closed, place an "X" at the each end of the runway. With taxiways, place an "X" at the entrance of the closed taxiway.

c. Temporarily closed airport.

When the airport is closed temporarily, mark the runways as closed and turn off the airport beacon.

d. Permanently closed airports

When the airport is closed permanently, mark the runways as permanently closed, disconnect the airport beacon, and place an "X" in the segmented circle or at a central location if no segmented circle exists.

3-9. HAZARD MARKING AND LIGHTING.

Provide prominent, comprehensible warning indicators for any area affected by construction that is normally accessible to aircraft, personnel, or vehicles. Using appropriate hazard marking and lighting may prevent damage, injury, traffic delays, and/or facility closures. Hazard marking and lighting must restrict access and make specific hazards obvious to pilots, vehicle drivers, and other personnel. Barricades, traffic cones (weighted or sturdily attached to the surface), or flashers are acceptable methods used to identify and define the limits of construction and hazardous areas on airports.

Provide temporary hazard marking and lighting to prevent aircraft from taxiing onto a closed runway for takeoff and to identify open manholes, small areas under repair, stockpiled material, and waste areas. Also consider less obvious construction-related hazards and include markings to identify FAA, airport, and National Weather Service facilities cables and power lines; instrument landing system (ILS) critical areas; airport surfaces, such as RSA, OFA, and OFZ; and other sensitive areas to make it easier for contractor personnel to avoid these areas.

The construction specifications must include a provision requiring the contractor to have a person on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades. The contractor must file the contact person's information with the airport.

a. Nonmovement areas.

Indicate construction locations on nonmovement areas in which no part of an aircraft may enter by using barricades that are marked with diagonal, alternating orange and white stripes. Barricades may be supplemented with alternating

orange and white flags at least 20 by 20 inches (50 by 50 cm) square and made and installed so they are always in an extended position, properly oriented, and securely fastened to eliminate jet engine ingestion. Such barricades may be many different shapes and made from various materials, including railroad ties, sawhorses, jersey barriers, or barrels. During reduced visibility or night hours, supplement the barricades with red lights, either flashing or steady-burning, which should meet the luminance requirements of the State Highway Department (yellow lights are not acceptable after October 1, 2004). The intensity of the lights and spacing for barricade flags and lights must adequately and without ambiguity delineate the hazardous area.

b. Movement areas.

Use orange traffic cones; red lights, either flashing or steady-burning, which should meet the luminance requirements of the State Highway Department (yellow lights are not acceptable after October 1, 2004); collapsible barricades marked with diagonal, alternating orange and white stripes; and/or signs to separate all construction/maintenance areas from the movement area. All barricades, temporary markers, and other objects placed and left in safety areas associated with any open runway, taxiway, or taxilane must be as low as possible to the ground; of low mass; easily collapsible upon contact with an aircraft or any of its components; and weighted or sturdily attached to the surface to prevent displacement from prop wash, jet blast, wing vortex, or other surface wind currents. If affixed to the surface, they must be frangible at grade level or as low as possible, but not to exceed 3 inches (7.6cm) above the ground. Do not use nonfrangible hazard markings, such as concrete barriers and/or metal-drum-type barricades, in aircraft movement areas. Do not use railroad ties on runways.

Use highly reflective barriers with flashing or steady-burning red lights to barricade taxiways leading to closed runways. Evaluate all operating factors when determining how to mark temporary closures that can last from 10 to 15 minutes to a much longer period of time. However, we strongly recommend that, even for closures of relatively short duration, major taxiway/runway intersections be identified with barricades spaced no greater than 20 feet (6m) apart. Mark the barricades with a flashing or steady-burning red light. At a minimum, use a single barricade placed on the taxiway centerline.

3-10. CONSTRUCTION NEAR NAVIGATIONAL AIDS (NAVAIDS).

Construction activities, materials/equipment storage, and vehicle parking near electronic NAVAIDs require special consideration since they may interfere with signals essential to air navigation. Evaluate the effect of construction activity and the required distance and direction from the NAVAID for each construction project. Pay particular attention to stockpiling material, as well as to movement and parking of equipment that may interfere with line of sight from the ATCT or with electronic emissions. Interference from construction may require NAVAID shutdown or adjustment of instrument approach minimums for IFR. This condition requires that a NOTAM be filed. Construction activities and materials/equipment storage near a NAVAID may also obstruct access to the equipment and instruments for maintenance. Before commencing construction activity, parking vehicles, or storing construction equipment and materials near a NAVAID, consult with the nearest FAA Airway Facilities Office.

3-11. CONSTRUCTION SITE ACCESS AND HAUL ROADS.

Determine the construction contractor's access to the construction sites and haul roads. Do not permit the construction contractor to use any access or haul roads other than those approved. Construction contractors must submit specific proposed routes associated with construction activities to the airport operator for evaluation and approval as part of the safety plan before beginning construction activities. These proposed routes must also provide specifications to prevent inadvertent entry to movement areas. Pay special attention to ensure that ARFF right of way on access and haul roads is not impeded at any time and that construction traffic on haul roads does not interfere with NAVAIDs or approach surfaces of operational runways.

3-12. CONSTRUCTION MATERIAL STOCKPILING.

Stockpiled materials and equipment storage are not permitted within the RSA and OFZ of an operational runway. The airport operator must ensure that stockpiled materials and equipment adjacent to these areas are prominently marked and lighted during hours of restricted visibility or darkness. This includes determining and verifying that materials are stored at an approved location to prevent foreign object damage and attraction of wildlife.

3-13. OTHER LIMITATIONS ON CONSTRUCTION.

Contractors may not use open-flame welding or torches unless adequate fire safety precautions are provided and the airport operator has approved their use. Under no circumstances should flare pots be used within the AOA at any time. The use of electrical blasting caps must not be permitted on or within 1,000 feet (300m) of the airport property (see AC 150/5370-10, *Standards for Specifying Construction of Airports*).

3-14. FOREIGN OBJECT DEBRIS (FOD) MANAGEMENT.

Waste and loose materials, commonly referred to as FOD, are capable of causing damage to aircraft landing gears, propellers, and jet engines. Construction contractors must not leave or place FOD on or near active aircraft movement areas. Materials tracked onto these areas must be continuously removed during the construction project. We also recommend that airport operators and construction contractors carefully control and continuously remove waste or loose materials that might attract wildlife.

Section 4. Safety Hazards and Impacts

3-15. OVERVIEW.

The situations identified below are potentially hazardous conditions that may occur during airport construction projects. Safety area encroachments, unauthorized and improper ground vehicle operations, and unmarked or uncovered holes and trenches near aircraft operating surfaces pose the most prevalent threats to airport operational safety during airport construction projects. Airport operators and contractors should consider the following when performing inspections of construction activity:

a. Excavation adjacent to runways, taxiways, and aprons.

b. Mounds of earth, construction materials, temporary structures, and other obstacles near any open runway, taxiway, or taxilane; in the related object-free area and aircraft approach or departure areas/zones; or obstructing any sign or marking.

c. Runway resurfacing projects resulting in lips exceeding 3 inches (7.6cm) from pavement edges and ends.

d. Heavy equipment (stationary or mobile) operating or idle near AOAs, in runway approaches and departures areas, or in OFZs.

e. Equipment or material near NAVAIDs that may degrade or impair radiated signals and/or the monitoring of navigational and visual aids. Unauthorized or improper vehicle operations in localizer or glide slope critical areas, resulting in electronic interference and/or facility shutdown.

f. Tall and especially relatively low-visibility units (i.e., equipment with slim profiles)—cranes, drills, and similar objects—located in critical areas, such as OFZs and approach zones.

g. Improperly positioned or malfunctioning lights or unlighted airport hazards, such as holes or excavations, on any apron, open taxiway, or open taxilane or in a related safety, approach, or departure area.

h. Obstacles, loose pavement, trash, and other debris on or near AOAs. Construction debris (gravel, sand, mud, paving materials, etc.) on airport pavements may result in aircraft propeller, turbine engine, or tire damage. Also, loose materials may blow about, potentially causing personal injury or equipment damage.

i. Inappropriate or poorly maintained fencing during construction intended to deter human and animal intrusions into the AOA. Fencing and other markings that are inadequate to separate construction areas from open AOAs create aviation hazards.

j. Improper or inadequate marking or lighting of runways (especially thresholds that have been displaced or runways that have been closed) and taxiways that could cause pilot confusion and provide a potential for a runway incursion. Inadequate or improper methods of marking, barricading, and lighting of temporarily closed portions of AOAs create aviation hazards.

k. Wildlife attractants—such as trash (food scraps not collected from construction personnel activity), grass seeds, or ponded water—on or near airports.

l. Obliterated or faded markings on active operational areas.

m. Misleading or malfunctioning obstruction lights. Unlighted or unmarked obstructions in the approach to any open runway pose aviation hazards.

n. Failure to issue, update, or cancel NOTAMs about airport or runway closures or other construction-related airport conditions.

o. Failure to mark and identify utilities or power cables. Damage to utilities and power cables during construction activity can result in the loss of runway/taxiway lighting; loss of navigational, visual, or approach aids; disruption of weather reporting services; and/or loss of communications.

p. Restrictions on ARFF access from fire stations to the runway-taxiway system or airport buildings.

q. Lack of radio communications with construction vehicles in airport movement areas.

r. Objects, regardless of whether they are marked or flagged, or activities anywhere on or near an airport

that could be distracting, confusing, or alarming to pilots during aircraft operations.

s. Water, snow, dirt, debris, or other contaminants that temporarily obscure or derogate the visibility of runway/taxiway marking, lighting, and pavement edges. Any condition or factor that obscures or diminishes the visibility of areas under construction.

t. Spillage from vehicles (gasoline, diesel fuel, oil, etc.) on active pavement areas, such as runways, taxiways, ramps, and airport roadways.

u. Failure to maintain drainage system integrity during construction (e.g., no temporary drainage provided when working on a drainage system).

v. Failure to provide for proper electrical lockout and tagging procedures. At larger airports with multiple maintenance shifts/workers, construction contractors should make provisions for coordinating work on circuits.

w. Failure to control dust. Consider limiting the amount of area from which the contractor is allowed to strip turf.

x. Exposed wiring that creates an electrocution or fire ignition hazard. Identify and secure wiring, and place it in conduit or bury it.

y. Site burning, which can cause possible obscuration.

z. Construction work taking place outside of designated work areas and out of phase.

APPENDIX 1. RELATED READING MATERIAL

1. Obtain the latest version of the following free publications from the FAA on its Web site at **http://www.faa.gov/arp/.** In addition, these ACs are available by contacting the U.S. Department of Transportation, Subsequent Distribution Office, SVC-121.23, Ardmore East Business Center, 3341 Q 75th Avenue, Landover, MD 20785.

a. AC 150/5200-28, *Notices to Airmen (NOTAM) for Airport Operators.* Provides guidance for the use of the NOTAM System in airport reporting.

b. AC 150/5200-30, *Airport Winter Safety and Operations.* Provides guidance to airport owners/operators on the development of an acceptable airport snow and ice control program and on appropriate field condition reporting procedures.

c. AC 150/5200-33, *Hazardous Wildlife Attractants On or Near Airports.* Provides guidance on locating certain land uses having the potential to attract hazardous wildlife to public-use airports.

d. AC 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport.* Provides guidance, specifications, and standards for painting, marking, and lighting vehicles operating in the airport air operations areas.

e. AC 150/5220-4, *Water Supply Systems for Aircraft Fire and Rescue Protection.* Provides guidance for the selection of a water source and standards for the design of a distribution system to support aircraft rescue and fire fighting service operations on airports.

f. AC 150/5340-1, *Standards for Airport Markings.* Contains FAA standards for markings used on airport runways, taxiways, and aprons.

g. AC 150/5340-14B, *Economy Approach Lighting Aids.* Describes standards for the design, selection, siting, and maintenance of economy approach lighting aids.

h. AC 150/5340-18, *Standards for Airport Sign Systems.* Contains FAA standards for the siting and installation of signs on airport runways and taxiways.

i. AC 150/5345-28, *Precision Approach Path Indicator (PAPI) Systems.* Contains the FAA standards for PAPI systems, which provide pilots with visual glide slope guidance during approach for landing.

j. AC 150/5380-5, *Debris Hazards at Civil Airports.* Discusses problems at airports, gives information on foreign objects, and explains how to eliminate such objects from operational areas.

k. AC 70/7460-2, *Proposed Construction or Alteration of Objects that May Affect the Navigable Airspace.* Provides information to persons proposing to erect or alter an object that may affect navigable airspace and explains the need to notify the FAA before construction begins and the FAA's response to those notices, as required by 14 CFR part 77.

2. Obtain copies of the following publications from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Send a check or money order made payable to the Superintendent of Documents in the amount stated with your request. The Government Printing Office does not accept C.O.D. orders. In addition, the FAA makes these ACs available at no charge on the Web site at **http://www.faa.gov/arp/.**

a. AC 150/5300-13, *Airport Design.* Contains FAA standards and recommendations for airport design, establishes approach visibility minimums as an airport design parameter, and contains the object-free area and the obstacle free-zone criteria. ($26. Supt. Docs.) SN050-007-01208-0.

b. AC 150/5370-10, *Standards for Specifying Construction of Airports.* Provides standards for construction of airports. Items covered include earthwork, drainage, paving, turfing, lighting, and incidental construction. ($18. Supt. Docs.) SN050-007-0821-0.

APPENDIX 2. DEFINITIONS OF TERMS USED IN THE AC

1. **AIR OPERATIONS AREA (AOA).** Any area of the airport used or intended to be used for the landing, takeoff, or surface maneuvering of aircraft. An air operations area includes such paved or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runways, taxiways, or aprons.

2. **CONSTRUCTION.** The presence and movement of construction-related personnel, equipment, and materials in any location that could infringe upon the movement of aircraft.

3. **CERTIFICATED AIRPORT.** An airport that has been issued an Airport Operating Certificate by the FAA under the authority of 14 CFR part 139, Certification and Operation: Land Airports Serving Certain Air Carriers, or its subsequent revisions.

4. **FAA FORM 7460-1, NOTICE OF PROPOSED CONSTRUCTION OR ALTERATION.** The form submitted to the FAA Regional Air Traffic or Airports Division Office as formal written notification of any kind of construction or alteration of objects that affect navigable airspace, as defined in 14 CFR part 77, Objects Affecting Navigable Airspace (see AC 70/7460-2, *Proposed Construction or Alteration of Objects that May Affect the Navigable Airspace*, found at **http://www.faa.gov/arp/**).

5. **FAA FORM 7480-1, NOTICE OF LANDING AREA PROPOSAL.** Form submitted to the FAA Airports Regional Division Office or Airports District Office as formal written notification whenever a project without an airport layout plan on file with the FAA involves the construction of a new airport; the construction, realigning, altering, activating, or abandoning of a runway, landing strip, or associated taxiway; or the deactivation or abandoning of an entire airport (found at **http://www.faa.gov/arp/**).

6. **MOVEMENT AREA.** The runways, taxiways, and other areas of an airport that are used for taxiing or hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and aircraft parking areas (reference 14 CFR part 139).

7. **OBSTRUCTION.** Any object/obstacle exceeding the obstruction standards specified by 14 CFR part 77, subpart C.

8. **OBJECT-FREE AREA (OFA).** An area on the ground centered on the runway, taxiway, or taxilane centerline provided to enhance safety of aircraft operations by having the area free of objects except for those objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes (see AC 150/5300-13, *Airport Design,* for additional guidance on OFA standards and wingtip clearance criteria).

9. **OBSTACLE-FREE ZONE (OFZ).** The airspace below 150 feet (45m) above the established airport elevation and along the runway and extended runway centerline that is required to be clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function, in order to provide clearance protection for aircraft landing or taking off from the runway and for missed approaches (refer to AC 150/5300-13 for guidance on OFZs).

10. **RUNWAY SAFETY AREA (RSA).** A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway, in accordance with AC 150/5300-13.

11. **TAXIWAY SAFETY AREA.** A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway, in accordance with AC 150/5300-13.

12. **THRESHOLD.** The beginning of that portion of the runway available for landing. In some instances, the landing threshold may be displaced.

13. **DISPLACED THRESHOLD.** The portion of pavement behind a displaced threshold that may be available for takeoffs in either direction or landing from the opposite direction.

14. **VISUAL GLIDE SLOPE INDICATOR (VGSI).** This device provides a visual glide slope indicator to landing pilots. These systems include precision approach path indicators (PAPIs), visual approach slope indicators (VASIs), and pulse light approach slope indicators (PLASIs).

APPENDIX 3. AIRPORT CONSTRUCTION SAFETY PLANNING GUIDE

Aviation Safety Requirements During Construction

PURPOSE. *This appendix provides airport operators with boilerplate format and language for developing a safety plan for an airport construction project. Adapt this appendix, as applicable, to specific conditions found on the airport for which the plan is being developed. Consider including a copy of this safety plan in the construction drawings for easy access by contractor personnel. Plans should contain the following:*

1. GENERAL SAFETY REQUIREMENTS.

Throughout the construction project, the following safety and operational practices should be observed:

- Operational safety should be a standing agenda item during progress meetings throughout the construction project.
- The contractor and airport operator must perform onsite inspections throughout the project, with immediate remedy of any deficiencies, whether caused by negligence, oversight, or project scope change.
- Airport runways and taxiways should remain in use by aircraft to the maximum extent possible.
- Aircraft use of areas near the contractor's work should be controlled to minimize disturbance to the contractor's operation.
- Contractor, subcontractor, and supplier employees or any unauthorized persons must be restricted from entering an airport area that would be hazardous.
- Construction that is within the safety area of an active runway, taxiway, or apron that is performed under normal operational conditions must be performed when the runway, taxiway, or apron is closed or use-restricted and initiated only with prior permission from the airport operator.
- The contracting officer, airport operator, or other designated airport representative may order the contractor to suspend operations; move personnel, equipment, and materials to a safe location; and stand by until aircraft use is completed.

2. CONSTRUCTION MAINTENANCE AND FACILITIES MAINTENANCE.

Before beginning any construction activity, the contractor must, through the airport operator, give notice [using the Notice to Airmen (NOTAM) System] of proposed location, time, and date of commencement of construction. Upon completion of work and return of all such areas to standard conditions, the contractor must, through the airport operator, verify the cancellation of all notices issued via the NOTAM System. Throughout the duration of the construction project, the contractor must—

a. Be aware of and understand the safety problems and hazards described in AC 150/5370-2, *Operational Safety on Airports During Construction.*

b. Conduct activities so as not to violate any safety standards contained in AC 150/5370-2 or any of the references therein.

c. Inspect all construction and storage areas as often as necessary to be aware of conditions.

d. Promptly take all actions necessary to prevent or remedy any unsafe or potentially unsafe conditions as soon as they are discovered.

3. APPROACH CLEARANCE TO RUNWAYS.

Runway thresholds must provide an unobstructed approach surface over equipment and materials. (Refer to Appendix 2 in AC 150/5300-13, *Airport Design,* for guidance in this area.)

4. RUNWAY AND TAXIWAY SAFETY AREA (RSA AND TSA).

Limit construction to outside of the approved RSA, as shown on the approved airport layout plan—unless the runway is closed or restricted to aircraft operations, requiring a lesser standard RSA that is equal to the RSA available during construction (see AC 150/5370-2 for exceptions). Construction activity within the TSA is permissible when the taxiway is open to aircraft traffic if adequate wingtip clearance exists between the aircraft and equipment/material; evacuations, trenches, or other conditions are conspicuously marked and lighted; and local NOTAMs are in effect for the activity (see AC 150/5300-13 for wingtip clearance requirements). The NOTAM should state that, "personnel and equipment are working adjacent to Taxiway____."

a. Procedures for protecting runway edges.

- Limit construction to no closer than 200 feet (60m) from the runway centerline—unless the runway is closed or restricted to aircraft operations, requiring a lesser standard RSA

that is equal to the RSA available during construction.

- Prevent personnel, material, and/or equipment, as defined in AC 150/5300-13, Paragraph 306, "Obstacle Free Zone (OFZ)," from penetrating the OFZ.
- Coordinate construction activity with the Airport Traffic Control Tower (ATCT) and FAA Regional Airports Division Office or Airports District Office, and through the airport operator, issue an appropriate NOTAM.

Complete the following chart to determine the area that must be protected along the runway edges:

Runway	Aircraft Approach Category* A, B, C, or D	Airplane Design Group* I, II, III, or IV	RSA Width in Feet Divided by 2*
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

*See AC 150/5300-13, *Airport Design,* to complete the chart for a specific runway.

b. Procedures for protecting runway ends.

- Maintain the RSA from the runway threshold to a point at least the distance from the runway threshold as existed before construction activity—unless the runway is closed or restricted to aircraft operations, requiring an RSA that is equal to the RSA length available during construction in accordance with AC 150/5300-13. This may involve the use of declared distances and partial runway closures (see AC 150/5370-2 for exceptions).
- Ensure all personnel, materials, and/or equipment are clear of the applicable threshold siting criteria surface, as defined in Appendix 2, "Threshold Siting Requirements," of AC 150/5300-13.
- Prevent personnel, material, and/or equipment, as defined in AC 150/5300-13, from penetrating the obstacle-free zone.
- Ensure adequate distance for blast protection is provided, as needed.
- Coordinate construction activity with the ATCT and FAA Regional Airports Division Office or Airports District Office, and through the airport operator, issue an appropriate NOTAM.
- Provide a drawing showing the profile of the appropriate surfaces of each runway end where construction will take place. Where operations by turbojet aircraft are anticipated, review takeoff procedures and jet blast characteristics of aircraft and incorporate safety measures for construction workers in the contract documents.

Complete the following chart to determine the area that must be protected before the runway threshold:

Runway End Number	Airplane Design Group* I, II, III, or IV	Aircraft Approach Category* A, B, C, or D	Minimum Safety Area Prior to the Threshold*	Minimum Unobstructed Approach Slope
_____	_____	_____	_____: FEET	____: 1 to (threshold)
_____	_____	_____	_____: FEET	____: 1 to (threshold)
_____	_____	_____	_____: FEET	____: 1 to (threshold)
_____	_____	_____	_____: FEET	____: 1 to (threshold)

*See AC 150/5300-13, *Airport Design*, to complete the chart for a specific runway.

5. MARKING AND LIGHTING FOR TEMPORARY THRESHOLDS.

Marking and lighting for a temporary threshold is____/is not____ required. The airport owner or contractor, as specified in the contract, will furnish and maintain markings for temporary thresholds. Precision approach path indicators (PAPIs) or runway end identification lights (REIL) are____/are not____ required. The airport owner or contractor, as specified in the contract, will furnish and install all temporary lighting. Include appropriate items per AC 150/5370-2, Chapter 3, "Safety Standards and Guidelines." *If marking and lighting for the temporary threshold is not required, delete this section of the safety plan. If visual aids and/or markings are necessary, provide details. (Include applicable 14 CFR part 77 surfaces in the contract documents.)*

6. CLOSED RUNWAY MARKINGS AND LIGHTING.

The following must be specified for closed runways. Closed runway marking are ____/are not____ required. Closed runway markings will be as shown on the plans____/as furnished by the airport owner____/other____ (specify). Barricades, flagging, and flashers are____/are not____required at Taxiway____ and Runway____and will be supplied by the airport ____/other____(specify).

7. HAZARDOUS AREA MARKING AND LIGHTING.

Hazardous areas on the movement area will be marked with barricades, traffic cones, flags, or flashers (specify). These markings restrict access and make hazards obvious to aircraft, personnel, and vehicles. During periods of low visibility and at night, identify hazardous areas with red flashing or steady-burning lights (specify). The hazardous area marking and lighting will be supplied by the airport operator/contractor, as specified in the contract, and will be depicted on the plans.

8. TEMPORARY LIGHTING AND MARKING.

Airport markings, lighting, and/or signs will be altered in the following manner (specify) during the period from _____ to _____. The alterations are depicted on the plans.

9. VEHICLE OPERATION MARKING AND CONTROL.

Include the following provisions in the construction contract, and address them in the safety plans:

a. When any vehicle, other than one that has prior approval from the airport operator, must travel over any portion of an aircraft movement area, it will be escorted and properly identified. To operate in those areas during daylight hours, the vehicle must have a flag or beacon attached to it. Any vehicle operating on the movement areas during hours of darkness or reduced visibility must be equipped with a flashing dome-type light, the color of which is in accordance with local or state codes.

b. It may be desirable to clearly identify the vehicles for control purposes by either assigned initials or numbers that are prominently displayed on each side of the vehicle. The identification symbols should be at minimum 8-inch (20-cm) block-type characters of a contrasting color and easy to read. They may be applied either by using tape or a water-soluble paint to facilitate removal. Magnetic signs are also acceptable. In addition, vehicles must display identification media, as specified in the approved security plan. *(This section should be revised to conform to the airport operator's requirements.)*

c. Employee parking shall be _____ (specify location), as designated by the airport manager_____/ project engineer_____/other_____ (specify).

d. Access to the job site shall be via_____ (specify route), as shown on the plans_____/designated by the engineer_____/designated by the superintendent_____/designated by the airport manager_____/other_____ (specify).

e. At 14 CFR part 139 certificated and towered airports, all vehicle operators having access to the movement area must be familiar with airport procedures for the operation of ground vehicles and the consequences of noncompliance.

f. If the airport is certificated and/or has a security plan, the airport operator should check for guidance on the additional identification and control of construction equipment.

10. NAVIGATIONAL AIDS.

The contractor must not conduct any construction activity within navigational aid restricted areas without prior approval from the local FAA Airway Facilities sector representative. Navigational aids include instrument landing system components and very high-frequency omnidirectional range, airport surveillance radar. Such restricted areas are depicted on construction plans.

11. LIMITATIONS ON CONSTRUCTION.

Additional limitations on construction include—

a. Prohibiting open-flame welding or torch cutting operations unless adequate fire safety precautions are provided and these operations have been authorized by the airport operator *(as tailored to conform to local requirements and restrictions).*

b. Prominently marking open trenches, excavations, and stockpiled materials at the construction and lighting these obstacles during hours of restricted visibility and darkness.

c. Marking and lighting closed, deceptive, and hazardous areas on airports, as appropriate.

d. Constraining stockpiled material to prevent its movement as a result of the maximum anticipated aircraft blast and forecast wind conditions.

12. RADIO COMMUNICATIONS.

Vehicular traffic located in or crossing an active movement area must have a working two-way radio in contact with the control tower or be escorted by a person in radio contact with the tower. The driver, through personal observation, should confirm that no aircraft is approaching the vehicle position. Construction personnel may operate in a movement area without two-way radio communication provided a NOTAM is issued closing the area and the area is properly marked to prevent incursions. Two-way radio communications are ____/are not____required between contractors and the Airport Traffic Control Tower_____/FAA Flight Service Station_____/Airport Aeronautical Advisory Stations (UNICOM/CTAF)_____. Radio contact is _____/is not_____ required between the hours of ____and _____. Continuous monitoring is required _____/or is required only when equipment movement is necessary in certain areas_____. *(This section may be tailored to suit the specific vehicle and safety requirements of the airport sponsor.)*

13. DEBRIS.

Waste and loose material must not be placed in active movement areas. Materials tracked onto these areas must be removed continuously during the work project.

APPENDIX 4. SAMPLE NOTAM

_____ **AIRPORT**

FAA NOTAM # _____ **DATE:** _____

AIRPORT I.D. # _____ **TIME:** _____

NOTAM TEXT:

NOTIFICATON:

TOWER _____ _____ _____ _____

PHONE # INITIALS TIME CALLED IN BY

FSS _____ _____ _____ _____

PHONE # INITIALS TIME CALLED IN BY

AIRLINES

_____ _____

_____ _____

_____ _____

CANCELLED:

NOTIFICATON:

TOWER _____ _____ _____ _____

PHONE # INITIALS TIME CALLED IN BY

FSS _____ _____ _____ _____

PHONE # INITIALS TIME CALLED IN BY

AIRLINES

_____ _____

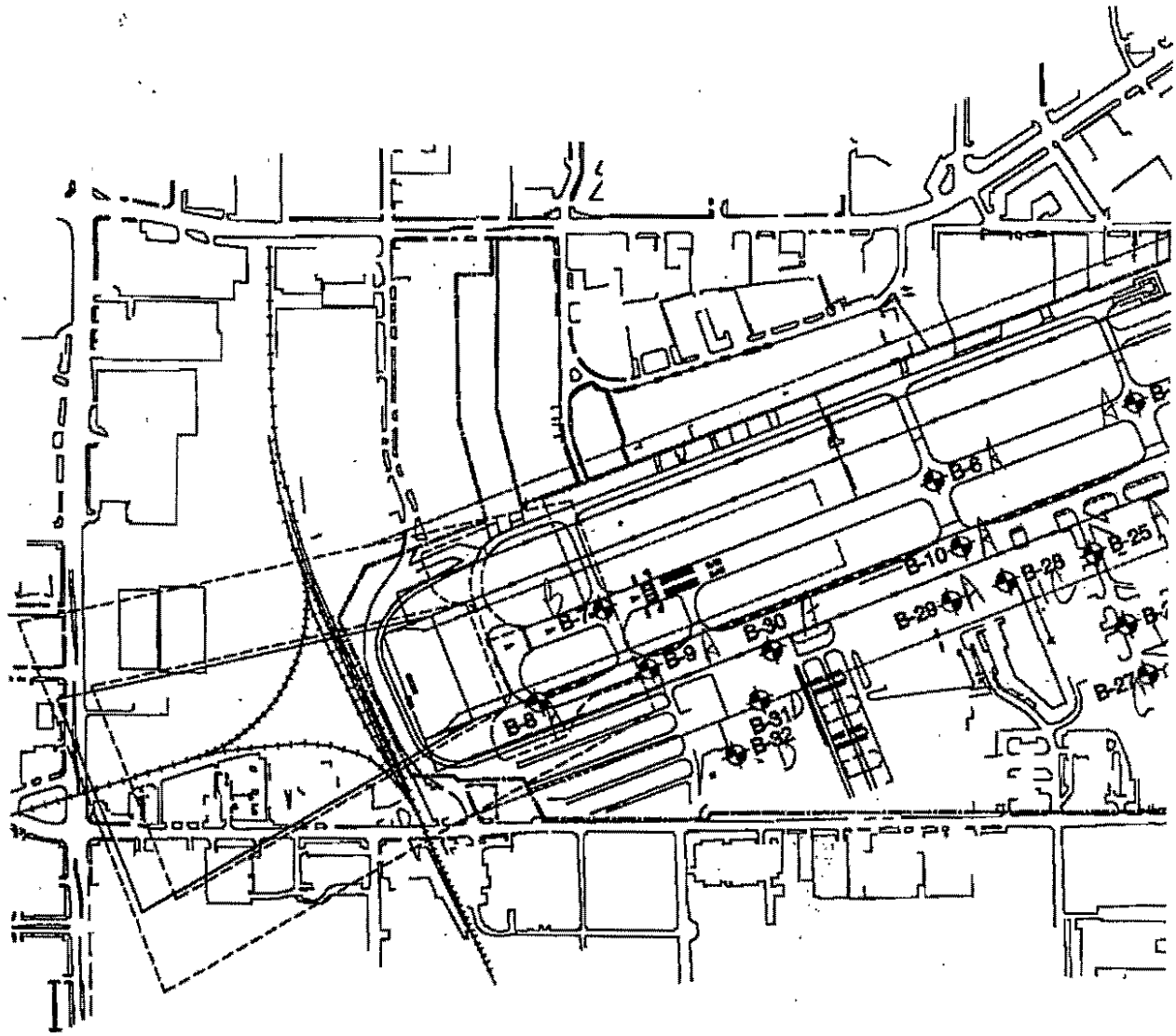
_____ _____

_____ _____

PROJECT NO. 8614
REPORT NO. 1
MARCH, 2002

GEOTECHNICAL INVESTIGATION
ADDISON AIRPORT
RUNWAY AND TAXIWAYS
ADDISON, TEXAS

Presented To:
COFFMAN ASSOCIATES
PHOENIX, ARIZONA


B-6
B-10
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B-8
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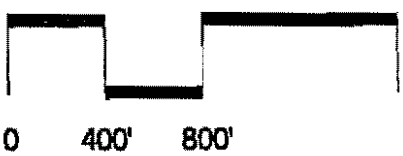
B-32
B-27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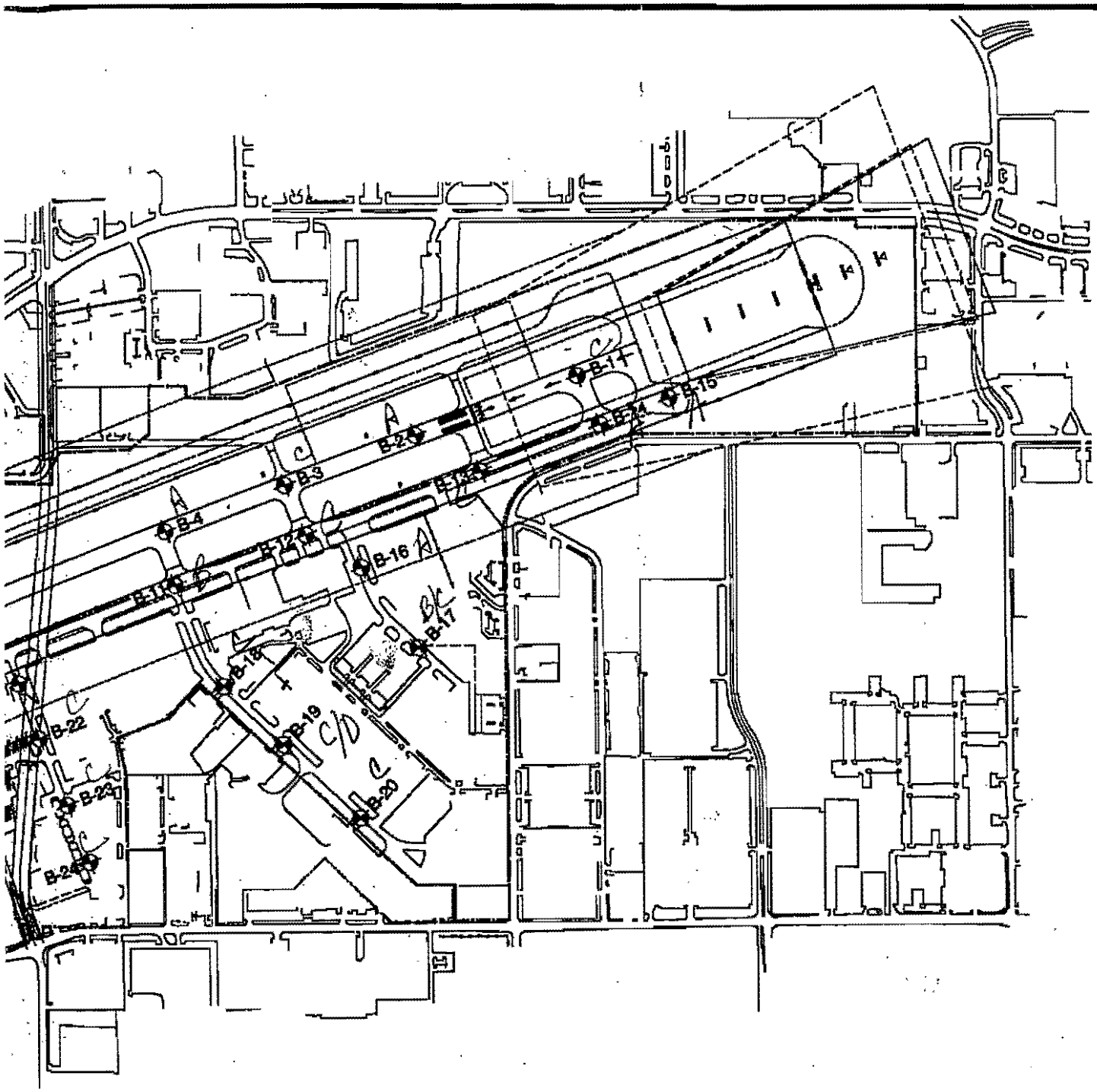


REED ENGINEERING GROUP
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

PLAN OF BORINGS

Addison Airport

Runway & Taxiways
Addison, Texas

PLATE 1

reed engineering
GROUP

Project No. 8614

Date: 02-10-02

Addison Airport
Runway and Taxiways
Addison, Texas

Location: See Plate 1

DEPTH, feet	DESCRIPTIVE SYMBOLS	SAMPLES	CORE % REC.	CORE % RQD	DESCRIPTION OF STRATA
0					ASPHALT (5.8")
					LIMESTONE FRAGMENTS, yellowish-brown, fine- to coarse-grained, angular, w/clay (Fill) (GP)
					Total Depth = 7 feet
5					
10					
15					
20					

Pocket Penetrometer Readings
Tons Per Sq. Ft: -*
Standard Penetration Tests
Blows per Foot - +

* + 1 10 2 20 3 30 4 40 4.5+ 50 4.5++ 60

BORING LOG B-30

PLATE 31

GEOTECHNICAL CONSULTANTS

reed engineering GROUP

Project No: 8614

Date: 02-10-02

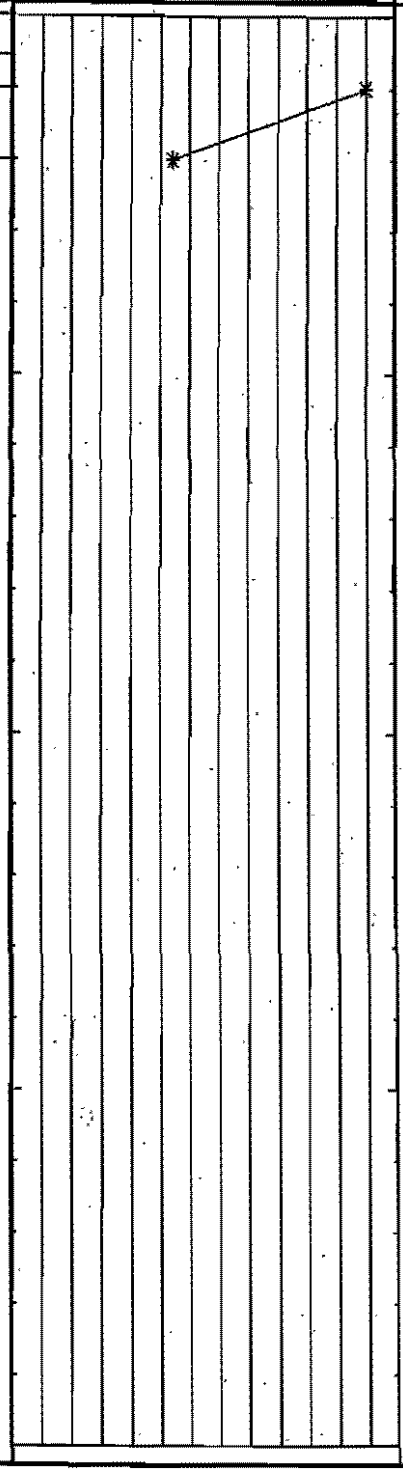
Addison Airport
Runway and Taxiways
Addison, Texas

Location: See Plate 1

DEPTH, feet	DESCRIPTIVE SYMBOLS	SAMPLES	CORE % REC.	CORE % RQD	DESCRIPTION OF STRATA
0					ASPHALT (6.3")
					CLAYEY GRAVEL, brown, well-rounded, fine- to medium-grained, siliceous & calcareous, w/fine- to coarse-grained, sub-rounded to sub-angular sand (Fill) (GP)
					CLAY, dark gray, very stiff (CH)
5					Total Depth = 2 feet
10					
15					
20					

Pocket Penetrometer Readings
Tons Per Sq. Ft. - *
Standard Penetration Tests
Blows per Foot - +

*	1	2	3	4	4.5+	4.5++
+	10	20	30	40	50	60



BORING LOG B-31

PLATE 32

reed engineering GROUP

Project No. 8614

Date: 02-10-02

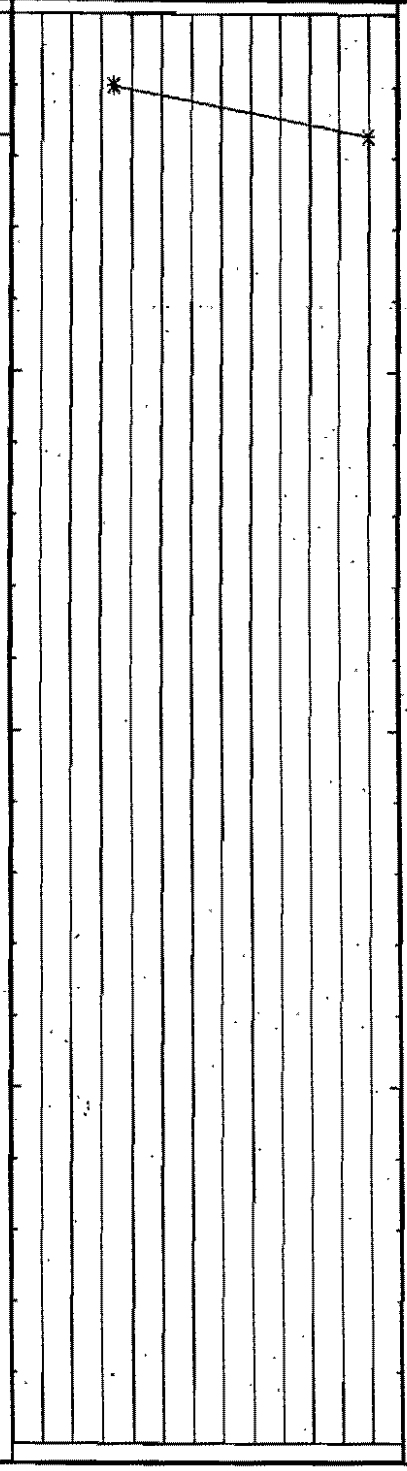
Addison Airport
Runway and Taxiways
Addison, Texas

Location: See Plate 1

DEPTH, feet	DESCRIPTIVE SYMBOLS	SAMPLES	CORE % REC.	CORE % RQD	DESCRIPTION OF STRATA
0					ASPHALT (7.4")
					CLAY, dark brown & dark gray, stiff to hard, w/fine- to medium- grained, soft, weathered limestone fragments (Fill) (CH)
					gray limestone @ 1-1/2'
5					Total Depth = 1-1/2 feet
10					
15					
20					

Pocket Penetrometer Readings
Tons Per Sq. Ft. - *
Standard Penetration Tests
Blows per Foot - +

* +	1 10	2 20	3 30	4 40	4.5+ 50	4.5++ 60



BORING LOG B-32

PLATE 33

SOIL PROPERTIES

COHESIONLESS SOILS

SPT N-Values (blows/foot)	Relative Density
0 – 4	Very Loose
4 –10	Loose
10–30	Medium Dense
30–50	Dense
50 +	Very Dense

COHESIVE SOILS

Pocket Penetrometer (T.S.F.)	Consistency
<0.25	Very Soft
0.25–0.50	Soft
0.50–1.00	Medium Stiff
1.00–2.00	Stiff
2.00–4.00	Very Stiff
4.00 +	Hard

ROCK PROPERTIES

HARDNESS	DIAGNOSTIC FEATURES
Very Soft	Can be dented with moderate finger pressure.
Soft	Can be scratched easily with fingernail.
Moderately Hard	Can be scratched easily with knife but not with fingernail.
Hard	Can be scratched with knife with some difficulty; can be broken by light to moderate hammer blow.
Very Hard	Cannot be scratched with knife; can be broken by repeated heavy hammer blows.

DEGREE OF WEATHERING	DIAGNOSTIC FEATURES
Slightly Weathered	Slight discoloration inwards from open fractures.
Weathered	Discoloration throughout; weaker minerals decomposed; strength somewhat less than fresh rock; structure preserved.
Severely Weathered	Most minerals somewhat decomposes; much softer than fresh rock; texture becoming indistinct but fabric and structure preserved.
Completely Weathered	Minerals decomposed to soil; rock fabric and structure destroyed (residual soil).

GEOTECHNICAL INVESTIGATION
ADDISON AIRPORT
RUNWAY AND TAXIWAYS
ADDISON, TEXAS
(Continued)

Summary of Classification and Index Property Tests

Boring No.	Depth (feet)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (PI)	Percent Passing No. 200 Sieve
B-30	0.4 - 0.7	--	--	--	17
B-31	1.0 - 2.0	66	26	40	--
B-32	0.5 - 1.0	56	22	34	--

U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION

Date: 1/17/03
Initiated by: AAS-300

AC No: 150/5370-2E
Change:

1. THE PURPOSE OF THIS ADVISORY CIRCULAR (AC).

Aviation safety is the primary consideration at airports, especially during construction. This AC sets forth guidelines for operational safety on airports during construction. It contains major changes to the following areas: "Runway Safety Area," paragraph 3-2; "Taxiway Safety Areas/Object-Free Areas," paragraph 3-3; "Overview," paragraph 3-4; "Marking Guidelines for Temporary Threshold," paragraph 3-5; and "Hazard Marking and Lighting," paragraph 3-9.

2. WHAT THIS AC CANCELS.

This AC cancels AC 150/5370-2D, *Operational Safety on Airports During Construction,* dated May 31, 2002.

3. READING MATERIAL RELATED TO THIS AC.

Appendix 1 contains a list of reading materials on airport construction, design, and potential safety hazards during construction, as well as instructions for ordering these documents. Many of them, including this AC, are available on the Federal Aviation Administration (FAA) Web site.

4. WHO THIS AC AFFECTS.

This AC assists airport operators in complying with 14 Code of Federal Regulations (CFR), part 139, Certification and Operation: Land Airports Serving Certain Air Carriers, and with the requirements of airport construction projects receiving funds under the Airport Improvement Program or from the Passenger Facility Charge Program. While the FAA does not require noncertificated airports without grant agreements to adhere to these guidelines, we recommend that they do so as it will help these airports maintain a desirable level of operational safety during construction.

5. ADDITIONAL BACKGROUND INFORMATION.

Appendix 2 contains definitions of terms used in this AC. Appendix 3 provides airport operators with boilerplate format and language for developing a safety plan for an airport construction project. Appendix 4 is a sample Notice to Airmen form.

6. HAZARD LIGHTING IMPLEMENTATION TIME LINE.

Supplemental hazard lighting must be red in color by October 1, 2004. See paragraph 3-9 for more information.

DAVID L. BENNETT

Director, Office of Airport Safety and Standards

CONTENTS

Appendices

CHAPTER 1. GENERAL SAFETY REQUIREMENTS AND RESPONSIBILITIES

1-1. OVERVIEW.

Hazardous practices and marginal conditions created by construction activities can decrease or jeopardize operational safety on airports. To minimize disruption of normal aircraft operations and to avoid situations that compromise the airport's operational safety, the airport operator must carefully plan, schedule, and coordinate construction activities. While the guidance in this AC is primarily used for construction operations, some of the methods and procedures described may also enhance day-to-day maintenance operations.

1-2. WHO IS RESPONSIBLE FOR SAFETY DURING CONSTRUCTION.

An airport operator has overall responsibility for construction activities on an airport. This includes the predesign, design, preconstruction, construction, and inspection phases. Additional information on these responsibilities can be found throughout this AC.

a. Airport operator's responsibilities—

(1) Develop internally or approve a construction safety plan developed by an outside consultant/contractor that complies with the safety guidelines in Chapter 2, "Safety Plans," and Appendix 3, "Airport Construction Safety Planning Guide," of this AC.

(2) Require contractors to submit plans indicating how they intend to comply with the safety requirements of the project.

(3) Convene a meeting with the construction contractor, consultant, airport employees, and, if appropriate, tenant sponsor to review and discuss project safety before beginning construction activity.

(4) Ensure contact information is accurate for each representative/point of contact identified in the safety plan.

(5) Hold weekly or, if necessary, daily safety meetings to coordinate activities.

(6) Notify users, especially aircraft rescue and fire fighting (ARFF) personnel, of construction activity and conditions that may adversely affect the operational safety of the airport via Notices to Airmen (NOTAMs) or other methods, as appropriate. Convene a meeting for review and discussion if necessary.

(7) Ensure that construction personnel know of any applicable airport procedures and of changes to those procedures that may affect their work.

(8) Ensure that construction contractors and subcontractors undergo training required by the safety plan.

(9) Develop and/or coordinate a construction vehicle plan with airport tenants, the airport traffic control tower (ATCT), and construction contractors. Include the vehicle plan in the safety plan. See Chapter 2, section 2, of this AC for additional information.

(10) Ensure tenants and contractors comply with standards and procedures for vehicle lighting, marking, access, operation, and communication.

(11) At certificated airports, ensure that each tenant's construction safety plan is consistent with 14 CFR part 139, Certification and Operations: Land Airports Serving Certain Air Carriers.

(12) Conduct frequent inspections to ensure construction contractors and tenants comply with the safety plan and that altered construction activities do not create potential safety hazards.

(13) Resolve safety deficiencies immediately.

(14) Ensure construction access complies with the security requirements of 49 CFR part 1542, Airport Security.

(15) Notify appropriate parties when conditions exist that invoke provisions of the safety plan (e.g., implementation of low-visibility operations).

b. Construction contractor's responsibilities—

(1) Submit plans to the airport operator on how to comply with the safety requirements of the project.

(2) Have available a copy of the project safety plan.

(3) Comply with the safety plan associated with the construction project and ensure that construction personnel are familiar with safety procedures and regulations on the airport.

(4) Provide a point of contact who will coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport.

(5) Provide a safety officer/construction inspector familiar with airport safety to monitor construction activities.

(6) Restrict movement of construction vehicles to construction areas by flagging and barricading, erecting temporary fencing, or providing escorts, as appropriate.

(7) Ensure that no construction employees, employees of subcontractors or suppliers, or other persons enter any part of the air operations areas (AOAs) from the construction site unless authorized.

c. Tenant's responsibilities if planning construction activities on leased property—

(1) Develop a safety plan, and submit it to the airport operator for approval prior to issuance of a Notice to Proceed.

(2) Provide a point of contact who will coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport.

(3) Ensure that no tenant or construction employees, employees of subcontractors or suppliers, or any other persons enter any part of the AOA from the construction site unless authorized.

(4) Restrict movement of construction vehicles to construction areas by flagging and barricading or erecting temporary fencing.

CHAPTER 2. SAFETY PLANS

Section 1. Basic Safety Plan Considerations

2-1. OVERVIEW.

Airport operators should coordinate safety issues with the air carriers, FAA Airway Facilities, and other airport tenants before the design phase of the project. The airport operator should identify project safety concerns, requirements, and impacts before making arrangements with contractors and other personnel to perform work on an airport. These safety concerns will serve as the foundation for the construction safety plan and help maintain a high level of aviation safety during the project.

The airport operator should determine the level of complexity of the safety plan that is necessary for each construction project and its phases. The safety plan may be detailed in the specifications included in the invitation for bids, or the invitation for bid may specify that the contractor develop the safety plan and the airport operator approve it. In the latter case, the invitation for bid should contain sufficient information to allow the contractor to develop and determine the costs associated with the safety plan. In either case, safety plan costs should be incorporated into the total cost of the project. The airport operator has final approval authority and responsibility for all safety plans.

Coordination will vary from formal predesign conferences to informal contacts throughout the duration of the construction project.

Details of a specified safety plan, or requirements for a contractor-developed safety plan, should be discussed at the predesign and preconstruction conferences and should include the following, as appropriate:

a. Actions necessary before starting construction, including defining and assigning responsibilities.

b. Basic responsibilities and procedures for disseminating instructions about airport procedures to the contractor's personnel.

c. Means of separating construction areas from aeronautical-use areas.

d. Navigational aid (NAVAID) requirements and weather.

e. Marking and lighting plan illustrations.

f. Methods of coordinating significant changes in airport operations with all the appropriate parties.

2-2. SAFETY PLAN CHECKLIST.

To the extent applicable, the safety plan should address the following:

a. Scope of work to be performed, including proposed duration of work.

b. Runway and taxiway marking and lighting.

c. Procedures for protecting all runway and taxiway safety areas, obstacle-free zones (OFZs), object-free areas (OFAs), and threshold citing criteria outlined in AC 150/5300-13, *Airport Design,* and as described in this AC. This includes limitations on equipment height and stockpiled material.

d. Areas and operations affected by the construction activity, including possible safety problems.

e. NAVAIDs that could be affected, espeeially critical area boundaries.

f. Methods of separating vehicle and pedestrian construction traffic from the airport movement areas. This may include fencing off construction areas to keep equipment operators in restricted areas in which they are authorized to operate. Fencing, or some other form of restrictive barrier, is an operational necessity in some cases.

g. Procedures and equipment, such as barricades (identify type), to delineate closed construction areas from the airport operational areas, as necessary.

h. Limitations on construction.

i. Required compliance of contractor personnel with all airport safety and security measures.

j. Location of stockpiled construction materials, construction site parking, and access and haul roads.

k. Radio communications.

l. Vehicle identification.

m. Trenches and excavations and cover requirements.

n. Procedures for notifying ARFF personnel if water lines or fire hydrants must be deactivated or if emergency access routes must be rerouted or blocked.

o. Emergency notification procedures for medical and police response.

p. Use of temporary visual aids.

q. Wildlife management.

r. Foreign object debris (FOD) control provisions.

s. Hazardous materials (HAZMAT) management.

t. NOTAM issuance.

u. Inspection requirements.

v. Procedures for locating and protecting existing underground utilities, cables, wires, pipelines, and other underground facilities in excavation areas.

w. Procedures for contacting responsible representatives/points of contact for all involved parties. This should include off-duty contact information so an immediate response may be coordinated to correct any construction-related activity that could adversely affect the operational safety of the airport. Particular care should be taken to ensure that appropriate Airways Facilities personnel are identified in the event that an unanticipated utility outage or eable cut occurs that impacts FAA NAVAIDs.

x. Vehicle operator training.

y. Penalty provisions for noncompliance with airport rules and regulations and the safety plan (e.g., if a vehicle is involved in a runway incursion).

z. Any special conditions that affect the operation of the airport and will require a portion of the safety plan to be activated (e.g., low-visibility operations, snow removal).

Section 2. Safety and Security Measures

2-3. OVERVIEW.

Airport operators are responsible for closely monitoring tenant and construction contractor activity during the construction project to ensure continual compliance with all safety and security requirements. Airports subject to 49 CFR part 1542, Airport Security, must meet standards for access control, movement of ground vehicles, and identification of construction contractor and tenant personnel. In addition, airport operators should use safety program standards, as described in Chapter 3 of this AC, to develop specific safety measures to which tenants and construction contractors must adhere throughout the duration of construction activities.

General safety provisions are contained in AC 150/5370-10, *Standards for Specifying Construction of Airports,* paragraphs 40-05, "Maintenance of Traffic"; 70-08, "Barricades, Warning Signs, and Hazard Markings"; and 80-04, "Limitation of Operations." At any time during construction, aircraft operations, weather, security, or local airport rules may dictate more stringent safety measures. The airport operator should ensure that both general and specific safety requirements are coordinated with airport tenants and ATCT personnel. The airport operator should also include these parties in the coordination of all bid documents, construction plans, and specifications for on-airport construction projects.

2-4. VEHICLE OPERATION AND MARKING AND PEDESTRIAN CONTROL.

Vehicle and pedestrian access routes for airport construction projects must be controlled to prevent inadvertent or unauthorized entry of persons, vehicles, or animals onto the AOA. This includes aircraft movement and nonmovement areas. The airport operator should develop and coordinate a construction vehicle plan with airport tenants, contractors, and the ATCT. The safety plan or invitation for bid should include specific vehicle and pedestrian requirements.

The vehicle plan should contain the following items:

a. Airport operator's rules and regulations for vehicle marking, lighting, and operation.

b. Requirements for marking and identifying vehicles in accordance with AC 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport.*

c. Description of proper vehicle operations on movement and nonmovement areas under normal, lost communications, and emergency conditions.

d. Penalties for noncompliance with driving rules and regulations.

e. Training requirements for vehicle drivers to ensure compliance with the airport operator's vehicle rules and regulations.

f. Provisions for radio communication training for construction contractor personnel engaged in construction activities around aircraft movement areas. Some drivers,

such as construction drivers under escort, may not require this training.

g. Escort procedures for construction vehicles requiring access to aircraft movement areas. A vehicle in the movement area must have a working aviation-band, two-way radio unless it is under escort. Vehicles can be in closed areas without a radio if the closed area is properly marked and lighted to prevent incursions and a NOTAM regarding the closure is issued.

h. Monitoring procedures to ensure that vehicle drivers are in compliance with the construction vehicle plan.

i. Procedures for, if appropriate, personnel to control access through gates and fencing or across aircraft movement areas.

2-5. CONSTRUCTION EMPLOYEE PARKING AREAS.

Designate in advance vehicle parking areas for contractor employees to prevent any unauthorized entry of persons or vehicles onto the airport movement area. These areas should provide reasonable contractor employee access to the job site.

2-6. CONSTRUCTION VEHICLE EQUIPMENT PARKING.

Construction employees must park and service all construction vehicles in an area designated by the airport operator outside the runway safety areas and OFZs and never on a closed taxiway or runway. Employees should also park construction vehicles outside the OFA when not in use by construction personnel (e.g., overnight, on weekends, or during other periods when construction is not active). Parking areas must not obstruct the clear line of sight by the ATCT to any taxiways or runways under air traffic control nor obstruct any runway visual aids, signs, or navigational aids. The FAA must also study those areas to determine effects on 14 CFR part 77, *Objects Affecting Navigable Airspace*, surfaces (see paragraph 2-13 for further information).

2-7. RADIO COMMUNICATION TRAINING.

The airport operator must ensure that tenant and construction contractor personnel engaged in activities involving unescorted operation on aircraft movement areas observe the proper procedures for communications, including using appropriate radio frequencies at airports with and without ATCTs. Training of contractors on proper communication procedures is essential for maintaining airport operational safety. When operating vehicles on or near open runways or taxiways, construction personnel must understand the critical importance of maintaining radio contact with airport operations, ATCT, or the Common Traffic Advisory Frequency, which may include UNICOM, MULTICOM, or one of the FAA Flight Service Stations (FSS), as directed by airport management.

Vehicular traffic crossing active movement areas must be controlled either by two-way radio with the ATCT, escort, flagman, signal light, or other means appropriate for the particular airport. Vehicle drivers must confirm by personal observation that no aircraft is approaching their position when given clearance to cross a runway. In addition, it is the responsibility of the escort vehicle driver to verify the movement/position of all escorted vehicles at any given time.

Even though radio communication is maintained, escort vehicle drivers must also familiarize themselves with ATCT light gun signals in the event of radio failure (see the FAA safety placard "Ground Vehicle Guide to Airport Signs and Markings"). This safety placard may be ordered through the Runway Safety Program Web site at **http://www.faarsp.org** or obtained from the Regional Airports Division Office.

2-8. FENCING AND GATES.

Airport operators and contractors must take care to maintain a high level of safety and security during construction when access points are created in the security fencing to permit the passage of construction vehicles or personnel. Temporary gates should be equipped so they can be securely closed and locked to prevent access by animals and people (especially minors). Procedures should be in place to ensure that only authorized persons and vehicles have access to the AOA and to prohibit "piggybacking" behind another person or vehicle. The Department of Transportation (DOT) document DOT/FAA/AR-00/52, *Recommended Security Guidelines for Airport Planning and Construction*, provides more specific information on fencing. A copy of this document can be obtained from the Airport Consultants Council, Airports Council International, or American Association of Airport Executives.

Section 3. Notification of Construction Activities

2-9. GENERAL.

In order to maintain the desired levels of operational safety on airports during construction activities, the safety plan should contain the notification actions described below.

2-10. ENSURING PROMPT NOTIFICATIONS.

The airport operator should establish and follow procedures for the immediate notification of airport users and the FAA of any conditions adversely affecting the operational safety of an airport.

2-11. NOTICES TO AIRMEN (NOTAMS).

The airport operator must provide information on closed or hazardous conditions on airport movement areas to the FSS so it can issue a NOTAM. The airport operator must coordinate the issuance, maintenance, and cancellation of NOTAMs about airport conditions resulting from construction activities with tenants and the local air traffic facility (control tower, approach control, or air traffic control center. Refer to AC 150/5200-28, *Notices to Airmen (NOTAMs) for Airport Operators,* and Appendix 4 in this AC for a sample NOTAM form. Only the FAA may issue or cancel NOTAMs on shutdown or irregular operation of FAA-owned facilities. Only the airport operator or an authorized representative may issue or cancel NOTAMs on airport conditions. (The airport owner/operator is the only entity that can close or open a runway.) The airport operator must file and maintain this list of authorized representatives with the FSS. Any person having reason to believe that a NOTAM is missing, incomplete, or inaccurate must notify the airport operator.

2-12. AIRCRAFT RESCUE AND FIRE FIGHTING (ARFF) NOTIFICATION.

The safety plan must provide procedures for notifying ARFF personnel, mutual aid providers, and other emergency services if construction requires shutting off or otherwise disrupting any water line or fire hydrant on the airport or adjoining areas and if contractors work with hazardous material on the airfield. Notification procedures must also be developed for notifying ARFF and all other emergency personnel when the work performed will close or affect any emergency routes. Likewise, the procedures must address appropriate notifications when services are restored.

2-13. NOTIFICATION TO THE FAA.

For certain airport projects, 14 CFR part 77 requires notification to the FAA. In addition to applications made for Federally funded construction, 14 CFR part 157, Notice of Construction, Alteration, Activation, and Deactivation of Airports, requires that the airport operator notify the FAA in writing whenever a non-Federally funded project involves the construction of a new airport; the construction, realigning, altering, activating, or abandoning of a runway, landing strip, or associated taxiway; or the deactivation or abandoning of an entire airport. Notification involves submitting FAA Form 7480-1, Notice of Landing Area Proposal, to the nearest FAA Regional Airports Division Office or Airports District Office.

Also, any person proposing any kind of construction or alteration of objects that affect navigable airspace, as defined in 14 CFR part 77 must notify the FAA. This includes construction equipment and proposed parking areas for this equipment (i.e., cranes, graders, etc.). FAA Form 7460-1, Notice of Proposed Construction or Alteration, can be used for this purpose and submitted to the FAA Regional Airports Division Office or Airports District Office. (See AC 70/7460-2, *Proposed Construction or Alteration of Objects that May Affect the Navigable Airspace.*)

If construction operations require a shutdown of an airport owned NAVAID from service for more than 24 hours or in excess of 4 hours daily on consecutive days, we recommend a 45-day minimum notice prior to facility shutdown. Coordinate work for a FAA owned NAVAID shutdown with the local FAA Airways Facilities Office. In addition, procedures that address unanticipated utility outages and cable cuts that could impact FAA NAVAIDs must be addressed.

2-14. WORK SCHEDULING AND ACCOMPLISHMENT.

Airport operators—or tenants having construction on their leased properties—should use predesign, prebid, and preconstruction conferences to introduce the subject of airport operational safety during construction (see AC 150/5300-9, *Predesign, Prebid, and Preconstruction Conferences for Airport Grant Projects).* The airport operator, tenants, and construction contractors should integrate operational safety requirements into their planning and work schedules as early as practical. Operational safety should be a standing agenda item for discussion during progress meetings throughout the project. The contractor and airport operator should carry out onsite inspections throughout the project and immediately remedy any deficiencies, whether caused by negligence, oversight, or project scope change.

CHAPTER 3. SAFETY STANDARDS AND GUIDELINES

Section 1. Runway and Taxiway Safety Areas, Obstacle-Free Zones, and Object-Free Areas

3-1. OVERVIEW.

Airport operators must use these safety guidelines when preparing plans and specifications for construction activities in areas that may interfere with aircraft operations. The safety plan should recognize and address these standards for each airport construction project. However, the safety plan must reflect the specific needs of a particular project, and for this reason, these safety guidelines should not be incorporated verbatim into project specifications. For additional guidance on meeting safety and security requirements, refer to the planning guide template included in Appendix 3 of this AC.

3-2. RUNWAY SAFETY AREA (RSA)/ OBSTACLE-FREE ZONE (OFZ).

A runway safety area is the defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway (see AC 150/5300-13, *Airport Design*). Construction activities within the standard RSA are subject to the following conditions:

a. Runway edges.

(1) No construction may occur closer than 200 feet (60m) from the runway centerline unless the runway is closed or restricted to aircraft operations, requiring an RSA that is equal to the RSA width available during construction, or 400 feet, whichever is less (see AC 150/5300-13, Tables 3-1 through 3-3).

(2) Personnel, material, and/or equipment must not penetrate the OFZ, as defined in AC 150/5300-13.

(3) The airport operator must coordinate the construction activity in the RSA as permitted above with the ATCT and the FAA Regional Airports Division Office or appropriate Airports District Office and issue a local NOTAM.

b. Runway ends.

(1) An RSA must be maintained of such dimensions that it extends beyond the end of the runway a distance equal to that which existed before construction activity, unless the runway is closed or restricted to aircraft operations for which the reduced RSA is adequate (see AC 150/5300-13). The temporary use of declared distances and/or partial runway closures may help provide the necessary RSA. In addition, all personnel, materials, and/or equipment must remain clear of the applicable threshold siting surfaces, as defined in Appendix 2, "Threshold Siting Requirements," of AC 150/5300-13.[1] Consult with the appropriate FAA Regional Airports Division Office or Airports District Office to determine the appropriate approach surface required.

(2) Personnel, material, and/or equipment must not penetrate the OFZ, as defined in AC 150/5300-13.

(3) The safety plan must provide procedures for ensuring adequate distance for blast protection, if required by operational considerations.

(4) The airport operator must coordinate construction activity in this portion of the RSA with the ATCT and the FAA Regional Airports Division Office or appropriate Airports District Office and issue a local NOTAM.

c. Excavations.

(1) Construction contractors must prominently mark open trenches and excavations at the construction site with red or orange flags, as approved by the airport operator, and light them with red lights during hours of restricted visibility or darkness.

(2) Open trenches or excavations are not permitted within 200 feet (60m) of the runway centerline and at least the existing RSA distance from the runway threshold while the runway is open. If the runway must be opened before excavations are backfilled, cover the excavations appropriately. Coverings for open trenches or excavations must be of sufficient strength to support the weight of the heaviest aircraft operating on the runway.

3-3. TAXIWAY SAFETY AREAS/OBJECT-FREE AREAS.

a. Unrestricted construction activity is permissible adjacent to taxiways when the taxiway is restricted to aircraft such that the available taxiway safety area is equal

[1] If a full safety area cannot be obtained through declared distances and partial closures, or other methods such as alternate runway use, construction activity may operate in the RSA as long as conditions cited in paragraph 3-1b(2) thru (4) are met. In addition, various surfaces outlined in AC 150/5300-13 and Terminal Instrument Procedures (TERPS) must be protected through an aeronautical study.

to at least ½ of the widest wingspan of the aircraft expected to use the taxiway and the available taxiway object-free area is equal to at least .7 times the widest wingspan plus 10 feet. (See AC 150/5300-13 for guidance on taxiway safety and object-free areas.)

Construction activity may be accomplished closer to a taxiway, subject to the following restrictions:

(1) The activity is first coordinated with the airport operator.

(2) Appropriate NOTAMs are issued.

(3) Marking and lighting meeting the provisions of paragraph 3-9 are implemented.

(4) Adequate clearance is maintained between equipment and materials and any part of an aircraft. If such clearance can only be maintained if an aircraft does not have full use of the entire taxiway width (with its main landing gear at the edge of the pavement), then it will be necessary to move personnel and equipment for each passing aircraft. In these situations, flag persons will be used to direct construction equipment, and wing walkers may be necessary to guide aircraft. Wing walkers should be airline/aviation personnel rather than construction workers.

b. Construction contractors must prominently mark open trenches and excavations at the construction site, as approved by the airport operator, and light them with red lights during hours of restricted visibility or darkness

c. Excavations and open trenches may be permitted up to the edge of a structural taxiway and apron pavement provided the dropoff is marked and lighted per paragraph 3-9, "Hazard Marking and Lighting."

Section 2. Temporary Runway Thresholds

3-4. OVERVIEW.

Construction activity in a runway approach area may result in the need to partially close a runway or displace the existing runway threshold. In either case, locate the threshold in accordance with Appendix 2 of AC 150/5300-13, *Airport Design*. Objects that do not penetrate these surfaces may still be obstructions to air navigation and may affect standard instrument approach procedures. Coordinate these objects with the FAA's Regional Airports Office or appropriate Airports District Office, as necessary. Refer to the current edition of AC 150/5300-13 for guidance on threshold siting requirements. The partial runway closure, the displacement of the runway threshold, as well as closures of the complete runway and other portions of the movement area also requires coordination with appropriate ATCT personnel and airport users.

Caution regarding partial runway closures: When filing a NOTAM for a partial runway closure, clearly state to FSS personnel that the portion of pavement located prior to the threshold is not available for landing and departing traffic. In this case, the threshold has been moved for both landing and takeoff purposes (this is different than a displaced threshold).

Example NOTAM: "North 1,000 feet of Runway 18/36 is closed; 7,000 feet remain available on Runway 18 and Runway 36 for arrivals and departures." There may be situations where the portion of closed runway is available for taxiing only. If so, the NOTAM must reflect this condition.

Caution regarding displaced thresholds: Implementation of a displaced threshold affects runway length available for aircraft landing over the displacement. Depending on the reason for the displacement (to provide obstruction clearance or RSA), such a displacement may also require an adjustment in the landing distance available and accelerate-stop distance available in the opposite direction. If project scope includes personnel, equipment, excavation, etc. within the RSA of any usable runway end, we do not recommend a displaced threshold unless arrivals and departures toward the construction activity are prohibited. Instead, implement a partial closure.

3-5. MARKING GUIDELINES FOR TEMPORARY THRESHOLD.

Ensure that markings for temporary displaced thresholds are clearly visible to pilots approaching the airport to land. When construction personnel and equipment are located close to any threshold, a temporary visual NAVAID, such as runway end identifier lights (REIL), may be required (even on unlighted runways) to define the new beginning of the runway clearly. A visual vertical guidance device, such as a visual approach slope indicator (VASI), pulse light approach slope indicator (PLASI), or precision approach path indicator (PAPI), may be necessary to assure landing clearance over personnel, vehicles, equipment, and/or above-grade stockpiled materials. If such devices are installed, ensure an appropriate descriptive NOTAM is issued to inform pilots of these conditions. The current edition of AC 150/5340-1, *Standards for Airport Markings*, describes standard marking colors and layouts. In addition, we recommend that a temporary runway threshold be marked using the following guidelines:

a. Airport markings must be clearly visible to pilots; not misleading, confusing, or deceptive; secured in place to prevent movement by prop wash, jet blast, wing vortices, or other wind currents; and constructed of

materials that would minimize damage to an aircraft in the event of inadvertent contact.

(1) Pavement markings for temporary closed portions of the runway should consist of yellow chevrons to identify pavement areas that are unsuitable for takeoff/landing (see AC 150/5340-1). If unable to paint the markings on the pavement, construct them from any of the following materials: double-layered painted snow fence, colored plastic, painted sheets of plywood, or similar materials. They must be properly configured and secured to prevent movement by prop wash, jet blast, or other wind currents.

(2) It may be necessary to remove or cover runway markings, such as runway designation markings and aiming point markings, depending on the length of construction and type of activity at the airport.

(3) When threshold markings are needed to identify the temporary beginning of the runway that is available for landing, use a white threshold bar of the dimensions specified in AC 150/5340-1.

(4) If temporary outboard elevated or flush threshold bars are used, locate them outside of the runway pavement surface, one on each side of the runway. They should be at least 10 feet (3m) in width and extend outboard from each side of the runway so they are clearly visible to landing and departing aircraft. These threshold bars are white. If the white threshold bars are not discernable on grass or snow, apply a black background with appropriate material over the ground to ensure the markings are clearly visible.

(5) A temporary threshold may also be marked with the use of retroreflective, elevated markers. One side of such markers is green to denote the approach end of the runway; the side that is seen by pilots on rollout is red. See AC 150/5345-39, *FAA Specification L-853, Runway and Taxiway Retroreflective Markers.*

(6) At 14 CFR part 139 certificated airports, temporary elevated threshold markers must be mounted with a frangible fitting (see 14 CFR part 139.309). However, at noncertificated airports, the temporary elevated threshold markings may either be mounted with a frangible fitting or be flexible. See AC 150/5345-39.

b. The application rate of the paint to mark a short-term temporary runway threshold may deviate from the standard (see Item P-620, "Runway and Taxiway Painting," in AC 150/5370-10, *Standards for Specifying Construction of Airports*), but the dimensions must meet the existing standards, unless coordinated with the appropriate offices.

c. When a runway is partially closed, the distance remaining signs for aircraft landing in the opposite direction should be covered or removed during the construction.

3-6. LIGHTING GUIDELINES FOR TEMPORARY THRESHOLD.

A temporary runway threshold must be lighted if the runway is lighted and it is the intended threshold for night landings or instrument meteorological conditions. We recommend that temporary threshold lights and related visual NAVAIDs be installed outboard of the edges of the full-strength pavement with bases at grade level or as low as possible, but not to exceed 3 inches (7.6cm) above ground. When any portion of a base is above grade, place properly compacted fill around the base to minimize the rate of gradient change so aircraft can, in an emergency, cross at normal landing or takeoff speeds without incurring significant damage (see AC 150/5370-10). We recommend that the following be observed when using temporary runway threshold lighting:

a. Maintain threshold and edge lighting color and spacing standards as described in AC 150/5340-24, *Runway and Taxiway Edge Lighting System.* Battery-powered, solar, or portable lights that meet the criteria in AC 150/5345-50, *Specification for Portable Runway Lights,* may be used. These systems are intended primarily for visual flight rules (VFR) aircraft operation but may be used for instrument flight rules (IFR) aircraft operations, upon individual approval from the Flight Standards Division of the applicable FAA Regional Office.

b. When the runway has been partially closed, disconnect edge and threshold lights with associated isolation transformers on that part of the runway at and behind the threshold (i.e., the portion of the runway that is closed). Alternately, cover the light fixture in such a way as to prevent light leakage. Avoid removing the lamp from energized fixtures because an excessive number of isolation transformers with open secondaries may damage the regulators and/or increase the current above its normal value.

c. Secure, identify, and place any temporary exposed wiring in conduit to prevent electrocution and fire ignition sources.

d. Reconfigure yellow lenses (caution zone), as necessary. If the runway has centerline lights, reconfigure the red lenses, as necessary, or place the centerline lights out of service.

e. Relocate the visual glide slope indicator (VGSI), such as VASI and PAPI; other airport lights, such as REIL; and approach lights to identify the temporary threshold. Another option is to disable the VGSI or any equipment that would give misleading indications to pilots as to the new threshold location. Installation of temporary visual aids may be necessary to provide adequate guidance to pilots on approach to the affected runway. If the FAA owns and operates the VGSI,

coordinate its installation or disabling with the local Airway Facilities Systems Management Office.

f. Issue a NOTAM to inform pilots of temporary lighting conditions.

Section 3. Other Construction Marking and Lighting Activities

3-7. OVERVIEW.

Ensure that construction areas, including closed runways, are clearly and visibly separated from movement areas and that hazards, facilities, cables, and power lines are identified prominently for construction contractors. Throughout the duration of the construction project, verify that these areas remain clearly marked and visible at all times and that marking and lighting aids remain in place and operational. Routine inspections must be made of temporary construction lighting, especially battery-powered lighting since weather conditions can limit battery life.

3-8. CLOSED RUNWAY AND TAXIWAY MARKING AND LIGHTING.

Closed runway markings consist of a yellow "X" in compliance with the standards of AC 150/5340-1, *Standards for Airport Markings*. A very effective and preferable visual aid to depict temporary closure is the lighted "X" signal placed on or near the runway designation numbers. This device is much more discernible to approaching aircraft than the other materials described. If the lighted "X" is not available, construct the marking of any of the following materials: double-layered painted snow fence, colored plastic, painted sheets of plywood, or similar materials. They must be properly configured and secured to prevent movement by prop wash, jet blast, or other wind currents. In addition, the airport operator may install barricades, traffic cones, activate stop bars, or other acceptable visual devices at major entrances to the runways to prevent aircraft from entering a closed portion of runway. The placement of even a single reflective barricade with a "do not enter" sign on a taxiway centerline can prevent an aircraft from continuing onto a closed runway. If the taxiway must remain open for aircraft crossings, barricades or markings, as described above or in paragraph 3-9, should be placed on the runway.

a. Permanently closed runways.

For runways and taxiways that have been permanently closed, disconnect the lighting circuits. For runways, obliterate the threshold marking, runway designation marking, and touchdown zone markings, and place "X's" at each end and at 1,000-foot (300-m) intervals. For taxiways, place an "X" at the entrance of the closed taxiway.

b. Temporarily closed runway and taxiways.

For runways that have been temporarily closed, place an "X" at the each end of the runway. With taxiways, place an "X" at the entrance of the closed taxiway.

c. Temporarily closed airport.

When the airport is closed temporarily, mark the runways as closed and turn off the airport beacon.

d. Permanently closed airports

When the airport is closed permanently, mark the runways as permanently closed, disconnect the airport beacon, and place an "X" in the segmented circle or at a central location if no segmented circle exists.

3-9. HAZARD MARKING AND LIGHTING.

Provide prominent, comprehensible warning indicators for any area affected by construction that is normally accessible to aircraft, personnel, or vehicles. Using appropriate hazard marking and lighting may prevent damage, injury, traffic delays, and/or facility closures. Hazard marking and lighting must restrict access and make specific hazards obvious to pilots, vehicle drivers, and other personnel. Barricades, traffic cones (weighted or sturdily attached to the surface), or flashers are acceptable methods used to identify and define the limits of construction and hazardous areas on airports.

Provide temporary hazard marking and lighting to prevent aircraft from taxiing onto a closed runway for takeoff and to identify open manholes, small areas under repair, stockpiled material, and waste areas. Also consider less obvious construction-related hazards and include markings to identify FAA, airport, and National Weather Service facilities cables and power lines; instrument landing system (ILS) critical areas; airport surfaces, such as RSA, OFA, and OFZ; and other sensitive areas to make it easier for contractor personnel to avoid these areas.

The construction specifications must include a provision requiring the contractor to have a person on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades. The contractor must file the contact person's information with the airport.

a. Nonmovement areas.

Indicate construction locations on nonmovement areas in which no part of an aircraft may enter by using barricades that are marked with diagonal, alternating orange and white stripes. Barricades may be supplemented with alternating

orange and white flags at least 20 by 20 inches (50 by 50 cm) square and made and installed so they are always in an extended position, properly oriented, and securely fastened to eliminate jet engine ingestion. Such barricades may be many different shapes and made from various materials, including railroad ties, sawhorses, jersey barriers, or barrels. During reduced visibility or night hours, supplement the barricades with red lights, either flashing or steady-burning, which should meet the luminance requirements of the State Highway Department (yellow lights are not acceptable after October 1, 2004). The intensity of the lights and spacing for barricade flags and lights must adequately and without ambiguity delineate the hazardous area.

b. Movement areas.

Use orange traffic cones; red lights, either flashing or steady-burning, which should meet the luminance requirements of the State Highway Department (yellow lights are not acceptable after October 1, 2004); collapsible barricades marked with diagonal, alternating orange and white stripes; and/or signs to separate all construction/maintenance areas from the movement area. All barricades, temporary markers, and other objects placed and left in safety areas associated with any open runway, taxiway, or taxilane must be as low as possible to the ground; of low mass; easily collapsible upon contact with an aircraft or any of its components; and weighted or sturdily attached to the surface to prevent displacement from prop wash, jet blast, wing vortex, or other surface wind currents. If affixed to the surface, they must be frangible at grade level or as low as possible, but not to exceed 3 inches (7.6cm) above the ground. Do not use nonfrangible hazard markings, such as concrete barriers and/or metal-drum-type barricades, in aircraft movement areas. Do not use railroad ties on runways.

Use highly reflective barriers with flashing or steady-burning red lights to barricade taxiways leading to closed runways. Evaluate all operating factors when determining how to mark temporary closures that can last from 10 to 15 minutes to a much longer period of time. However, we strongly recommend that, even for closures of relatively short duration, major taxiway/runway intersections be identified with barricades spaced no greater than 20 feet (6m) apart. Mark the barricades with a flashing or steady-burning red light. At a minimum, use a single barricade placed on the taxiway centerline.

3-10. CONSTRUCTION NEAR NAVIGATIONAL AIDS (NAVAIDS).

Construction activities, materials/equipment storage, and vehicle parking near electronic NAVAIDs require special consideration since they may interfere with signals essential to air navigation. Evaluate the effect of construction activity and the required distance and direction from the NAVAID for each construction project. Pay particular attention to stockpiling material, as well as to movement and parking of equipment that may interfere with line of sight from the ATCT or with electronic emissions. Interference from construction may require NAVAID shutdown or adjustment of instrument approach minimums for IFR. This condition requires that a NOTAM be filed. Construction activities and materials/equipment storage near a NAVAID may also obstruct access to the equipment and instruments for maintenance. Before commencing construction activity, parking vehicles, or storing construction equipment and materials near a NAVAID, consult with the nearest FAA Airway Facilities Office.

3-11. CONSTRUCTION SITE ACCESS AND HAUL ROADS.

Determine the construction contractor's access to the construction sites and haul roads. Do not permit the construction contractor to use any access or haul roads other than those approved. Construction contractors must submit specific proposed routes associated with construction activities to the airport operator for evaluation and approval as part of the safety plan before beginning construction activities. These proposed routes must also provide specifications to prevent inadvertent entry to movement areas. Pay special attention to ensure that ARFF right of way on access and haul roads is not impeded at any time and that construction traffic on haul roads does not interfere with NAVAIDs or approach surfaces of operational runways.

3-12. CONSTRUCTION MATERIAL STOCKPILING.

Stockpiled materials and equipment storage are not permitted within the RSA and OFZ of an operational runway. The airport operator must ensure that stockpiled materials and equipment adjacent to these areas are prominently marked and lighted during hours of restricted visibility or darkness. This includes determining and verifying that materials are stored at an approved location to prevent foreign object damage and attraction of wildlife.

3-13. OTHER LIMITATIONS ON CONSTRUCTION.

Contractors may not use open-flame welding or torches unless adequate fire safety precautions are provided and the airport operator has approved their use. Under no circumstances should flare pots be used within the AOA at any time. The use of electrical blasting caps must not be permitted on or within 1,000 feet (300m) of the airport property (see AC 150/5370-10, *Standards for Specifying Construction of Airports*).

3-14. FOREIGN OBJECT DEBRIS (FOD) MANAGEMENT.

Waste and loose materials, commonly referred to as FOD, are capable of causing damage to aircraft landing gears, propellers, and jet engines. Construction contractors must not leave or place FOD on or near active aircraft movement areas. Materials tracked onto these areas must be continuously removed during the construction project. We also recommend that airport operators and construction contractors carefully control and continuously remove waste or loose materials that might attract wildlife.

Section 4. Safety Hazards and Impacts

3-15. OVERVIEW.

The situations identified below are potentially hazardous conditions that may occur during airport construction projects. Safety area encroachments, unauthorized and improper ground vehicle operations, and unmarked or uncovered holes and trenches near aircraft operating surfaces pose the most prevalent threats to airport operational safety during airport construction projects. Airport operators and contractors should consider the following when performing inspections of construction activity:

a. Excavation adjacent to runways, taxiways, and aprons.

b. Mounds of earth, construction materials, temporary structures, and other obstacles near any open runway, taxiway, or taxilane; in the related object-free area and aircraft approach or departure areas/zones; or obstructing any sign or marking.

c. Runway resurfacing projects resulting in lips exceeding 3 inches (7.6cm) from pavement edges and ends.

d. Heavy equipment (stationary or mobile) operating or idle near AOAs, in runway approaches and departures areas, or in OFZs.

e. Equipment or material near NAVAIDs that may degrade or impair radiated signals and/or the monitoring of navigational and visual aids. Unauthorized or improper vehicle operations in localizer or glide slope critical areas, resulting in electronic interference and/or facility shutdown.

f. Tall and especially relatively low-visibility units (i.e., equipment with slim profiles)—cranes, drills, and similar objects—located in critical areas, such as OFZs and approach zones.

g. Improperly positioned or malfunctioning lights or unlighted airport hazards, such as holes or excavations, on any apron, open taxiway, or open taxilane or in a related safety, approach, or departure area.

h. Obstacles, loose pavement, trash, and other debris on or near AOAs. Construction debris (gravel, sand, mud, paving materials, etc.) on airport pavements may result in aircraft propeller, turbine engine, or tire damage. Also, loose materials may blow about, potentially causing personal injury or equipment damage.

i. Inappropriate or poorly maintained fencing during construction intended to deter human and animal intrusions into the AOA. Fencing and other markings that are inadequate to separate construction areas from open AOAs create aviation hazards.

j. Improper or inadequate marking or lighting of runways (especially thresholds that have been displaced or runways that have been closed) and taxiways that could cause pilot confusion and provide a potential for a runway incursion. Inadequate or improper methods of marking, barricading, and lighting of temporarily closed portions of AOAs create aviation hazards.

k. Wildlife attractants—such as trash (food scraps not collected from construction personnel activity), grass seeds, or ponded water—on or near airports.

l. Obliterated or faded markings on active operational areas.

m. Misleading or malfunctioning obstruction lights. Unlighted or unmarked obstructions in the approach to any open runway pose aviation hazards.

n. Failure to issue, update, or cancel NOTAMs about airport or runway closures or other construction-related airport conditions.

o. Failure to mark and identify utilities or power cables. Damage to utilities and power cables during construction activity can result in the loss of runway/taxiway lighting; loss of navigational, visual, or approach aids; disruption of weather reporting services; and/or loss of communications.

p. Restrictions on ARFF access from fire stations to the runway-taxiway system or airport buildings.

q. Lack of radio communications with construction vehicles in airport movement areas.

r. Objects, regardless of whether they are marked or flagged, or activities anywhere on or near an airport

that could be distracting, confusing, or alarming to pilots during aircraft operations.

s. Water, snow, dirt, debris, or other contaminants that temporarily obscure or derogate the visibility of runway/taxiway marking, lighting, and pavement edges. Any condition or factor that obscures or diminishes the visibility of areas under construction.

t. Spillage from vehicles (gasoline, diesel fuel, oil, etc.) on active pavement areas, such as runways, taxiways, ramps, and airport roadways.

u. Failure to maintain drainage system integrity during construction (e.g., no temporary drainage provided when working on a drainage system).

v. Failure to provide for proper electrical lockout and tagging procedures. At larger airports with multiple maintenance shifts/workers, construction contractors should make provisions for coordinating work on circuits.

w. Failure to control dust. Consider limiting the amount of area from which the contractor is allowed to strip turf.

x. Exposed wiring that creates an electrocution or fire ignition hazard. Identify and secure wiring, and place it in conduit or bury it.

y. Site burning, which can cause possible obscuration.

z. Construction work taking place outside of designated work areas and out of phase.

APPENDIX 1. RELATED READING MATERIAL

1. Obtain the latest version of the following free publications from the FAA on its Web site at **http://www.faa.gov/arp/.** In addition, these ACs are available by contacting the U.S. Department of Transportation, Subsequent Distribution Office, SVC-121.23, Ardmore East Business Center, 3341 Q 75th Avenue, Landover, MD 20785.

a. AC 150/5200-28, *Notices to Airmen (NOTAM) for Airport Operators.* Provides guidance for the use of the NOTAM System in airport reporting.

b. AC 150/5200-30, *Airport Winter Safety and Operations.* Provides guidance to airport owners/operators on the development of an acceptable airport snow and ice control program and on appropriate field condition reporting procedures.

c. AC 150/5200-33, *Hazardous Wildlife Attractants On or Near Airports.* Provides guidance on locating certain land uses having the potential to attract hazardous wildlife to public-use airports.

d. AC 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport.* Provides guidance, specifications, and standards for painting, marking, and lighting vehicles operating in the airport air operations areas.

e. AC 150/5220-4, *Water Supply Systems for Aircraft Fire and Rescue Protection.* Provides guidance for the selection of a water source and standards for the design of a distribution system to support aircraft rescue and fire fighting service operations on airports.

f. AC 150/5340-1, *Standards for Airport Markings.* Contains FAA standards for markings used on airport runways, taxiways, and aprons.

g. AC 150/5340-14B, *Economy Approach Lighting Aids.* Describes standards for the design, selection, siting, and maintenance of economy approach lighting aids.

h. AC 150/5340-18, *Standards for Airport Sign Systems.* Contains FAA standards for the siting and installation of signs on airport runways and taxiways.

i. AC 150/5345-28, *Precision Approach Path Indicator (PAPI) Systems.* Contains the FAA standards for PAPI systems, which provide pilots with visual glide slope guidance during approach for landing.

j. AC 150/5380-5, *Debris Hazards at Civil Airports.* Discusses problems at airports, gives information on foreign objects, and explains how to eliminate such objects from operational areas.

k. AC 70/7460-2, *Proposed Construction or Alteration of Objects that May Affect the Navigable Airspace.* Provides information to persons proposing to erect or alter an object that may affect navigable airspace and explains the need to notify the FAA before construction begins and the FAA's response to those notices, as required by 14 CFR part 77.

2. Obtain copies of the following publications from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Send a check or money order made payable to the Superintendent of Documents in the amount stated with your request. The Government Printing Office does not accept C.O.D. orders. In addition, the FAA makes these ACs available at no charge on the Web site at **http://www.faa.gov/arp/.**

a. AC 150/5300-13, *Airport Design.* Contains FAA standards and recommendations for airport design, establishes approach visibility minimums as an airport design parameter, and contains the object-free area and the obstacle free-zone criteria. ($26. Supt. Docs.) SN050-007-01208-0.

b. AC 150/5370-10, *Standards for Specifying Construction of Airports.* Provides standards for construction of airports. Items covered include earthwork, drainage, paving, turfing, lighting, and incidental construction. ($18. Supt. Docs.) SN050-007-0821-0.

APPENDIX 2. DEFINITIONS OF TERMS USED IN THE AC

1. AIR OPERATIONS AREA (AOA). Any area of the airport used or intended to be used for the landing, takeoff, or surface maneuvering of aircraft. An air operations area includes such paved or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runways, taxiways, or aprons.

2. CONSTRUCTION. The presence and movement of construction-related personnel, equipment, and materials in any location that could infringe upon the movement of aircraft.

3. CERTIFICATED AIRPORT. An airport that has been issued an Airport Operating Certificate by the FAA under the authority of 14 CFR part 139, Certification and Operation: Land Airports Serving Certain Air Carriers, or its subsequent revisions.

4. FAA FORM 7460-1, NOTICE OF PROPOSED CONSTRUCTION OR ALTERATION. The form submitted to the FAA Regional Air Traffic or Airports Division Office as formal written notification of any kind of construction or alteration of objects that affect navigable airspace, as defined in 14 CFR part 77, Objects Affecting Navigable Airspace (see AC 70/7460-2, *Proposed Construction or Alteration of Objects that May Affect the Navigable Airspace*, found at **http://www.faa.gov/arp/**).

5. FAA FORM 7480-1, NOTICE OF LANDING AREA PROPOSAL. Form submitted to the FAA Airports Regional Division Office or Airports District Office as formal written notification whenever a project without an airport layout plan on file with the FAA involves the construction of a new airport; the construction, realigning, altering, activating, or abandoning of a runway, landing strip, or associated taxiway; or the deactivation or abandoning of an entire airport (found at **http://www.faa.gov/arp/**).

6. MOVEMENT AREA. The runways, taxiways, and other areas of an airport that are used for taxiing or hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and aircraft parking areas (reference 14 CFR part 139).

7. OBSTRUCTION. Any object/obstacle exceeding the obstruction standards specified by 14 CFR part 77, subpart C.

8. OBJECT-FREE AREA (OFA). An area on the ground centered on the runway, taxiway, or taxilane centerline provided to enhance safety of aircraft operations by having the area free of objects except for those objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes (see AC 150/5300-13, *Airport Design,* for additional guidance on OFA standards and wingtip clearance criteria).

9. OBSTACLE-FREE ZONE (OFZ). The airspace below 150 feet (45m) above the established airport elevation and along the runway and extended runway centerline that is required to be clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function, in order to provide clearance protection for aircraft landing or taking off from the runway and for missed approaches (refer to AC 150/5300-13 for guidance on OFZs).

10. RUNWAY SAFETY AREA (RSA). A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway, in accordance with AC 150/5300-13.

11. TAXIWAY SAFETY AREA. A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway, in accordance with AC 150/5300-13.

12. THRESHOLD. The beginning of that portion of the runway available for landing. In some instances, the landing threshold may be displaced.

13. DISPLACED THRESHOLD. The portion of pavement behind a displaced threshold that may be available for takeoffs in either direction or landing from the opposite direction.

14. VISUAL GLIDE SLOPE INDICATOR (VGSI). This device provides a visual glide slope indicator to landing pilots. These systems include precision approach path indicators (PAPIs), visual approach slope indicators (VASIs), and pulse light approach slope indicators (PLASIs).

APPENDIX 3. AIRPORT CONSTRUCTION SAFETY PLANNING GUIDE

Aviation Safety Requirements During Construction

PURPOSE. *This appendix provides airport operators with boilerplate format and language for developing a safety plan for an airport construction project. Adapt this appendix, as applicable, to specific conditions found on the airport for which the plan is being developed. Consider including a copy of this safety plan in the construction drawings for easy access by contractor personnel. Plans should contain the following:*

1. GENERAL SAFETY REQUIREMENTS.

Throughout the construction project, the following safety and operational practices should be observed:

- Operational safety should be a standing agenda item during progress meetings throughout the construction project.
- The contractor and airport operator must perform onsite inspections throughout the project, with immediate remedy of any deficiencies, whether caused by negligence, oversight, or project scope change.
- Airport runways and taxiways should remain in use by aircraft to the maximum extent possible.
- Aircraft use of areas near the contractor's work should be controlled to minimize disturbance to the contractor's operation.
- Contractor, subcontractor, and supplier employees or any unauthorized persons must be restricted from entering an airport area that would be hazardous.
- Construction that is within the safety area of an active runway, taxiway, or apron that is performed under normal operational conditions must be performed when the runway, taxiway, or apron is closed or use-restricted and initiated only with prior permission from the airport operator.
- The contracting officer, airport operator, or other designated airport representative may order the contractor to suspend operations; move personnel, equipment, and materials to a safe location; and stand by until aircraft use is completed.

2. CONSTRUCTION MAINTENANCE AND FACILITIES MAINTENANCE.

Before beginning any construction activity, the contractor must, through the airport operator, give notice [using the Notice to Airmen (NOTAM) System] of proposed location, time, and date of commencement of construction. Upon completion of work and return of all such areas to standard conditions, the contractor must, through the airport operator, verify the cancellation of all notices issued via the NOTAM System. Throughout the duration of the construction project, the contractor must—

a. Be aware of and understand the safety problems and hazards described in AC 150/5370-2, *Operational Safety on Airports During Construction.*

b. Conduct activities so as not to violate any safety standards contained in AC 150/5370-2 or any of the references therein.

c. Inspect all construction and storage areas as often as necessary to be aware of conditions.

d. Promptly take all actions necessary to prevent or remedy any unsafe or potentially unsafe conditions as soon as they are discovered.

3. APPROACH CLEARANCE TO RUNWAYS.

Runway thresholds must provide an unobstructed approach surface over equipment and materials. (Refer to Appendix 2 in AC 150/5300-13, *Airport Design,* for guidance in this area.)

4. RUNWAY AND TAXIWAY SAFETY AREA (RSA AND TSA).

Limit construction to outside of the approved RSA, as shown on the approved airport layout plan—unless the runway is closed or restricted to aircraft operations, requiring a lesser standard RSA that is equal to the RSA available during construction (see AC 150/5370-2 for exceptions). Construction activity within the TSA is permissible when the taxiway is open to aircraft traffic if adequate wingtip clearance exists between the aircraft and equipment/material; evacuations, trenches, or other conditions are conspicuously marked and lighted; and local NOTAMs are in effect for the activity (see AC 150/5300-13 for wingtip clearance requirements). The NOTAM should state that, "personnel and equipment are working adjacent to Taxiway____."

a. Procedures for protecting runway edges.

- Limit construction to no closer than 200 feet (60m) from the runway centerline—unless the runway is closed or restricted to aircraft operations, requiring a lesser standard RSA

that is equal to the RSA available during construction.

- Prevent personnel, material, and/or equipment, as defined in AC 150/5300-13, Paragraph 306, "Obstacle Free Zone (OFZ)," from penetrating the OFZ.
- Coordinate construction activity with the Airport Traffic Control Tower (ATCT) and FAA Regional Airports Division Office or Airports District Office, and through the airport operator, issue an appropriate NOTAM.

Complete the following chart to determine the area that must be protected along the runway edges:

Runway	Aircraft Approach Category* A, B, C, or D	Airplane Design Group* I, II, III, or IV	RSA Width in Feet Divided by 2*
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

*See AC 150/5300-13, *Airport Design,* to complete the chart for a specific runway.

b. Procedures for protecting runway ends.

- Maintain the RSA from the runway threshold to a point at least the distance from the runway threshold as existed before construction activity—unless the runway is closed or restricted to aircraft operations, requiring an RSA that is equal to the RSA length available during construction in accordanee with AC 150/5300-13. This may involve the use of declared distances and partial runway closures (see AC 150/5370-2 for exceptions).
- Ensure all personnel, materials, and/or equipment are clear of the applicable threshold siting criteria surface, as defined in Appendix 2, "Threshold Siting Requirements," of AC 150/5300-13.
- Prevent personnel, material, and/or equipment, as defined in AC 150/5300-13, from penetrating the obstacle-free zone.
- Ensure adequate distance for blast protection is provided, as needed.
- Coordinate construction activity with the ATCT and FAA Regional Airports Division Office or Airports District Office, and through the airport operator, issue an appropriate NOTAM.
- Provide a drawing showing the profile of the appropriate surfaces of each runway end where construction will take place. Where operations by turbojet aircraft are anticipated, review takeoff procedures and jet blast characteristics of aircraft and incorporate safety measures for construction workers in the contract documents.

Complete the following chart to determine the area that must be protected before the runway threshold:

Runway End Number	Airplane Design Group* I, II, III, or IV	Aircraft Approach Category* A, B, C, or D	Minimum Safety Area Prior to the Threshold*	Minimum Unobstructed Approach Slope
_____	_____	_____	_____: FEET	____: 1 to (threshold)
_____	_____	_____	_____: FEET	____: 1 to (threshold)
_____	_____	_____	_____: FEET	____: 1 to (threshold)
_____	_____	_____	_____: FEET	____: 1 to (threshold)

*See AC 150/5300-13, *Airport Design,* to complete the chart for a specific runway.

5. MARKING AND LIGHTING FOR TEMPORARY THRESHOLDS.

Marking and lighting for a temporary threshold is____/is not____ required. The airport owner or contractor, as specified in the contract, will furnish and maintain markings for temporary thresholds. Precision approach path indicators (PAPIs) or runway end identification lights (REIL) are____/are not____ required. The airport owner or contractor, as specified in the contract, will furnish and install all temporary lighting. Include appropriate items per AC 150/5370-2, Chapter 3, "Safety Standards and Guidelines." *If marking and lighting for the temporary threshold is not required, delete this section of the safety plan. If visual aids and/or markings are necessary, provide details. (Include applicable 14 CFR part 77 surfaces in the contract documents.)*

6. CLOSED RUNWAY MARKINGS AND LIGHTING.

The following must be specified for closed runways. Closed runway marking are ____/are not____ required. Closed runway markings will be as shown on the plans____/as furnished by the airport owner____/other____ (specify). Barricades, flagging, and flashers are____/are not____required at Taxiway____ and Runway____and will be supplied by the airport ____/other____(specify).

7. HAZARDOUS AREA MARKING AND LIGHTING.

Hazardous areas on the movement area will be marked with barricades, traffic cones, flags, or flashers (specify). These markings restrict access and make hazards obvious to aircraft, personnel, and vehicles. During periods of low visibility and at night, identify hazardous areas with red flashing or steady-burning lights (specify). The hazardous area marking and lighting will be supplied by the airport operator/contractor, as specified in the contract, and will be depicted on the plans.

8. TEMPORARY LIGHTING AND MARKING.

Airport markings, lighting, and/or signs will be altered in the following manner (specify) during the period from _____ to _____. The alterations are depicted on the plans.

9. VEHICLE OPERATION MARKING AND CONTROL.

Include the following provisions in the construction contract, and address them in the safety plans:

a. When any vehicle, other than one that has prior approval from the airport operator, must travel over any portion of an aircraft movement area, it will be escorted and properly identified. To operate in those areas during daylight hours, the vehicle must have a flag or beacon attached to it. Any vehicle operating on the movement areas during hours of darkness or reduced visibility must be equipped with a flashing dome-type light, the color of which is in accordance with local or state codes.

b. It may be desirable to clearly identify the vehicles for control purposes by either assigned initials or numbers that are prominently displayed on each side of the vehicle. The identification symbols should be at minimum 8-inch (20-cm) block-type characters of a contrasting color and easy to read. They may be applied either by using tape or a water-soluble paint to facilitate removal. Magnetic signs are also acceptable. In addition, vehicles must display identification media, as specified in the approved security plan. *(This section should be revised to conform to the airport operator's requirements.)*

c. Employee parking shall be _____ (specify location), as designated by the airport manager_____/ project engineer_____/other_____ (specify).

d. Access to the job site shall be via_____ (specify route), as shown on the plans_____/designated by the engineer_____/designated by the superintendent_____/designated by the airport manager_____/other_____ (specify).

e. At 14 CFR part 139 certificated and towered airports, all vehicle operators having access to the movement area must be familiar with airport procedures for the operation of ground vehicles and the consequences of noncompliance.

f. If the airport is certificated and/or has a security plan, the airport operator should check for guidance on the additional identification and control of construction equipment.

10. NAVIGATIONAL AIDS.

The contractor must not conduct any construction activity within navigational aid restricted areas without prior approval from the local FAA Airway Facilities sector representative. Navigational aids include instrument landing system components and very high-frequency omnidirectional range, airport surveillance radar. Such restricted areas are depicted on construction plans.

11. LIMITATIONS ON CONSTRUCTION.

Additional limitations on construction include—

a. Prohibiting open-flame welding or torch cutting operations unless adequate fire safety precautions are provided and these operations have been authorized by the airport operator *(as tailored to conform to local requirements and restrictions).*

b. Prominently marking open trenches, excavations, and stockpiled materials at the construction and lighting these obstacles during hours of restricted visibility and darkness.

c. Marking and lighting closed, deceptive, and hazardous areas on airports, as appropriate.

d. Constraining stockpiled material to prevent its movement as a result of the maximum anticipated aircraft blast and forecast wind conditions.

12. RADIO COMMUNICATIONS.

Vehicular traffic located in or crossing an active movement area must have a working two-way radio in contact with the control tower or be escorted by a person in radio contact with the tower. The driver, through personal observation, should confirm that no aircraft is approaching the vehicle position. Construction personnel may operate in a movement area without two-way radio communication provided a NOTAM is issued closing the area and the area is properly marked to prevent incursions. Two-way radio communications are ____/are not____required between contractors and the Airport Traffic Control Tower_____/FAA Flight Service Station_____/Airport Aeronautical Advisory Stations (UNICOM/CTAF)_____. Radio contact is _____/is not_____ required between the hours of____and _____. Continuous monitoring is required _____/or is required only when equipment movement is necessary in certain areas_____. *(This section may be tailored to suit the specific vehicle and safety requirements of the airport sponsor.)*

13. DEBRIS.

Waste and loose material must not be placed in active movement areas. Materials tracked onto these areas must be removed continuously during the work project.

APPENDIX 4. SAMPLE NOTAM

_____ **AIRPORT**

FAA NOTAM # _____ **DATE:** _____

AIRPORT I.D. # _____ **TIME:** _____

NOTAM TEXT:

NOTIFICATON:

TOWER _____ _____ _____ _____

PHONE # INITIALS TIME CALLED IN BY

FSS _____ _____ _____ _____

PHONE # INITIALS TIME CALLED IN BY

AIRLINES

_____ _____

_____ _____

_____ _____

CANCELLED:

NOTIFICATON:

TOWER _____ _____ _____ _____

PHONE # INITIALS TIME CALLED IN BY

FSS _____ _____ _____ _____

PHONE # INITIALS TIME CALLED IN BY

AIRLINES

_____ _____

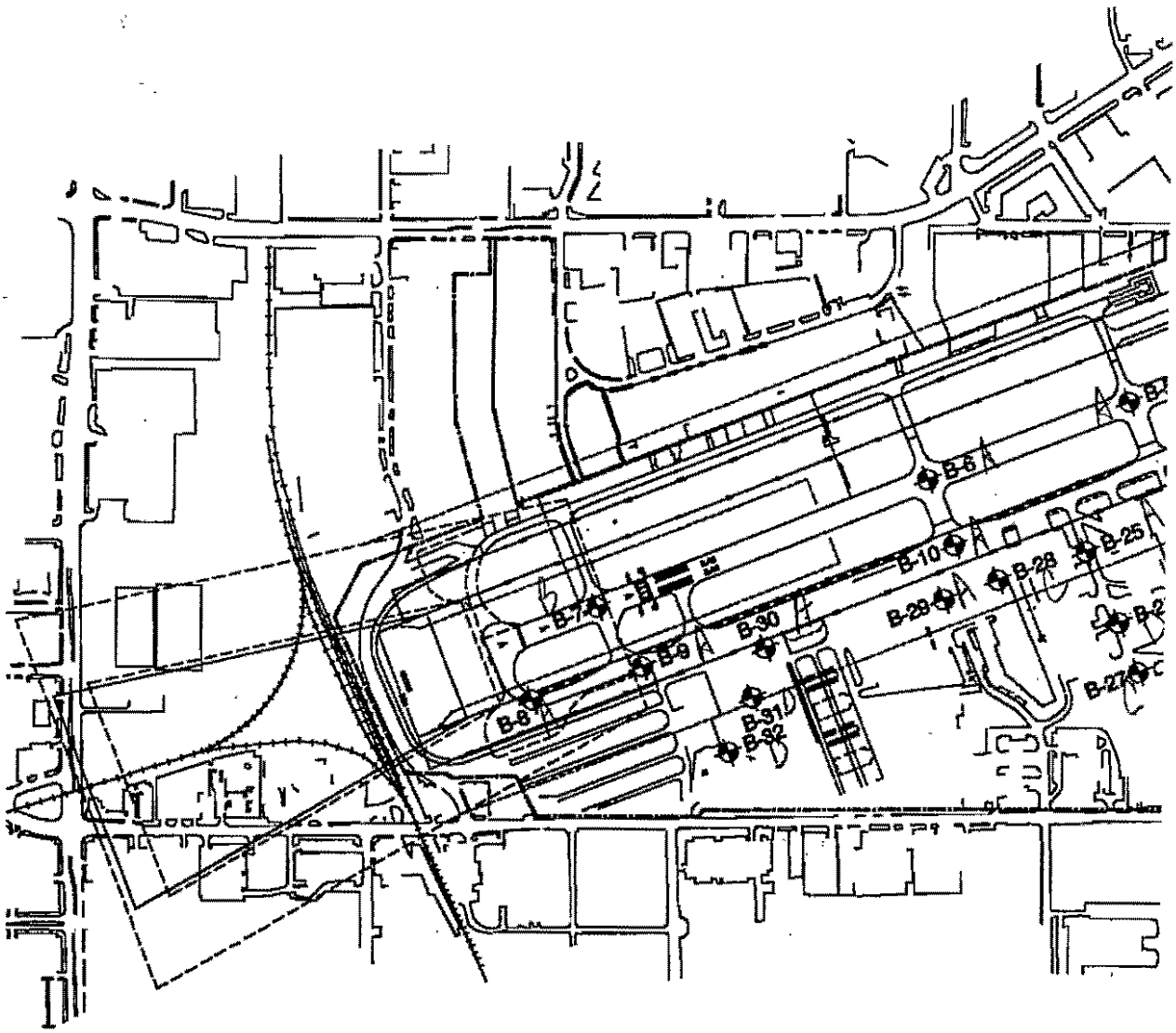
_____ _____

_____ _____

PROJECT NO. 8614
REPORT NO. 1
MARCH, 2002

GEOTECHNICAL INVESTIGATION
ADDISON AIRPORT
RUNWAY AND TAXIWAYS
ADDISON, TEXAS

Presented To:
COFFMAN ASSOCIATES
PHOENIX, ARIZONA


B-6
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B-8
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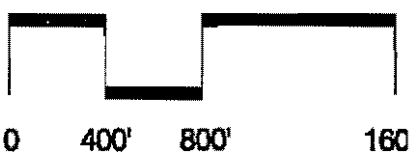
B-32
B-27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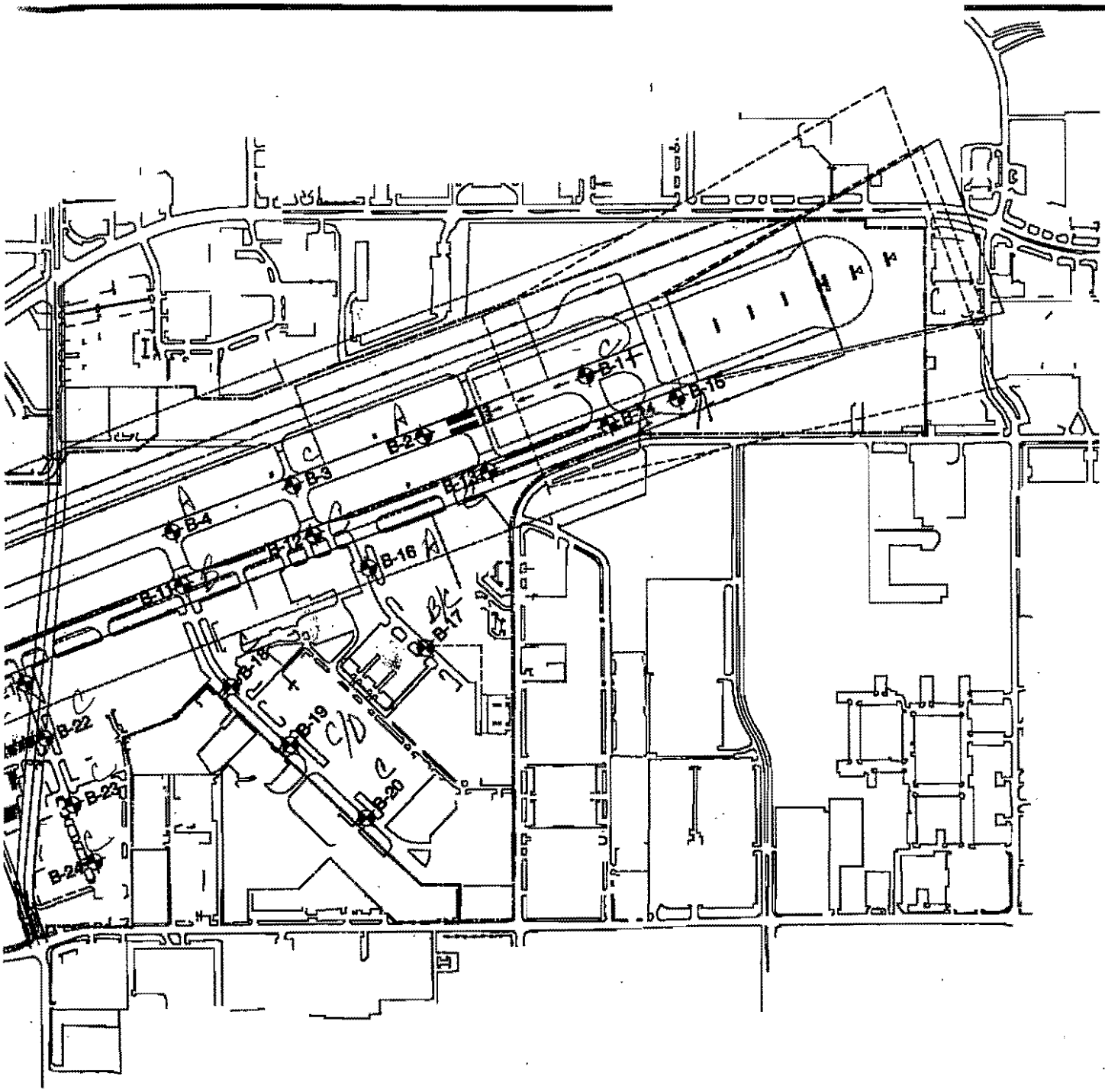
800'
160



REED ENGINEERING GROUP
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

PLAN OF BORINGS

Addison Airport

Runway & Taxiways
Addison, Texas

PLATE 1

reed engineering GROUP

Project No. 8614

Date: 02-10-02

Addison Airport
Runway and Taxiways
Addison, Texas

Location: See Plate 1

DEPTH, feet	DESCRIPTIVE SYMBOLS	SAMPLES	CORE % REC.	CORE % RQD	DESCRIPTION OF STRATA
0					ASPHALT (5.8")
					LIMESTONE FRAGMENTS, yellowish-brown, fine- to coarse-grained, angular, w/clay (Fill) (GP)
					Total Depth = .7 feet
5					
10					
15					
20					

Pocket Penetrometer Readings
Tons Per Sq. Ft. -*
Standard Penetration Tests
Blows per Foot - +

* +	1 10	2 20	3 30	4 40	4.5+ 50	4.5++ 60

BORING LOG B-30

PLATE 31

reed engineering GROUP

Project No: 8614

Date: 02-10-02

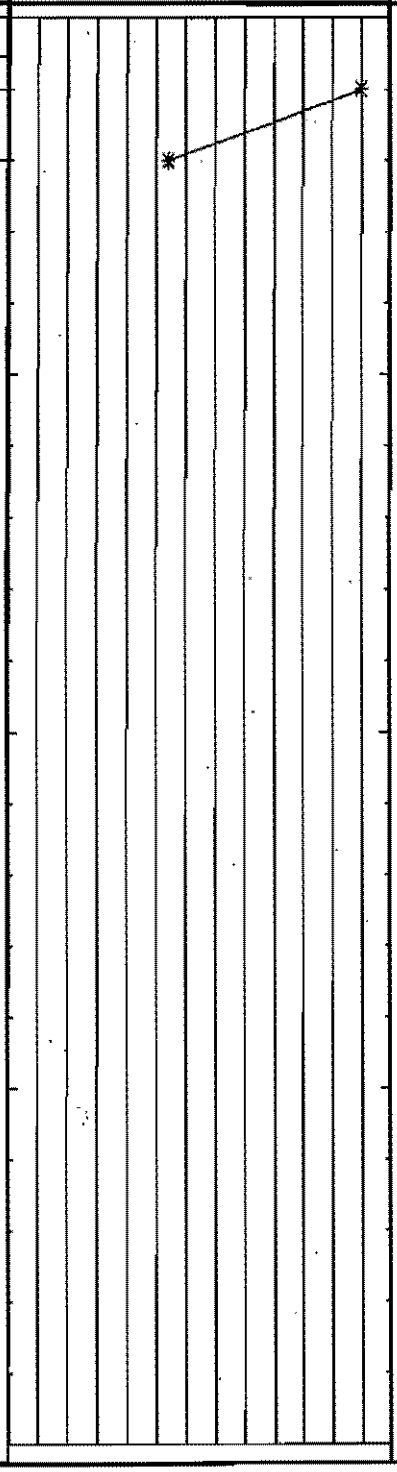
Addison Airport
Runway and Taxiways
Addison, Texas

Location: See Plate 1

DEPTH, feet	DESCRIPTIVE SYMBOLS	SAMPLES	CORE % REC.	CORE % RQD	DESCRIPTION OF STRATA
0					ASPHALT (6.3")
					CLAYEY GRAVEL, brown, well-rounded, fine- to medium-grained, siliceous & calcareous, w/fine- to coarse-grained, sub-rounded to sub-angular sand (Fill) (GP)
					CLAY, dark gray, very stiff (CH)
5					Total Depth = 2 feet
10					
15					
20					

Pocket Penetrometer Readings
Tons Per Sq. Ft. - *
Standard Penetration Tests
Blows per Foot - +

* +	1 10	2 20	3 30	4 40	4.5+ 50	4.5++ 60



BORING LOG B-31

PLATE 32

reed engineering GROUP

Project No. 8614

Date: 02-10-02

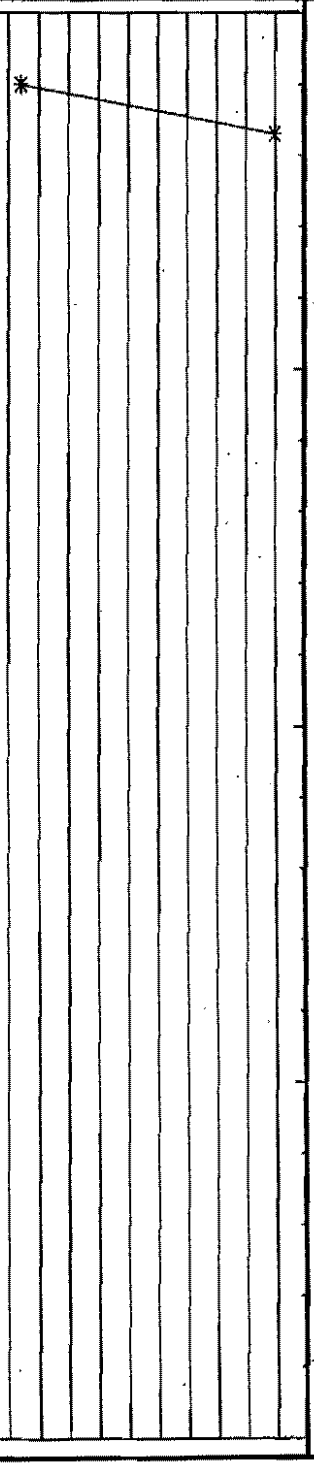
Addison Airport
Runway and Taxiways
Addison, Texas

Location: See Plate 1

DEPTH, feet	DESCRIPTIVE SYMBOLS	SAMPLES	CORE % REC.	CORE % RQD	DESCRIPTION OF STRATA
0					ASPHALT (7.4")
					CLAY, dark brown & dark gray, stiff to hard, w/fine- to medium- grained, soft, weathered limestone fragments (Fill) (CH)
					gray limestone @ 1-1/2'
5					Total Depth = 1-1/2 feet
10					
15					
20					

Pocket Penetrometer Readings
Tons Per Sq. Ft. - *
Standard Penetration Tests
Blows per Foot - +

* +	1 10	2 20	3 30	4 40	4.5+ 50	4.5++ 60



BORING LOG B-32

PLATE 33

SOIL PROPERTIES

COHESIONLESS SOILS

SPT N-Values (blows/foot)	Relative Density
0 – 4	Very Loose
4 –10	Loose
10–30	Medium Dense
30–50	Dense
50 +	Very Dense

COHESIVE SOILS

Pocket Penetrometer (T.S.F.)	Consistency
<0.25	Very Soft
0.25–0.50	Soft
0.50–1.00	Medium Stiff
1.00–2.00	Stiff
2.00–4.00	Very Stiff
4.00 +	Hard

ROCK PROPERTIES

HARDNESS	DIAGNOSTIC FEATURES
Very Soft	Can be dented with moderate finger pressure.
Soft	Can be scratched easily with fingernail.
Moderately Hard	Can be scratched easily with knife but not with fingernail.
Hard	Can be scratched with knife with some difficulty; can be broken by light to moderate hammer blow.
Very Hard	Cannot be scratched with knife; can be broken by repeated heavy hammer blows.

DEGREE OF WEATHERING	DIAGNOSTIC FEATURES
Slightly Weathered	Slight discoloration inwards from open fractures.
Weathered	Discoloration throughout; weaker minerals decomposed; strength somewhat less than fresh rock; structure preserved.
Severely Weathered	Most minerals somewhat decomposes; much softer than fresh rock; texture becoming indistinct but fabric and structure preserved.
Completely Weathered	Minerals decomposed to soil; rock fabric and structure destroyed (residual soil).

GEOTECHNICAL INVESTIGATION
ADDISON AIRPORT
RUNWAY AND TAXIWAYS
ADDISON, TEXAS
(Continued)

Summary of Classification and Index Property Tests

Boring No.	Depth (feet)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (PI)	Percent Passing No. 200 Sieve
B-30	0.4 - 0.7	--	--	--	17
B-31	1.0 - 2.0	66	26	40	--
B-32	0.5 - 1.0	56	22	34	--

U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION

Date: 1/17/03
Initiated by: AAS-300

AC No: 150/5370-2E
Change:

1. THE PURPOSE OF THIS ADVISORY CIRCULAR (AC).

Aviation safety is the primary consideration at airports, especially during construction. This AC sets forth guidelines for operational safety on airports during construction. It contains major changes to the following areas: "Runway Safety Area," paragraph 3-2; "Taxiway Safety Areas/Object-Free Areas," paragraph 3-3; "Overview," paragraph 3-4; "Marking Guidelines for Temporary Threshold," paragraph 3-5; and "Hazard Marking and Lighting," paragraph 3-9.

2. WHAT THIS AC CANCELS.

This AC cancels AC 150/5370-2D, *Operational Safety on Airports During Construction,* dated May 31, 2002.

3. READING MATERIAL RELATED TO THIS AC.

Appendix 1 contains a list of reading materials on airport construction, design, and potential safety hazards during construction, as well as instructions for ordering these documents. Many of them, including this AC, are available on the Federal Aviation Administration (FAA) Web site.

4. WHO THIS AC AFFECTS.

This AC assists airport operators in complying with 14 Code of Federal Regulations (CFR), part 139, Certification and Operation: Land Airports Serving Certain Air Carriers, and with the requirements of airport construction projects receiving funds under the Airport Improvement Program or from the Passenger Facility Charge Program. While the FAA does not require noncertificated airports without grant agreements to adhere to these guidelines, we recommend that they do so as it will help these airports maintain a desirable level of operational safety during construction.

5. ADDITIONAL BACKGROUND INFORMATION.

Appendix 2 contains definitions of terms used in this AC. Appendix 3 provides airport operators with boilerplate format and language for developing a safety plan for an airport construction project. Appendix 4 is a sample Notice to Airmen form.

6. HAZARD LIGHTING IMPLEMENTATION TIME LINE.

Supplemental hazard lighting must be red in color by October 1, 2004. See paragraph 3-9 for more information.

DAVID L. BENNETT

Director, Office of Airport Safety and Standards

CONTENTS

Appendices

CHAPTER 1. GENERAL SAFETY REQUIREMENTS AND RESPONSIBILITIES

1-1. OVERVIEW.

Hazardous practices and marginal conditions created by construction activities can decrease or jeopardize operational safety on airports. To minimize disruption of normal aircraft operations and to avoid situations that compromise the airport's operational safety, the airport operator must carefully plan, schedule, and coordinate construction activities. While the guidance in this AC is primarily used for construction operations, some of the methods and procedures described may also enhance day-to-day maintenance operations.

1-2. WHO IS RESPONSIBLE FOR SAFETY DURING CONSTRUCTION.

An airport operator has overall responsibility for construction activities on an airport. This includes the predesign, design, preconstruction, construction, and inspection phases. Additional information on these responsibilities can be found throughout this AC.

a. Airport operator's responsibilities—

(1) Develop internally or approve a construction safety plan developed by an outside consultant/contractor that complies with the safety guidelines in Chapter 2, "Safety Plans," and Appendix 3, "Airport Construction Safety Planning Guide," of this AC.

(2) Require contractors to submit plans indicating how they intend to comply with the safety requirements of the project.

(3) Convene a meeting with the construction contractor, consultant, airport employees, and, if appropriate, tenant sponsor to review and discuss project safety before beginning construction activity.

(4) Ensure contact information is accurate for each representative/point of contact identified in the safety plan.

(5) Hold weekly or, if necessary, daily safety meetings to coordinate activities.

(6) Notify users, especially aircraft rescue and fire fighting (ARFF) personnel, of construction activity and conditions that may adversely affect the operational safety of the airport via Notices to Airmen (NOTAMs) or other methods, as appropriate. Convene a meeting for review and discussion if necessary.

(7) Ensure that construction personnel know of any applicable airport procedures and of changes to those procedures that may affect their work.

(8) Ensure that construction contractors and subcontractors undergo training required by the safety plan.

(9) Develop and/or coordinate a construction vehicle plan with airport tenants, the airport traffic control tower (ATCT), and construction contractors. Include the vehicle plan in the safety plan. See Chapter 2, section 2, of this AC for additional information.

(10) Ensure tenants and contractors comply with standards and procedures for vehicle lighting, marking, access, operation, and communication.

(11) At certificated airports, ensure that each tenant's construction safety plan is consistent with 14 CFR part 139, Certification and Operations: Land Airports Serving Certain Air Carriers.

(12) Conduct frequent inspections to ensure construction contractors and tenants comply with the safety plan and that altered construction activities do not create potential safety hazards.

(13) Resolve safety deficiencies immediately.

(14) Ensure construction access complies with the security requirements of 49 CFR part 1542, Airport Security.

(15) Notify appropriate parties when conditions exist that invoke provisions of the safety plan (e.g., implementation of low-visibility operations).

b. Construction contractor's responsibilities—

(1) Submit plans to the airport operator on how to comply with the safety requirements of the project.

(2) Have available a copy of the project safety plan.

(3) Comply with the safety plan associated with the construction project and ensure that construction personnel are familiar with safety procedures and regulations on the airport.

(4) Provide a point of contact who will coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport.

(5) Provide a safety officer/construction inspector familiar with airport safety to monitor construction activities.

(6) Restrict movement of construction vehicles to construction areas by flagging and barricading, erecting temporary fencing, or providing escorts, as appropriate.

(7) Ensure that no construction employees, employees of subcontractors or suppliers, or other persons enter any part of the air operations areas (AOAs) from the construction site unless authorized.

c. Tenant's responsibilities if planning construction activities on leased property—

(1) Develop a safety plan, and submit it to the airport operator for approval prior to issuance of a Notice to Proceed.

(2) Provide a point of contact who will coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport.

(3) Ensure that no tenant or construction employees, employees of subcontractors or suppliers, or any other persons enter any part of the AOA from the construction site unless authorized.

(4) Restrict movement of construction vehicles to construction areas by flagging and barricading or erecting temporary fencing.

CHAPTER 2. SAFETY PLANS

Section 1. Basic Safety Plan Considerations

2-1. OVERVIEW.

Airport operators should coordinate safety issues with the air carriers, FAA Airway Facilities, and other airport tenants before the design phase of the project. The airport operator should identify project safety concerns, requirements, and impacts before making arrangements with contractors and other personnel to perform work on an airport. These safety concerns will serve as the foundation for the construction safety plan and help maintain a high level of aviation safety during the project.

The airport operator should determine the level of complexity of the safety plan that is necessary for each construction project and its phases. The safety plan may be detailed in the specifications included in the invitation for bids, or the invitation for bid may specify that the contractor develop the safety plan and the airport operator approve it. In the latter case, the invitation for bid should contain sufficient information to allow the contractor to develop and determine the costs associated with the safety plan. In either case, safety plan costs should be incorporated into the total cost of the project. The airport operator has final approval authority and responsibility for all safety plans.

Coordination will vary from formal predesign conferences to informal contacts throughout the duration of the construction project.

Details of a specified safety plan, or requirements for a contractor-developed safety plan, should be discussed at the predesign and preconstruction conferences and should include the following, as appropriate:

a. Actions necessary before starting construction, including defining and assigning responsibilities.

b. Basic responsibilities and procedures for disseminating instructions about airport procedures to the contractor's personnel.

c. Means of separating construction areas from aeronautical-use areas.

d. Navigational aid (NAVAID) requirements and weather.

e. Marking and lighting plan illustrations.

f. Methods of coordinating significant changes in airport operations with all the appropriate parties.

2-2. SAFETY PLAN CHECKLIST.

To the extent applicable, the safety plan should address the following:

a. Scope of work to be performed, including proposed duration of work.

b. Runway and taxiway marking and lighting.

c. Procedures for protecting all runway and taxiway safety areas, obstacle-free zones (OFZs), object-free areas (OFAs), and threshold citing criteria outlined in AC 150/5300-13, *Airport Design,* and as described in this AC. This includes limitations on equipment height and stockpiled material.

d. Areas and operations affected by the construction activity, including possible safety problems.

e. NAVAIDs that could be affected, especially critical area boundaries.

f. Methods of separating vehicle and pedestrian construction traffic from the airport movement areas. This may include fencing off construction areas to keep equipment operators in restricted areas in which they are authorized to operate. Fencing, or some other form of restrictive barrier, is an operational necessity in some cases.

g. Procedures and equipment, such as barricades (identify type), to delineate closed construction areas from the airport operational areas, as necessary.

h. Limitations on construction.

i. Required compliance of contractor personnel with all airport safety and security measures.

j. Location of stockpiled construction materials, construction site parking, and access and haul roads.

k. Radio communications.

l. Vehicle identification.

m. Trenches and excavations and cover requirements.

n. Procedures for notifying ARFF personnel if water lines or fire hydrants must be deactivated or if emergency access routes must be rerouted or blocked.

o. Emergency notification procedures for medical and police response.

p. Use of temporary visual aids.

q. Wildlife management.

r. Foreign object debris (FOD) control provisions.

s. Hazardous materials (HAZMAT) management.

t. NOTAM issuance.

u. Inspection requirements.

v. Procedures for locating and protecting existing underground utilities, cables, wires, pipelines, and other underground facilities in excavation areas.

w. Procedures for contacting responsible representatives/points of contact for all involved parties. This should include off-duty contact information so an immediate response may be coordinated to correct any construction-related activity that could adversely affect the operational safety of the airport. Particular care should be taken to ensure that appropriate Airways Facilities personnel are identified in the event that an unanticipated utility outage or cable cut occurs that impacts FAA NAVAIDs.

x. Vehicle operator training.

y. Penalty provisions for noncompliance with airport rules and regulations and the safety plan (e.g., if a vehicle is involved in a runway incursion).

z. Any special conditions that affect the operation of the airport and will require a portion of the safety plan to be activated (e.g., low-visibility operations, snow removal).

Section 2. Safety and Security Measures

2-3. OVERVIEW.

Airport operators are responsible for closely monitoring tenant and construction contractor activity during the construction project to ensure continual compliance with all safety and security requirements. Airports subject to 49 CFR part 1542, Airport Security, must meet standards for access control, movement of ground vehicles, and identification of construction contractor and tenant personnel. In addition, airport operators should use safety program standards, as described in Chapter 3 of this AC, to develop specific safety measures to which tenants and construction contractors must adhere throughout the duration of construction activities.

General safety provisions are contained in AC 150/5370-10, *Standards for Specifying Construction of Airports,* paragraphs 40-05, "Maintenance of Traffic"; 70-08, "Barricades, Warning Signs, and Hazard Markings"; and 80-04, "Limitation of Operations." At any time during construction, aircraft operations, weather, security, or local airport rules may dictate more stringent safety measures. The airport operator should ensure that both general and specific safety requirements are coordinated with airport tenants and ATCT personnel. The airport operator should also include these parties in the coordination of all bid documents, construction plans, and specifications for on-airport construction projects.

2-4. VEHICLE OPERATION AND MARKING AND PEDESTRIAN CONTROL.

Vehicle and pedestrian access routes for airport construction projects must be controlled to prevent inadvertent or unauthorized entry of persons, vehicles, or animals onto the AOA. This includes aircraft movement and nonmovement areas. The airport operator should develop and coordinate a construction vehicle plan with airport tenants, contractors, and the ATCT. The safety plan or invitation for bid should include specific vehicle and pedestrian requirements.

The vehicle plan should contain the following items:

a. Airport operator's rules and regulations for vehicle marking, lighting, and operation.

b. Requirements for marking and identifying vehicles in accordance with AC 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport.*

c. Description of proper vehicle operations on movement and nonmovement areas under normal, lost communications, and emergency conditions.

d. Penalties for noncompliance with driving rules and regulations.

e. Training requirements for vehicle drivers to ensure compliance with the airport operator's vehicle rules and regulations.

f. Provisions for radio communication training for construction contractor personnel engaged in construction activities around aircraft movement areas. Some drivers,

such as construction drivers under escort, may not require this training.

g. Escort procedures for construction vehicles requiring access to aircraft movement areas. A vehicle in the movement area must have a working aviation-band, two-way radio unless it is under escort. Vehicles can be in closed areas without a radio if the closed area is properly marked and lighted to prevent incursions and a NOTAM regarding the closure is issued.

h. Monitoring procedures to ensure that vehicle drivers are in compliance with the construction vehicle plan.

i. Procedures for, if appropriate, personnel to control access through gates and fencing or across aircraft movement areas.

2-5. CONSTRUCTION EMPLOYEE PARKING AREAS.

Designate in advance vehicle parking areas for contractor employees to prevent any unauthorized entry of persons or vehicles onto the airport movement area. These areas should provide reasonable contractor employee access to the job site.

2-6. CONSTRUCTION VEHICLE EQUIPMENT PARKING.

Construction employees must park and service all construction vehicles in an area designated by the airport operator outside the runway safety areas and OFZs and never on a closed taxiway or runway. Employees should also park construction vehicles outside the OFA when not in use by construction personnel (e.g., overnight, on weekends, or during other periods when construction is not active). Parking areas must not obstruct the clear line of sight by the ATCT to any taxiways or runways under air traffic control nor obstruct any runway visual aids, signs, or navigational aids. The FAA must also study those areas to determine effects on 14 CFR part 77, *Objects Affecting Navigable Airspace*, surfaces (see paragraph 2-13 for further information).

2-7. RADIO COMMUNICATION TRAINING.

The airport operator must ensure that tenant and construction contractor personnel engaged in activities involving unescorted operation on aircraft movement areas observe the proper procedures for communications, including using appropriate radio frequencies at airports with and without ATCTs. Training of contractors on proper communication procedures is essential for maintaining airport operational safety. When operating vehicles on or near open runways or taxiways, construction personnel must understand the critical importance of maintaining radio contact with airport operations, ATCT, or the Common Traffic Advisory Frequency, which may include UNICOM, MULTICOM, or one of the FAA Flight Service Stations (FSS), as directed by airport management.

Vehicular traffic crossing active movement areas must be controlled either by two-way radio with the ATCT, escort, flagman, signal light, or other means appropriate for the particular airport. Vehicle drivers must confirm by personal observation that no aircraft is approaching their position when given clearance to cross a runway. In addition, it is the responsibility of the escort vehicle driver to verify the movement/position of all escorted vehicles at any given time.

Even though radio communication is maintained, escort vehicle drivers must also familiarize themselves with ATCT light gun signals in the event of radio failure (see the FAA safety placard "Ground Vehicle Guide to Airport Signs and Markings"). This safety placard may be ordered through the Runway Safety Program Web site at **http://www.faarsp.org** or obtained from the Regional Airports Division Office.

2-8. FENCING AND GATES.

Airport operators and contractors must take care to maintain a high level of safety and security during construction when access points are created in the security fencing to permit the passage of construction vehicles or personnel. Temporary gates should be equipped so they can be securely closed and locked to prevent access by animals and people (especially minors). Procedures should be in place to ensure that only authorized persons and vehicles have access to the AOA and to prohibit "piggybacking" behind another person or vehicle. The Department of Transportation (DOT) document DOT/FAA/AR-00/52, *Recommended Security Guidelines for Airport Planning and Construction*, provides more specific information on fencing. A copy of this document can be obtained from the Airport Consultants Council, Airports Council International, or American Association of Airport Executives.

Section 3. Notification of Construction Activities

2-9. GENERAL.

In order to maintain the desired levels of operational safety on airports during construction activities, the safety plan should contain the notification actions described below.

2-10. ENSURING PROMPT NOTIFICATIONS.

The airport operator should establish and follow procedures for the immediate notification of airport users and the FAA of any conditions adversely affecting the operational safety of an airport.

2-11. NOTICES TO AIRMEN (NOTAMS).

The airport operator must provide information on closed or hazardous conditions on airport movement areas to the FSS so it can issue a NOTAM. The airport operator must coordinate the issuance, maintenance, and cancellation of NOTAMs about airport conditions resulting from construction activities with tenants and the local air traffic facility (control tower, approach control, or air traffic control center. Refer to AC 150/5200-28, *Notices to Airmen (NOTAMs) for Airport Operators,* and Appendix 4 in this AC for a sample NOTAM form. Only the FAA may issue or cancel NOTAMs on shutdown or irregular operation of FAA-owned facilities. Only the airport operator or an authorized representative may issue or cancel NOTAMs on airport conditions. (The airport owner/operator is the only entity that can close or open a runway.) The airport operator must file and maintain this list of authorized representatives with the FSS. Any person having reason to believe that a NOTAM is missing, incomplete, or inaccurate must notify the airport operator.

2-12. AIRCRAFT RESCUE AND FIRE FIGHTING (ARFF) NOTIFICATION.

The safety plan must provide procedures for notifying ARFF personnel, mutual aid providers, and other emergency services if construction requires shutting off or otherwise disrupting any water line or fire hydrant on the airport or adjoining areas and if contractors work with hazardous material on the airfield. Notification procedures must also be developed for notifying ARFF and all other emergency personnel when the work performed will close or affect any emergency routes. Likewise, the procedures must address appropriate notifications when services are restored.

2-13. NOTIFICATION TO THE FAA.

For certain airport projects, 14 CFR part 77 requires notification to the FAA. In addition to applications made for Federally funded construction, 14 CFR part 157, Notice of Construction, Alteration, Activation, and Deactivation of Airports, requires that the airport operator notify the FAA in writing whenever a non-Federally funded project involves the construction of a new airport; the construction, realigning, altering, activating, or abandoning of a runway, landing strip, or associated taxiway; or the deactivation or abandoning of an entire airport. Notification involves submitting FAA Form 7480-1, Notice of Landing Area Proposal, to the nearest FAA Regional Airports Division Office or Airports District Office.

Also, any person proposing any kind of construction or alteration of objects that affect navigable airspace, as defined in 14 CFR part 77 must notify the FAA. This includes construction equipment and proposed parking areas for this equipment (i.e., cranes, graders, etc.). FAA Form 7460-1, Notice of Proposed Construction or Alteration, can be used for this purpose and submitted to the FAA Regional Airports Division Office or Airports District Offiee. (See AC 70/7460-2, *Proposed Construction or Alteration of Objects that May Affect the Navigable Airspace.*)

If construction operations require a shutdown of an airport owned NAVAID from service for more than 24 hours or in excess of 4 hours daily on consecutive days, we recommend a 45-day minimum notice prior to facility shutdown. Coordinate work for a FAA owned NAVAID shutdown with the local FAA Airways Facilities Office. In addition, procedures that address unanticipated utility outages and cable cuts that could impact FAA NAVAIDs must be addressed.

2-14. WORK SCHEDULING AND ACCOMPLISHMENT.

Airport operators—or tenants having construction on their leased properties—should use predesign, prebid, and preconstruction conferences to introduce the subject of airport operational safety during construction (see AC 150/5300-9, *Predesign, Prebid, and Preconstruction Conferences for Airport Grant Projects).* The airport operator, tenants, and construction contractors should integrate operational safety requirements into their planning and work schedules as early as practical. Operational safety should be a standing agenda item for discussion during progress meetings throughout the project. The contractor and airport operator should carry out onsite inspections throughout the project and immediately remedy any deficiencies, whether caused by negligence, oversight, or project scope change.

CHAPTER 3. SAFETY STANDARDS AND GUIDELINES

Section 1. Runway and Taxiway Safety Areas, Obstacle-Free Zones, and Object-Free Areas

3-1. OVERVIEW.

Airport operators must use these safety guidelines when preparing plans and specifications for construction activities in areas that may interfere with aircraft operations. The safety plan should recognize and address these standards for each airport construction project. However, the safety plan must reflect the specific needs of a particular project, and for this reason, these safety guidelines should not be incorporated verbatim into project specifications. For additional guidance on meeting safety and security requirements, refer to the planning guide template included in Appendix 3 of this AC.

3-2. RUNWAY SAFETY AREA (RSA)/ OBSTACLE-FREE ZONE (OFZ).

A runway safety area is the defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway (see AC 150/5300-13, *Airport Design*). Construction activities within the standard RSA are subject to the following conditions:

a. Runway edges.

(1) No construction may occur closer than 200 feet (60m) from the runway centerline unless the runway is closed or restricted to aircraft operations, requiring an RSA that is equal to the RSA width available during construction, or 400 feet, whichever is less (see AC 150/5300-13, Tables 3-1 through 3-3).

(2) Personnel, material, and/or equipment must not penetrate the OFZ, as defined in AC 150/5300-13.

(3) The airport operator must coordinate the construction activity in the RSA as permitted above with the ATCT and the FAA Regional Airports Division Office or appropriate Airports District Office and issue a local NOTAM.

b. Runway ends.

(1) An RSA must be maintained of such dimensions that it extends beyond the end of the runway a distance equal to that which existed before construction activity, unless the runway is closed or restricted to aircraft operations for which the reduced RSA is adequate (see AC 150/5300-13). The temporary use of declared distances and/or partial runway closures may help provide the necessary RSA. In addition, all personnel, materials, and/or equipment must remain clear of the applicable threshold siting surfaces, as defined in Appendix 2, "Threshold Siting Requirements," of AC 150/5300-13.[1] Consult with the appropriate FAA Regional Airports Division Office or Airports District Office to determine the appropriate approach surface required.

(2) Personnel, material, and/or equipment must not penetrate the OFZ, as defined in AC 150/5300-13.

(3) The safety plan must provide procedures for ensuring adequate distance for blast protection, if required by operational considerations.

(4) The airport operator must coordinate construction activity in this portion of the RSA with the ATCT and the FAA Regional Airports Division Office or appropriate Airports District Office and issue a local NOTAM.

c. Excavations.

(1) Construction contractors must prominently mark open trenches and excavations at the construction site with red or orange flags, as approved by the airport operator, and light them with red lights during hours of restricted visibility or darkness.

(2) Open trenches or excavations are not permitted within 200 feet (60m) of the runway centerline and at least the existing RSA distance from the runway threshold while the runway is open. If the runway must be opened before excavations are backfilled, cover the excavations appropriately. Coverings for open trenches or excavations must be of sufficient strength to support the weight of the heaviest aircraft operating on the runway.

3-3. TAXIWAY SAFETY AREAS/OBJECT-FREE AREAS.

a. Unrestricted construction activity is permissible adjacent to taxiways when the taxiway is restricted to aircraft such that the available taxiway safety area is equal

[1] If a full safety area cannot be obtained through declared distances and partial closures, or other methods such as alternate runway use, construction activity may operate in the RSA as long as conditions cited in paragraph 3-1b(2) thru (4) are met. In addition, various surfaces outlined in AC 150/5300-13 and Terminal Instrument Procedures (TERPS) must be protected through an aeronautical study.

to at least ½ of the widest wingspan of the aircraft expected to use the taxiway and the available taxiway object-free area is equal to at least .7 times the widest wingspan plus 10 feet. (See AC 150/5300-13 for guidance on taxiway safety and object-free areas.)

Construction activity may be accomplished closer to a taxiway, subject to the following restrictions:

(1) The activity is first coordinated with the airport operator.

(2) Appropriate NOTAMs are issued.

(3) Marking and lighting meeting the provisions of paragraph 3-9 are implemented.

(4) Adequate clearance is maintained between equipment and materials and any part of an aircraft. If such clearance can only be maintained if an aircraft does not have full use of the entire taxiway width (with its main landing gear at the edge of the pavement), then it will be necessary to move personnel and equipment for each passing aircraft. In these situations, flag persons will be used to direct construction equipment, and wing walkers may be necessary to guide aircraft. Wing walkers should be airline/aviation personnel rather than construction workers.

b. Construction contractors must prominently mark open trenches and excavations at the construction site, as approved by the airport operator, and light them with red lights during hours of restricted visibility or darkness

c. Excavations and open trenches may be permitted up to the edge of a structural taxiway and apron pavement provided the dropoff is marked and lighted per paragraph 3-9, "Hazard Marking and Lighting."

Section 2. Temporary Runway Thresholds

3-4. OVERVIEW.

Construction activity in a runway approach area may result in the need to partially close a runway or displace the existing runway threshold. In either case, locate the threshold in accordance with Appendix 2 of AC 150/5300-13, *Airport Design*. Objects that do not penetrate these surfaces may still be obstructions to air navigation and may affect standard instrument approach procedures. Coordinate these objects with the FAA's Regional Airports Office or appropriate Airports District Office, as necessary. Refer to the current edition of AC 150/5300-13 for guidance on threshold siting requirements. The partial runway closure, the displacement of the runway threshold, as well as closures of the complete runway and other portions of the movement area also requires coordination with appropriate ATCT personnel and airport users.

Caution regarding partial runway closures: When filing a NOTAM for a partial runway closure, clearly state to FSS personnel that the portion of pavement located prior to the threshold is not available for landing and departing traffic. In this case, the threshold has been moved for both landing and takeoff purposes (this is different than a displaced threshold).

Example NOTAM: "North 1,000 feet of Runway 18/36 is closed; 7,000 feet remain available on Runway 18 and Runway 36 for arrivals and departures." There may be situations where the portion of closed runway is available for taxiing only. If so, the NOTAM must reflect this condition.

Caution regarding displaced thresholds: Implementation of a displaced threshold affects runway length available for aircraft landing over the displacement. Depending on the reason for the displacement (to provide obstruction clearance or RSA), such a displacement may also require an adjustment in the landing distance available and accelerate-stop distance available in the opposite direction. If project scope includes personnel, equipment, excavation, etc. within the RSA of any usable runway end, we do not recommend a displaced threshold unless arrivals and departures toward the construction activity are prohibited. Instead, implement a partial closure.

3-5. MARKING GUIDELINES FOR TEMPORARY THRESHOLD.

Ensure that markings for temporary displaced thresholds are clearly visible to pilots approaching the airport to land. When construction personnel and equipment are located close to any threshold, a temporary visual NAVAID, such as runway end identifier lights (REIL), may be required (even on unlighted runways) to define the new beginning of the runway clearly. A visual vertical guidance device, such as a visual approach slope indicator (VASI), pulse light approach slope indicator (PLASI), or precision approach path indicator (PAPI), may be necessary to assure landing clearance over personnel, vehicles, equipment, and/or above-grade stockpiled materials. If such devices are installed, ensure an appropriate descriptive NOTAM is issued to inform pilots of these conditions. The current edition of AC 150/5340-1, *Standards for Airport Markings,* describes standard marking colors and layouts. In addition, we recommend that a temporary runway threshold be marked using the following guidelines:

a. Airport markings must be clearly visible to pilots; not misleading, confusing, or deceptive; secured in place to prevent movement by prop wash, jet blast, wing vortices, or other wind currents; and constructed of

materials that would minimize damage to an aircraft in the event of inadvertent contact.

(1) Pavement markings for temporary closed portions of the runway should consist of yellow chevrons to identify pavement areas that are unsuitable for takeoff/landing (see AC 150/5340-1). If unable to paint the markings on the pavement, construct them from any of the following materials: double-layered painted snow fence, colored plastic, painted sheets of plywood, or similar materials. They must be properly configured and secured to prevent movement by prop wash, jet blast, or other wind currents.

(2) It may be necessary to remove or cover runway markings, such as runway designation markings and aiming point markings, depending on the length of construction and type of activity at the airport.

(3) When threshold markings are needed to identify the temporary beginning of the runway that is available for landing, use a white threshold bar of the dimensions specified in AC 150/5340-1.

(4) If temporary outboard elevated or flush threshold bars are used, locate them outside of the runway pavement surface, one on each side of the runway. They should be at least 10 feet (3m) in width and extend outboard from each side of the runway so they are clearly visible to landing and departing aircraft. These threshold bars are white. If the white threshold bars are not discernable on grass or snow, apply a black background with appropriate material over the ground to ensure the markings are clearly visible.

(5) A temporary threshold may also be marked with the use of retroreflective, elevated markers. One side of such markers is green to denote the approach end of the runway; the side that is seen by pilots on rollout is red. See AC 150/5345-39, *FAA Specification L-853, Runway and Taxiway Retroreflective Markers.*

(6) At 14 CFR part 139 certificated airports, temporary elevated threshold markers must be mounted with a frangible fitting (see 14 CFR part 139.309). However, at noncertificated airports, the temporary elevated threshold markings may either be mounted with a frangible fitting or be flexible. See AC 150/5345-39.

b. The application rate of the paint to mark a short-term temporary runway threshold may deviate from the standard (see Item P-620, "Runway and Taxiway Painting," in AC 150/5370-10, *Standards for Specifying Construction of Airports*), but the dimensions must meet the existing standards, unless coordinated with the appropriate offices.

c. When a runway is partially closed, the distance remaining signs for aircraft landing in the opposite direction should be covered or removed during the construction.

3-6. LIGHTING GUIDELINES FOR TEMPORARY THRESHOLD.

A temporary runway threshold must be lighted if the runway is lighted and it is the intended threshold for night landings or instrument meteorological conditions. We recommend that temporary threshold lights and related visual NAVAIDs be installed outboard of the edges of the full-strength pavement with bases at grade level or as low as possible, but not to exceed 3 inches (7.6cm) above ground. When any portion of a base is above grade, place properly compacted fill around the base to minimize the rate of gradient change so aircraft can, in an emergency, cross at normal landing or takeoff speeds without incurring significant damage (see AC 150/5370-10). We recommend that the following be observed when using temporary runway threshold lighting:

a. Maintain threshold and edge lighting color and spacing standards as described in AC 150/5340-24, *Runway and Taxiway Edge Lighting System.* Battery-powered, solar, or portable lights that meet the criteria in AC 150/5345-50, *Specification for Portable Runway Lights,* may be used. These systems are intended primarily for visual flight rules (VFR) aircraft operation but may be used for instrument flight rules (IFR) aircraft operations, upon individual approval from the Flight Standards Division of the applicable FAA Regional Office.

b. When the runway has been partially closed, disconnect edge and threshold lights with associated isolation transformers on that part of the runway at and behind the threshold (i.e., the portion of the runway that is closed). Alternately, cover the light fixture in such a way as to prevent light leakage. Avoid removing the lamp from energized fixtures because an excessive number of isolation transformers with open secondaries may damage the regulators and/or increase the current above its normal value.

c. Secure, identify, and place any temporary exposed wiring in conduit to prevent electrocution and fire ignition sources.

d. Reconfigure yellow lenses (caution zone), as necessary. If the runway has centerline lights, reconfigure the red lenses, as necessary, or place the centerline lights out of service.

e. Relocate the visual glide slope indicator (VGSI), such as VASI and PAPI; other airport lights, such as REIL; and approach lights to identify the temporary threshold. Another option is to disable the VGSI or any equipment that would give misleading indications to pilots as to the new threshold location. Installation of temporary visual aids may be necessary to provide adequate guidance to pilots on approach to the affected runway. If the FAA owns and operates the VGSI,

coordinate its installation or disabling with the local Airway Facilities Systems Management Office.

f. Issue a NOTAM to inform pilots of temporary lighting conditions.

Section 3. Other Construction Marking and Lighting Activities

3-7. OVERVIEW.

Ensure that construction areas, including closed runways, are clearly and visibly separated from movement areas and that hazards, facilities, cables, and power lines are identified prominently for construction contractors. Throughout the duration of the construction project, verify that these areas remain clearly marked and visible at all times and that marking and lighting aids remain in place and operational. Routine inspections must be made of temporary construction lighting, especially battery-powered lighting since weather conditions can limit battery life.

3-8. CLOSED RUNWAY AND TAXIWAY MARKING AND LIGHTING.

Closed runway markings consist of a yellow "X" in compliance with the standards of AC 150/5340-1, *Standards for Airport Markings*. A very effective and preferable visual aid to depict temporary closure is the lighted "X" signal placed on or near the runway designation numbers. This device is much more discernible to approaching aircraft than the other materials described. If the lighted "X" is not available, construct the marking of any of the following materials: double-layered painted snow fence, colored plastic, painted sheets of plywood, or similar materials. They must be properly configured and secured to prevent movement by prop wash, jet blast, or other wind currents. In addition, the airport operator may install barricades, traffic cones, activate stop bars, or other acceptable visual devices at major entrances to the runways to prevent aircraft from entering a closed portion of runway. The placement of even a single reflective barricade with a "do not enter" sign on a taxiway centerline can prevent an aircraft from continuing onto a closed runway. If the taxiway must remain open for aircraft crossings, barricades or markings, as described above or in paragraph 3-9, should be placed on the runway.

a. Permanently closed runways.

For runways and taxiways that have been permanently closed, disconnect the lighting circuits. For runways, obliterate the threshold marking, runway designation marking, and touchdown zone markings, and place "X's" at each end and at 1,000-foot (300-m) intervals. For taxiways, place an "X" at the entrance of the closed taxiway.

b. Temporarily closed runway and taxiways.

For runways that have been temporarily closed, place an "X" at the each end of the runway. With taxiways, place an "X" at the entrance of the closed taxiway.

c. Temporarily closed airport.

When the airport is closed temporarily, mark the runways as closed and turn off the airport beacon.

d. Permanently closed airports

When the airport is closed permanently, mark the runways as permanently closed, disconnect the airport beacon, and place an "X" in the segmented circle or at a central location if no segmented circle exists.

3-9. HAZARD MARKING AND LIGHTING.

Provide prominent, comprehensible warning indicators for any area affected by construction that is normally accessible to aircraft, personnel, or vehicles. Using appropriate hazard marking and lighting may prevent damage, injury, traffic delays, and/or facility closures. Hazard marking and lighting must restrict access and make specific hazards obvious to pilots, vehicle drivers, and other personnel. Barricades, traffic cones (weighted or sturdily attached to the surface), or flashers are acceptable methods used to identify and define the limits of construction and hazardous areas on airports.

Provide temporary hazard marking and lighting to prevent aircraft from taxiing onto a closed runway for takeoff and to identify open manholes, small areas under repair, stockpiled material, and waste areas. Also consider less obvious construction-related hazards and include markings to identify FAA, airport, and National Weather Service facilities cables and power lines; instrument landing system (ILS) critical areas; airport surfaces, such as RSA, OFA, and OFZ; and other sensitive areas to make it easier for contractor personnel to avoid these areas.

The construction specifications must include a provision requiring the contractor to have a person on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades. The contractor must file the contact person's information with the airport.

a. Nonmovement areas.

Indicate construction locations on nonmovement areas in which no part of an aircraft may enter by using barricades that are marked with diagonal, alternating orange and white stripes. Barricades may be supplemented with alternating

orange and white flags at least 20 by 20 inches (50 by 50 cm) square and made and installed so they are always in an extended position, properly oriented, and securely fastened to eliminate jet engine ingestion. Such barricades may be many different shapes and made from various materials, including railroad ties, sawhorses, jersey barriers, or barrels. During reduced visibility or night hours, supplement the barricades with red lights, either flashing or steady-burning, which should meet the luminance requirements of the State Highway Department (yellow lights are not acceptable after October 1, 2004). The intensity of the lights and spacing for barricade flags and lights must adequately and without ambiguity delineate the hazardous area.

b. Movement areas.

Use orange traffic cones; red lights, either flashing or steady-burning, which should meet the luminance requirements of the State Highway Department (yellow lights are not acceptable after October 1, 2004); collapsible barricades marked with diagonal, alternating orange and white stripes; and/or signs to separate all construction/maintenance areas from the movement area. All barricades, temporary markers, and other objects placed and left in safety areas associated with any open runway, taxiway, or taxilane must be as low as possible to the ground; of low mass; easily collapsible upon contact with an aircraft or any of its components; and weighted or sturdily attached to the surface to prevent displacement from prop wash, jet blast, wing vortex, or other surface wind currents. If affixed to the surface, they must be frangible at grade level or as low as possible, but not to exceed 3 inches (7.6cm) above the ground. Do not use nonfrangible hazard markings, such as concrete barriers and/or metal-drum-type barricades, in aircraft movement areas. Do not use railroad ties on runways.

Use highly reflective barriers with flashing or steady-burning red lights to barricade taxiways leading to closed runways. Evaluate all operating factors when determining how to mark temporary closures that can last from 10 to 15 minutes to a much longer period of time. However, we strongly recommend that, even for closures of relatively short duration, major taxiway/runway intersections be identified with barricades spaced no greater than 20 feet (6m) apart. Mark the barricades with a flashing or steady-burning red light. At a minimum, use a single barricade placed on the taxiway centerline.

3-10. CONSTRUCTION NEAR NAVIGATIONAL AIDS (NAVAIDS).

Construction activities, materials/equipment storage, and vehicle parking near electronic NAVAIDs require special consideration since they may interfere with signals essential to air navigation. Evaluate the effect of construction activity and the required distance and direction from the NAVAID for each construction project. Pay particular attention to stockpiling material, as well as to movement and parking of equipment that may interfere with line of sight from the ATCT or with electronic emissions. Interference from construction may require NAVAID shutdown or adjustment of instrument approach minimums for IFR. This condition requires that a NOTAM be filed. Construction activities and materials/equipment storage near a NAVAID may also obstruct access to the equipment and instruments for maintenance. Before commencing construction activity, parking vehicles, or storing construction equipment and materials near a NAVAID, consult with the nearest FAA Airway Facilities Office.

3-11. CONSTRUCTION SITE ACCESS AND HAUL ROADS.

Determine the construction contractor's access to the construction sites and haul roads. Do not permit the construction contractor to use any access or haul roads other than those approved. Construction contractors must submit specific proposed routes associated with construction activities to the airport operator for evaluation and approval as part of the safety plan before beginning construction activities. These proposed routes must also provide specifications to prevent inadvertent entry to movement areas. Pay special attention to ensure that ARFF right of way on access and haul roads is not impeded at any time and that construction traffic on haul roads does not interfere with NAVAIDs or approach surfaces of operational runways.

3-12. CONSTRUCTION MATERIAL STOCKPILING.

Stockpiled materials and equipment storage are not permitted within the RSA and OFZ of an operational runway. The airport operator must ensure that stockpiled materials and equipment adjacent to these areas are prominently marked and lighted during hours of restricted visibility or darkness. This includes determining and verifying that materials are stored at an approved location to prevent foreign object damage and attraction of wildlife.

3-13. OTHER LIMITATIONS ON CONSTRUCTION.

Contractors may not use open-flame welding or torches unless adequate fire safety precautions are provided and the airport operator has approved their use. Under no circumstances should flare pots be used within the AOA at any time. The use of electrical blasting caps must not be permitted on or within 1,000 feet (300m) of the airport property (see AC 150/5370-10, *Standards for Specifying Construction of Airports*).

3-14. FOREIGN OBJECT DEBRIS (FOD) MANAGEMENT.

Waste and loose materials, commonly referred to as FOD, are capable of causing damage to aircraft landing gears, propellers, and jet engines. Construction contractors must not leave or place FOD on or near active aircraft movement areas. Materials tracked onto these areas must be continuously removed during the construction project. We also recommend that airport operators and construction contractors carefully control and continuously remove waste or loose materials that might attract wildlife.

Section 4. Safety Hazards and Impacts

3-15. OVERVIEW.

The situations identified below are potentially hazardous conditions that may occur during airport construction projects. Safety area encroachments, unauthorized and improper ground vehicle operations, and unmarked or uncovered holes and trenches near aircraft operating surfaces pose the most prevalent threats to airport operational safety during airport construction projects. Airport operators and contractors should consider the following when performing inspections of construction activity:

a. Excavation adjacent to runways, taxiways, and aprons.

b. Mounds of earth, construction materials, temporary structures, and other obstacles near any open runway, taxiway, or taxilane; in the related object-free area and aircraft approach or departure areas/zones; or obstructing any sign or marking.

c. Runway resurfacing projects resulting in lips exceeding 3 inches (7.6cm) from pavement edges and ends.

d. Heavy equipment (stationary or mobile) operating or idle near AOAs, in runway approaches and departures areas, or in OFZs.

e. Equipment or material near NAVAIDs that may degrade or impair radiated signals and/or the monitoring of navigational and visual aids. Unauthorized or improper vehicle operations in localizer or glide slope critical areas, resulting in electronic interference and/or facility shutdown.

f. Tall and especially relatively low-visibility units (i.e., equipment with slim profiles)—cranes, drills, and similar objects—located in critical areas, such as OFZs and approach zones.

g. Improperly positioned or malfunctioning lights or unlighted airport hazards, such as holes or excavations, on any apron, open taxiway, or open taxilane or in a related safety, approach, or departure area.

h. Obstacles, loose pavement, trash, and other debris on or near AOAs. Construction debris (gravel, sand, mud, paving materials, etc.) on airport pavements may result in aircraft propeller, turbine engine, or tire damage. Also, loose materials may blow about, potentially causing personal injury or equipment damage.

i. Inappropriate or poorly maintained fencing during construction intended to deter human and animal intrusions into the AOA. Fencing and other markings that are inadequate to separate construction areas from open AOAs create aviation hazards.

j. Improper or inadequate marking or lighting of runways (especially thresholds that have been displaced or runways that have been closed) and taxiways that could cause pilot confusion and provide a potential for a runway incursion. Inadequate or improper methods of marking, barricading, and lighting of temporarily closed portions of AOAs create aviation hazards.

k. Wildlife attractants—such as trash (food scraps not collected from construction personnel activity), grass seeds, or ponded water—on or near airports.

l. Obliterated or faded markings on active operational areas.

m. Misleading or malfunctioning obstruction lights. Unlighted or unmarked obstructions in the approach to any open runway pose aviation hazards.

n. Failure to issue, update, or cancel NOTAMs about airport or runway closures or other construction-related airport conditions.

o. Failure to mark and identify utilities or power cables. Damage to utilities and power cables during construction activity can result in the loss of runway/taxiway lighting; loss of navigational, visual, or approach aids; disruption of weather reporting services; and/or loss of communications.

p. Restrictions on ARFF access from fire stations to the runway-taxiway system or airport buildings.

q. Lack of radio communications with construction vehicles in airport movement areas.

r. Objects, regardless of whether they are marked or flagged, or activities anywhere on or near an airport

that could be distracting, confusing, or alarming to pilots during aircraft operations.

s. Water, snow, dirt, debris, or other contaminants that temporarily obscure or derogate the visibility of runway/taxiway marking, lighting, and pavement edges. Any condition or factor that obscures or diminishes the visibility of areas under construction.

t. Spillage from vehicles (gasoline, diesel fuel, oil, etc.) on active pavement areas, such as runways, taxiways, ramps, and airport roadways.

u. Failure to maintain drainage system integrity during construction (e.g., no temporary drainage provided when working on a drainage system).

v. Failure to provide for proper electrical lockout and tagging procedures. At larger airports with multiple maintenance shifts/workers, construction contractors should make provisions for coordinating work on circuits.

w. Failure to control dust. Consider limiting the amount of area from which the contractor is allowed to strip turf.

x. Exposed wiring that creates an electrocution or fire ignition hazard. Identify and secure wiring, and place it in conduit or bury it.

y. Site burning, which can cause possible obscuration.

z. Construction work taking place outside of designated work areas and out of phase.

APPENDIX 1. RELATED READING MATERIAL

1. Obtain the latest version of the following free publications from the FAA on its Web site at **http://www.faa.gov/arp/.** In addition, these ACs are available by contaeting the U.S. Department of Transportation, Subsequent Distribution Office, SVC-121.23, Ardmore East Business Center, 3341 Q 75th Avenue, Landover, MD 20785.

a. AC 150/5200-28, *Notices to Airmen (NOTAM) for Airport Operators.* Provides guidance for the use of the NOTAM System in airport reporting.

b. AC 150/5200-30, *Airport Winter Safety and Operations.* Provides guidance to airport owners/operators on the development of an acceptable airport snow and ice control program and on appropriate field condition reporting procedures.

c. AC 150/5200-33, *Hazardous Wildlife Attractants On or Near Airports.* Provides guidance on locating certain land uses having the potential to attract hazardous wildlife to public-use airports.

d. AC 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport.* Provides guidance, specifications, and standards for painting, marking, and lighting vehicles operating in the airport air operations areas.

e. AC 150/5220-4, *Water Supply Systems for Aircraft Fire and Rescue Protection.* Provides guidance for the selection of a water source and standards for the design of a distribution system to support aircraft rescue and fire fighting service operations on airports.

f. AC 150/5340-1, *Standards for Airport Markings.* Contains FAA standards for markings used on airport runways, taxiways, and aprons.

g. AC 150/5340-14B, *Economy Approach Lighting Aids.* Describes standards for the design, selection, siting, and maintenance of economy approach lighting aids.

h. AC 150/5340-18, *Standards for Airport Sign Systems.* Contains FAA standards for the siting and installation of signs on airport runways and taxiways.

i. AC 150/5345-28, *Precision Approach Path Indicator (PAPI) Systems.* Contains the FAA standards for PAPI systems, which provide pilots with visual glide slope guidance during approach for landing.

j. AC 150/5380-5, *Debris Hazards at Civil Airports.* Discusses problems at airports, gives information on foreign objects, and explains how to eliminate such objects from operational areas.

k. AC 70/7460-2, *Proposed Construction or Alteration of Objects that May Affect the Navigable Airspace.* Provides information to persons proposing to erect or alter an object that may affect navigable airspace and explains the need to notify the FAA before construction begins and the FAA's response to those notices, as required by 14 CFR part 77.

2. Obtain copies of the following publications from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Send a check or money order made payable to the Superintendent of Documents in the amount stated with your request. The Government Printing Office does not accept C.O.D. orders. In addition, the FAA makes these ACs available at no charge on the Web site at **http://www.faa.gov/arp/.**

a. AC 150/5300-13, *Airport Design.* Contains FAA standards and recommendations for airport design, establishes approach visibility minimums as an airport design parameter, and contains the object-free area and the obstacle free-zone criteria. ($26. Supt. Docs.) SN050-007-01208-0.

b. AC 150/5370-10, *Standards for Specifying Construction of Airports.* Provides standards for construction of airports. Items covered include earthwork, drainage, paving, turfing, lighting, and incidental construction. ($18. Supt. Docs.) SN050-007-0821-0.

APPENDIX 2. DEFINITIONS OF TERMS USED IN THE AC

1. **AIR OPERATIONS AREA (AOA).** Any area of the airport used or intended to be used for the landing, takeoff, or surface maneuvering of aircraft. An air operations area includes such paved or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runways, taxiways, or aprons.

2. **CONSTRUCTION.** The presence and movement of construction-related personnel, equipment, and materials in any location that could infringe upon the movement of aircraft.

3. **CERTIFICATED AIRPORT.** An airport that has been issued an Airport Operating Certificate by the FAA under the authority of 14 CFR part 139, Certification and Operation: Land Airports Serving Certain Air Carriers, or its subsequent revisions.

4. **FAA FORM 7460-1, NOTICE OF PROPOSED CONSTRUCTION OR ALTERATION.** The form submitted to the FAA Regional Air Traffic or Airports Division Office as formal written notification of any kind of construction or alteration of objects that affect navigable airspace, as defined in 14 CFR part 77, Objects Affecting Navigable Airspace (see AC 70/7460-2, *Proposed Construction or Alteration of Objects that May Affect the Navigable Airspace*, found at **http://www.faa.gov/arp/**).

5. **FAA FORM 7480-1, NOTICE OF LANDING AREA PROPOSAL.** Form submitted to the FAA Airports Regional Division Office or Airports District Office as formal written notification whenever a project without an airport layout plan on file with the FAA involves the construction of a new airport; the construction, realigning, altering, activating, or abandoning of a runway, landing strip, or associated taxiway; or the deactivation or abandoning of an entire airport (found at **http://www.faa.gov/arp/**).

6. **MOVEMENT AREA.** The runways, taxiways, and other areas of an airport that are used for taxiing or hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and aircraft parking areas (reference 14 CFR part 139).

7. **OBSTRUCTION.** Any object/obstacle exceeding the obstruction standards specified by 14 CFR part 77, subpart C.

8. **OBJECT-FREE AREA (OFA).** An area on the ground centered on the runway, taxiway, or taxilane centerline provided to enhance safety of aircraft operations by having the area free of objects except for those objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes (see AC 150/5300-13, *Airport Design*, for additional guidance on OFA standards and wingtip clearance criteria).

9. **OBSTACLE-FREE ZONE (OFZ).** The airspace below 150 feet (45m) above the established airport elevation and along the runway and extended runway centerline that is required to be clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function, in order to provide clearance protection for aircraft landing or taking off from the runway and for missed approaches (refer to AC 150/5300-13 for guidance on OFZs).

10. **RUNWAY SAFETY AREA (RSA).** A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway, in accordance with AC 150/5300-13.

11. **TAXIWAY SAFETY AREA.** A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway, in accordance with AC 150/5300-13.

12. **THRESHOLD.** The beginning of that portion of the runway available for landing. In some instances, the landing threshold may be displaced.

13. **DISPLACED THRESHOLD.** The portion of pavement behind a displaced threshold that may be available for takeoffs in either direction or landing from the opposite direction.

14. **VISUAL GLIDE SLOPE INDICATOR (VGSI).** This device provides a visual glide slope indicator to landing pilots. These systems include precision approach path indicators (PAPIs), visual approach slope indicators (VASIs), and pulse light approach slope indicators (PLASIs).

APPENDIX 3. AIRPORT CONSTRUCTION SAFETY PLANNING GUIDE

Aviation Safety Requirements During Construction

PURPOSE. *This appendix provides airport operators with boilerplate format and language for developing a safety plan for an airport construction project. Adapt this appendix, as applicable, to specific conditions found on the airport for which the plan is being developed. Consider including a copy of this safety plan in the construction drawings for easy access by contractor personnel. Plans should contain the following:*

1. GENERAL SAFETY REQUIREMENTS.

Throughout the construction project, the following safety and operational practices should be observed:

- Operational safety should be a standing agenda item during progress meetings throughout the construction project.
- The contractor and airport operator must perform onsite inspections throughout the project, with immediate remedy of any deficiencies, whether caused by negligence, oversight, or project scope change.
- Airport runways and taxiways should remain in use by aircraft to the maximum extent possible.
- Aircraft use of areas near the contractor's work should be controlled to minimize disturbance to the contractor's operation.
- Contractor, subcontractor, and supplier employees or any unauthorized persons must be restricted from entering an airport area that would be hazardous.
- Construction that is within the safety area of an active runway, taxiway, or apron that is performed under normal operational conditions must be performed when the runway, taxiway, or apron is closed or use-restricted and initiated only with prior permission from the airport operator.
- The contracting offieer, airport operator, or other designated airport representative may order the contractor to suspend operations; move personnel, equipment, and materials to a safe location; and stand by until aircraft use is completed.

2. CONSTRUCTION MAINTENANCE AND FACILITIES MAINTENANCE.

Before beginning any construction activity, the contractor must, through the airport operator, give notice [using the Notice to Airmen (NOTAM) System] of proposed location, time, and date of commencement of construction. Upon completion of work and return of all such areas to standard conditions, the contractor must, through the airport operator, verify the cancellation of all notices issued via the NOTAM System. Throughout the duration of the construction project, the contractor must—

a. Be aware of and understand the safety problems and hazards described in AC 150/5370-2, *Operational Safety on Airports During Construction.*

b. Conduct activities so as not to violate any safety standards contained in AC 150/5370-2 or any of the references therein.

c. Inspect all construction and storage areas as often as necessary to be aware of conditions.

d. Promptly take all actions necessary to prevent or remedy any unsafe or potentially unsafe conditions as soon as they are discovered.

3. APPROACH CLEARANCE TO RUNWAYS.

Runway thresholds must provide an unobstructed approach surface over equipment and materials. (Refer to Appendix 2 in AC 150/5300-13, *Airport Design,* for guidance in this area.)

4. RUNWAY AND TAXIWAY SAFETY AREA (RSA AND TSA).

Limit construction to outside of the approved RSA, as shown on the approved airport layout plan—unless the runway is closed or restricted to aircraft operations, requiring a lesser standard RSA that is equal to the RSA available during construction (see AC 150/5370-2 for exceptions). Construction activity within the TSA is permissible when the taxiway is open to aircraft traffic if adequate wingtip clearance exists between the aircraft and equipment/material; evacuations, trenches, or other conditions are conspicuously marked and lighted; and local NOTAMs are in effect for the activity (see AC 150/5300-13 for wingtip clearance requirements). The NOTAM should state that, "personnel and equipment are working adjacent to Taxiway____."

a. Procedures for protecting runway edges.

- Limit construction to no closer than 200 feet (60m) from the runway centerline—unless the runway is closed or restricted to aircraft operations, requiring a lesser standard RSA

that is equal to the RSA available during construction.

- Prevent personnel, material, and/or equipment, as defined in AC 150/5300-13, Paragraph 306, "Obstacle Free Zone (OFZ)," from penetrating the OFZ.
- Coordinate construction activity with the Airport Traffic Control Tower (ATCT) and FAA Regional Airports Division Office or Airports District Office, and through the airport operator, issue an appropriate NOTAM.

Complete the following chart to determine the area that must be protected along the runway edges:

Runway	Aircraft Approach Category* A, B, C, or D	Airplane Design Group* I, II, III, or IV	RSA Width in Feet Divided by 2*
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

*See AC 150/5300-13, *Airport Design,* to complete the chart for a specific runway.

b. Procedures for protecting runway ends.

- Maintain the RSA from the runway threshold to a point at least the distance from the runway threshold as existed before construction activity—unless the runway is closed or restricted to aircraft operations, requiring an RSA that is equal to the RSA length available during construction in accordance with AC 150/5300-13. This may involve the use of declared distances and partial runway closures (see AC 150/5370-2 for exceptions).
- Ensure all personnel, materials, and/or equipment are clear of the applicable threshold siting criteria surface, as defined in Appendix 2, "Threshold Siting Requirements," of AC 150/5300-13.
- Prevent personnel, material, and/or equipment, as defined in AC 150/5300-13, from penetrating the obstacle-free zone.
- Ensure adequate distance for blast protection is provided, as needed.
- Coordinate construction activity with the ATCT and FAA Regional Airports Division Office or Airports District Office, and through the airport operator, issue an appropriate NOTAM.
- Provide a drawing showing the profile of the appropriate surfaces of each runway end where construction will take place. Where operations by turbojet aircraft are anticipated, review takeoff procedures and jet blast characteristics of aircraft and incorporate safety measures for construction workers in the contract documents.

Complete the following chart to determine the area that must be protected before the runway threshold:

Runway End Number	Airplane Design Group* I, II, III, or IV	Aircraft Approach Category* A, B, C, or D	Minimum Safety Area Prior to the Threshold*	Minimum Unobstructed Approach Slope
_____	_____	_____	_____: FEET	____: 1 to (threshold)
_____	_____	_____	_____: FEET	____: 1 to (threshold)
_____	_____	_____	_____: FEET	____: 1 to (threshold)
_____	_____	_____	_____: FEET	____: 1 to (threshold)

*See AC 150/5300-13, *Airport Design,* to complete the chart for a specific runway.

5. MARKING AND LIGHTING FOR TEMPORARY THRESHOLDS.

Marking and lighting for a temporary threshold is____/is not____ required. The airport owner or contractor, as specified in the contract, will furnish and maintain markings for temporary thresholds. Precision approach path indicators (PAPIs) or runway end identification lights (REIL) are____/are not____ required. The airport owner or contractor, as specified in the contract, will furnish and install all temporary lighting. Include appropriate items per AC 150/5370-2, Chapter 3, "Safety Standards and Guidelines." *If marking and lighting for the temporary threshold is not required, delete this section of the safety plan. If visual aids and/or markings are necessary, provide details. (Include applicable 14 CFR part 77 surfaces in the contract documents.)*

6. CLOSED RUNWAY MARKINGS AND LIGHTING.

The following must be specified for closed runways. Closed runway marking are ____/are not____ required. Closed runway markings will be as shown on the plans____/as furnished by the airport owner____/other____ (specify). Barricades, flagging, and flashers are____/are not____required at Taxiway____ and Runway____and will be supplied by the airport ____/other____(specify).

7. HAZARDOUS AREA MARKING AND LIGHTING.

Hazardous areas on the movement area will be marked with barricades, traffic cones, flags, or flashers (specify). These markings restrict access and make hazards obvious to aircraft, personnel, and vehicles. During periods of low visibility and at night, identify hazardous areas with red flashing or steady-burning lights (specify). The hazardous area marking and lighting will be supplied by the airport operator/contractor, as specified in the contract, and will be depicted on the plans.

8. TEMPORARY LIGHTING AND MARKING.

Airport markings, lighting, and/or signs will be altered in the following manner (specify) during the period from _____ to _____. The alterations are depicted on the plans.

9. VEHICLE OPERATION MARKING AND CONTROL.

Include the following provisions in the construction contract, and address them in the safety plans:

a. When any vehicle, other than one that has prior approval from the airport operator, must travel over any portion of an aircraft movement area, it will be escorted and properly identified. To operate in those areas during daylight hours, the vehicle must have a flag or beacon attached to it. Any vehicle operating on the movement areas during hours of darkness or reduced visibility must be equipped with a flashing dome-type light, the color of which is in accordance with local or state codes.

b. It may be desirable to clearly identify the vehicles for control purposes by either assigned initials or numbers that are prominently displayed on each side of the vehicle. The identification symbols should be at minimum 8-inch (20-cm) block-type characters of a contrasting color and easy to read. They may be applied either by using tape or a water-soluble paint to facilitate removal. Magnetic signs are also acceptable. In addition, vehicles must display identification media, as specified in the approved security plan. *(This section should be revised to conform to the airport operator's requirements.)*

c. Employee parking shall be _____ (specify location), as designated by the airport manager_____/ project engineer_____/other_____ (specify).

d. Access to the job site shall be via_____ (specify route), as shown on the plans_____/designated by the engineer_____/designated by the superintendent_____/designated by the airport manager_____/other_____ (specify).

e. At 14 CFR part 139 certificated and towered airports, all vehicle operators having access to the movement area must be familiar with airport procedures for the operation of ground vehicles and the consequences of noncompliance.

f. If the airport is certificated and/or has a security plan, the airport operator should check for guidance on the additional identification and control of construction equipment.

10. NAVIGATIONAL AIDS.

The contractor must not conduct any construction activity within navigational aid restricted areas without prior approval from the local FAA Airway Facilities sector representative. Navigational aids include instrument landing system components and very high-frequency omnidirectional range, airport surveillance radar. Such restricted areas are depicted on construction plans.

11. LIMITATIONS ON CONSTRUCTION.

Additional limitations on construction include—

a. Prohibiting open-flame welding or torch cutting operations unless adequate fire safety precautions are provided and these operations have been authorized by the airport operator *(as tailored to conform to local requirements and restrictions).*

b. Prominently marking open trenches, excavations, and stockpiled materials at the construction and lighting these obstacles during hours of restricted visibility and darkness.

c. Marking and lighting closed, deceptive, and hazardous areas on airports, as appropriate.

d. Constraining stockpiled material to prevent its movement as a result of the maximum anticipated aircraft blast and forecast wind conditions.

12. RADIO COMMUNICATIONS.

Vehicular traffic located in or crossing an active movement area must have a working two-way radio in contact with the control tower or be escorted by a person in radio contact with the tower. The driver, through personal observation, should confirm that no aircraft is approaching the vehicle position. Construction personnel may operate in a movement area without two-way radio communication provided a NOTAM is issued closing the area and the area is properly marked to prevent incursions. Two-way radio communications are ____/are not____required between contractors and the Airport Traffic Control Tower_____/FAA Flight Service Station_____/Airport Aeronautical Advisory Stations (UNICOM/CTAF)_____. Radio contact is _____/is not_____ required between the hours of ____and _____. Continuous monitoring is required _____/or is required only when equipment movement is necessary in certain areas_____. *(This section may be tailored to suit the specific vehicle and safety requirements of the airport sponsor.)*

13. DEBRIS.

Waste and loose material must not be placed in active movement areas. Materials tracked onto these areas must be removed continuously during the work project.

APPENDIX 4. SAMPLE NOTAM

_____ AIRPORT

FAA NOTAM # _____ **DATE:** _____

AIRPORT I.D. # _____ **TIME:** _____

NOTAM TEXT:

NOTIFICATON:

TOWER _____ _____ _____ _____

PHONE # INITIALS TIME CALLED IN BY

FSS _____ _____ _____ _____

PHONE # INITIALS TIME CALLED IN BY

AIRLINES

_____ _____

_____ _____

_____ _____

CANCELLED:

NOTIFICATON:

TOWER _____ _____ _____ _____

PHONE # INITIALS TIME CALLED IN BY

FSS _____ _____ _____ _____

PHONE # INITIALS TIME CALLED IN BY

AIRLINES

_____ _____

_____ _____

_____ _____

U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION

Date: 1/17/03
Initiated by: AAS-300

AC No: 150/5370-2E
Change:

1. THE PURPOSE OF THIS ADVISORY CIRCULAR (AC).

Aviation safety is the primary consideration at airports, especially during construction. This AC sets forth guidelines for operational safety on airports during construction. It contains major changes to the following areas: "Runway Safety Area," paragraph 3-2; "Taxiway Safety Areas/Object-Free Areas," paragraph 3-3; "Overview," paragraph 3-4; "Marking Guidelines for Temporary Threshold," paragraph 3-5; and "Hazard Marking and Lighting," paragraph 3-9.

2. WHAT THIS AC CANCELS.

This AC cancels AC 150/5370-2D, *Operational Safety on Airports During Construction,* dated May 31, 2002.

3. READING MATERIAL RELATED TO THIS AC.

Appendix 1 contains a list of reading materials on airport construction, design, and potential safety hazards during construction, as well as instructions for ordering these documents. Many of them, including this AC, are available on the Federal Aviation Administration (FAA) Web site.

4. WHO THIS AC AFFECTS.

This AC assists airport operators in complying with 14 Code of Federal Regulations (CFR), part 139, Certification and Operation: Land Airports Serving Certain Air Carriers, and with the requirements of airport construction projects receiving funds under the Airport Improvement Program or from the Passenger Facility Charge Program. While the FAA does not require noncertificated airports without grant agreements to adhere to these guidelines, we recommend that they do so as it will help these airports maintain a desirable level of operational safety during construction.

5. ADDITIONAL BACKGROUND INFORMATION.

Appendix 2 contains definitions of terms used in this AC. Appendix 3 provides airport operators with boilerplate format and language for developing a safety plan for an airport construction project. Appendix 4 is a sample Notice to Airmen form.

6. HAZARD LIGHTING IMPLEMENTATION TIME LINE.

Supplemental hazard lighting must be red in color by October 1, 2004. See paragraph 3-9 for more information.

DAVID L. BENNETT
Director, Office of Airport Safety and Standards

CONTENTS

Appendices

CHAPTER 1. GENERAL SAFETY REQUIREMENTS AND RESPONSIBILITIES

1-1. OVERVIEW.

Hazardous practices and marginal conditions created by construction activities can decrease or jeopardize operational safety on airports. To minimize disruption of normal aircraft operations and to avoid situations that compromise the airport's operational safety, the airport operator must carefully plan, schedule, and coordinate construction activities. While the guidance in this AC is primarily used for construction operations, some of the methods and procedures described may also enhance day-to-day maintenance operations.

1-2. WHO IS RESPONSIBLE FOR SAFETY DURING CONSTRUCTION.

An airport operator has overall responsibility for construction activities on an airport. This includes the predesign, design, preconstruction, construction, and inspection phases. Additional information on these responsibilities can be found throughout this AC.

a. Airport operator's responsibilities—

(1) Develop internally or approve a construction safety plan developed by an outside consultant/contractor that complies with the safety guidelines in Chapter 2, "Safety Plans," and Appendix 3, "Airport Construction Safety Planning Guide," of this AC.

(2) Require contractors to submit plans indicating how they intend to comply with the safety requirements of the project.

(3) Convene a meeting with the construction contractor, consultant, airport employees, and, if appropriate, tenant sponsor to review and discuss project safety before beginning construction activity.

(4) Ensure contact information is accurate for each representative/point of contact identified in the safety plan.

(5) Hold weekly or, if necessary, daily safety meetings to coordinate activities.

(6) Notify users, especially aircraft rescue and fire fighting (ARFF) personnel, of construction activity and conditions that may adversely affect the operational safety of the airport via Notices to Airmen (NOTAMs) or other methods, as appropriate. Convene a meeting for review and discussion if necessary.

(7) Ensure that construction personnel know of any applicable airport procedures and of changes to those procedures that may affect their work.

(8) Ensure that construction contractors and subcontractors undergo training required by the safety plan.

(9) Develop and/or coordinate a construction vehicle plan with airport tenants, the airport traffic control tower (ATCT), and construction contractors. Include the vehicle plan in the safety plan. See Chapter 2, section 2, of this AC for additional information.

(10) Ensure tenants and contractors comply with standards and procedures for vehicle lighting, marking, access, operation, and communication.

(11) At certificated airports, ensure that each tenant's construction safety plan is consistent with 14 CFR part 139, Certification and Operations: Land Airports Serving Certain Air Carriers.

(12) Conduct frequent inspections to ensure construction contractors and tenants comply with the safety plan and that altered construction activities do not create potential safety hazards.

(13) Resolve safety deficiencies immediately.

(14) Ensure construction access complies with the security requirements of 49 CFR part 1542, Airport Security.

(15) Notify appropriate parties when conditions exist that invoke provisions of the safety plan (e.g., implementation of low-visibility operations).

b. Construction contractor's responsibilities—

(1) Submit plans to the airport operator on how to comply with the safety requirements of the project.

(2) Have available a copy of the project safety plan.

(3) Comply with the safety plan associated with the construction project and ensure that construction personnel are familiar with safety procedures and regulations on the airport.

(4) Provide a point of contact who will coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport.

(5) Provide a safety officer/construction inspector familiar with airport safety to monitor construction activities.

(6) Restrict movement of construction vehicles to construction areas by flagging and barricading, erecting temporary fencing, or providing escorts, as appropriate.

(7) Ensure that no construction employees, employees of subcontractors or suppliers, or other persons enter any part of the air operations areas (AOAs) from the construction site unless authorized.

c. Tenant's responsibilities if planning construction activities on leased property—

(1) Develop a safety plan, and submit it to the airport operator for approval prior to issuance of a Notice to Proceed.

(2) Provide a point of contact who will coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport.

(3) Ensure that no tenant or construction employees, employees of subcontractors or suppliers, or any other persons enter any part of the AOA from the construction site unless authorized.

(4) Restrict movement of construction vehicles to construction areas by flagging and barricading or erecting temporary fencing.

CHAPTER 2. SAFETY PLANS

Section 1. Basic Safety Plan Considerations

2-1. OVERVIEW.

Airport operators should coordinate safety issues with the air carriers, FAA Airway Facilities, and other airport tenants before the design phase of the project. The airport operator should identify project safety concerns, requirements, and impacts before making arrangements with contractors and other personnel to perform work on an airport. These safety concerns will serve as the foundation for the construction safety plan and help maintain a high level of aviation safety during the project.

The airport operator should determine the level of complexity of the safety plan that is necessary for each construction project and its phases. The safety plan may be detailed in the specifications included in the invitation for bids, or the invitation for bid may specify that the contractor develop the safety plan and the airport operator approve it. In the latter case, the invitation for bid should contain sufficient information to allow the contractor to develop and determine the costs associated with the safety plan. In either case, safety plan costs should be incorporated into the total cost of the project. The airport operator has final approval authority and responsibility for all safety plans.

Coordination will vary from formal predesign conferences to informal contacts throughout the duration of the construction project.

Details of a specified safety plan, or requirements for a contractor-developed safety plan, should be discussed at the predesign and preconstruction conferences and should include the following, as appropriate:

a. Actions necessary before starting construction, including defining and assigning responsibilities.

b. Basic responsibilities and procedures for disseminating instructions about airport procedures to the contractor's personnel.

c. Means of separating construction areas from aeronautical-use areas.

d. Navigational aid (NAVAID) requirements and weather.

e. Marking and lighting plan illustrations.

f. Methods of coordinating significant changes in airport operations with all the appropriate parties.

2-2. SAFETY PLAN CHECKLIST.

To the extent applicable, the safety plan should address the following:

a. Scope of work to be performed, including proposed duration of work.

b. Runway and taxiway marking and lighting.

c. Procedures for protecting all runway and taxiway safety areas, obstacle-free zones (OFZs), object-free areas (OFAs), and threshold citing criteria outlined in AC 150/5300-13, *Airport Design*, and as described in this AC. This includes limitations on equipment height and stockpiled material.

d. Areas and operations affected by the construction activity, including possible safety problems.

e. NAVAIDs that could be affected, especially critical area boundaries.

f. Methods of separating vehicle and pedestrian construction traffic from the airport movement areas. This may include fencing off construction areas to keep equipment operators in restricted areas in which they are authorized to operate. Fencing, or some other form of restrictive barrier, is an operational necessity in some cases.

g. Procedures and equipment, such as barricades (identify type), to delineate closed construction areas from the airport operational areas, as necessary.

h. Limitations on construction.

i. Required compliance of contractor personnel with all airport safety and security measures.

j. Location of stockpiled construction materials, construction site parking, and access and haul roads.

k. Radio communications.

l. Vehicle identification.

m. Trenches and excavations and cover requirements.

n. Procedures for notifying ARFF personnel if water lines or fire hydrants must be deactivated or if emergency access routes must be rerouted or blocked.

o. Emergency notification procedures for medical and police response.

p. Use of temporary visual aids.

q. Wildlife management.

r. Foreign object debris (FOD) control provisions.

s. Hazardous materials (HAZMAT) management.

t. NOTAM issuance.

u. Inspection requirements.

v. Procedures for locating and protecting existing underground utilities, cables, wires, pipelines, and other underground facilities in excavation areas.

w. Procedures for contacting responsible representatives/points of contact for all involved parties. This should include off-duty contact information so an immediate response may be coordinated to correct any construction-related activity that could adversely affect the operational safety of the airport. Particular care should be taken to ensure that appropriate Airways Facilities personnel are identified in the event that an unanticipated utility outage or cable cut occurs that impacts FAA NAVAIDs.

x. Vehicle operator training.

y. Penalty provisions for noncompliance with airport rules and regulations and the safety plan (e.g., if a vehicle is involved in a runway incursion).

z. Any special conditions that affect the operation of the airport and will require a portion of the safety plan to be activated (e.g., low-visibility operations, snow removal).

Section 2. Safety and Security Measures

2-3. OVERVIEW.

Airport operators are responsible for closely monitoring tenant and construction contractor activity during the construction project to ensure continual compliance with all safety and security requirements. Airports subject to 49 CFR part 1542, Airport Security, must meet standards for access control, movement of ground vehicles, and identification of construction contractor and tenant personnel. In addition, airport operators should use safety program standards, as described in Chapter 3 of this AC, to develop specific safety measures to which tenants and construction contractors must adhere throughout the duration of construction activities.

General safety provisions are contained in AC 150/5370-10, *Standards for Specifying Construction of Airports*, paragraphs 40-05, "Maintenance of Traffic"; 70-08, "Barricades, Warning Signs, and Hazard Markings"; and 80-04, "Limitation of Operations." At any time during construction, aircraft operations, weather, security, or local airport rules may dictate more stringent safety measures. The airport operator should ensure that both general and specific safety requirements are coordinated with airport tenants and ATCT personnel. The airport operator should also include these parties in the coordination of all bid documents, construction plans, and specifications for on-airport construction projects.

2-4. VEHICLE OPERATION AND MARKING AND PEDESTRIAN CONTROL.

Vehicle and pedestrian access routes for airport construction projects must be controlled to prevent inadvertent or unauthorized entry of persons, vehicles, or animals onto the AOA. This includes aircraft movement and nonmovement areas. The airport operator should develop and coordinate a construction vehicle plan with airport tenants, contractors, and the ATCT. The safety plan or invitation for bid should include specific vehicle and pedestrian requirements.

The vehicle plan should contain the following items:

a. Airport operator's rules and regulations for vehicle marking, lighting, and operation.

b. Requirements for marking and identifying vehicles in accordance with AC 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport.*

c. Description of proper vehicle operations on movement and nonmovement areas under normal, lost communications, and emergency conditions.

d. Penalties for noncompliance with driving rules and regulations.

e. Training requirements for vehicle drivers to ensure compliance with the airport operator's vehicle rules and regulations.

f. Provisions for radio communication training for construction contractor personnel engaged in construction activities around aircraft movement areas. Some drivers,

such as construction drivers under escort, may not require this training.

g. Escort procedures for construction vehicles requiring access to aircraft movement areas. A vehicle in the movement area must have a working aviation-band, two-way radio unless it is under escort. Vehicles can be in closed areas without a radio if the closed area is properly marked and lighted to prevent incursions and a NOTAM regarding the closure is issued.

h. Monitoring procedures to ensure that vehicle drivers are in compliance with the construction vehicle plan.

i. Procedures for, if appropriate, personnel to control access through gates and fencing or across aircraft movement areas.

2-5. CONSTRUCTION EMPLOYEE PARKING AREAS.

Designate in advance vehicle parking areas for contractor employees to prevent any unauthorized entry of persons or vehicles onto the airport movement area. These areas should provide reasonable contractor employee access to the job site.

2-6. CONSTRUCTION VEHICLE EQUIPMENT PARKING.

Construction employees must park and service all construction vehicles in an area designated by the airport operator outside the runway safety areas and OFZs and never on a closed taxiway or runway. Employees should also park construction vehicles outside the OFA when not in use by construction personnel (e.g., overnight, on weekends, or during other periods when construction is not active). Parking areas must not obstruct the clear line of sight by the ATCT to any taxiways or runways under air traffic control nor obstruct any runway visual aids, signs, or navigational aids. The FAA must also study those areas to determine effects on 14 CFR part 77, *Objects Affecting Navigable Airspace*, surfaces (see paragraph 2-13 for further information).

2-7. RADIO COMMUNICATION TRAINING.

The airport operator must ensure that tenant and construction contractor personnel engaged in activities involving unescorted operation on aircraft movement areas observe the proper procedures for communications, including using appropriate radio frequencies at airports with and without ATCTs. Training of contractors on proper communication procedures is essential for maintaining airport operational safety. When operating vehicles on or near open runways or taxiways, construction personnel must understand the critical importance of maintaining radio contact with airport operations, ATCT, or the Common Traffic Advisory Frequency, which may include UNICOM, MULTICOM, or one of the FAA Flight Service Stations (FSS), as directed by airport management.

Vehicular traffic crossing active movement areas must be controlled either by two-way radio with the ATCT, escort, flagman, signal light, or other means appropriate for the particular airport. Vehicle drivers must confirm by personal observation that no aircraft is approaching their position when given clearance to cross a runway. In addition, it is the responsibility of the escort vehicle driver to verify the movement/position of all escorted vehicles at any given time.

Even though radio communication is maintained, escort vehicle drivers must also familiarize themselves with ATCT light gun signals in the event of radio failure (see the FAA safety placard "Ground Vehicle Guide to Airport Signs and Markings"). This safety placard may be ordered through the Runway Safety Program Web site at **http://www.faarsp.org** or obtained from the Regional Airports Division Office.

2-8. FENCING AND GATES.

Airport operators and contractors must take care to maintain a high level of safety and security during construction when access points are created in the security fencing to permit the passage of construction vehicles or personnel. Temporary gates should be equipped so they can be securely closed and locked to prevent access by animals and people (especially minors). Procedures should be in place to ensure that only authorized persons and vehicles have access to the AOA and to prohibit "piggybacking" behind another person or vehicle. The Department of Transportation (DOT) document DOT/FAA/AR-00/52, *Recommended Security Guidelines for Airport Planning and Construction*, provides more specific information on fencing. A copy of this document can be obtained from the Airport Consultants Council, Airports Council International, or American Association of Airport Executives.

Section 3. Notification of Construction Activities

2-9. GENERAL.

In order to maintain the desired levels of operational safety on airports during construction activities, the safety plan should contain the notification actions described below.

2-10. ENSURING PROMPT NOTIFICATIONS.

The airport operator should establish and follow procedures for the immediate notification of airport users and the FAA of any conditions adversely affecting the operational safety of an airport.

2-11. NOTICES TO AIRMEN (NOTAMS).

The airport operator must provide information on closed or hazardous conditions on airport movement areas to the FSS so it can issue a NOTAM. The airport operator must coordinate the issuance, maintenance, and cancellation of NOTAMs about airport conditions resulting from construction activities with tenants and the local air traffic facility (control tower, approach control, or air traffic control center. Refer to AC 150/5200-28, *Notices to Airmen (NOTAMs) for Airport Operators,* and Appendix 4 in this AC for a sample NOTAM form. Only the FAA may issue or cancel NOTAMs on shutdown or irregular operation of FAA-owned facilities. Only the airport operator or an authorized representative may issue or cancel NOTAMs on airport conditions. (The airport owner/operator is the only entity that can close or open a runway.) The airport operator must file and maintain this list of authorized representatives with the FSS. Any person having reason to believe that a NOTAM is missing, incomplete, or inaccurate must notify the airport operator.

2-12. AIRCRAFT RESCUE AND FIRE FIGHTING (ARFF) NOTIFICATION.

The safety plan must provide procedures for notifying ARFF personnel, mutual aid providers, and other emergency services if construction requires shutting off or otherwise disrupting any water line or fire hydrant on the airport or adjoining areas and if contractors work with hazardous material on the airfield. Notification procedures must also be developed for notifying ARFF and all other emergency personnel when the work performed will close or affect any emergency routes. Likewise, the procedures must address appropriate notifications when services are restored.

2-13. NOTIFICATION TO THE FAA.

For certain airport projects, 14 CFR part 77 requires notification to the FAA. In addition to applications made for Federally funded construction, 14 CFR part 157, Notice of Construction, Alteration, Activation, and Deactivation of Airports, requires that the airport operator notify the FAA in writing whenever a non-Federally funded project involves the construction of a new airport; the construction, realigning, altering, activating, or abandoning of a runway, landing strip, or associated taxiway; or the deactivation or abandoning of an entire airport. Notification involves submitting FAA Form 7480-1, Notice of Landing Area Proposal, to the nearest FAA Regional Airports Division Office or Airports District Office.

Also, any person proposing any kind of construction or alteration of objects that affect navigable airspace, as defined in 14 CFR part 77 must notify the FAA. This includes construction equipment and proposed parking areas for this equipment (i.e., cranes, graders, etc.). FAA Form 7460-1, Notice of Proposed Construction or Alteration, can be used for this purpose and submitted to the FAA Regional Airports Division Office or Airports District Office. (See AC 70/7460-2, *Proposed Construction or Alteration of Objects that May Affect the Navigable Airspace.*)

If construction operations require a shutdown of an airport owned NAVAID from service for more than 24 hours or in excess of 4 hours daily on consecutive days, we recommend a 45-day minimum notice prior to facility shutdown. Coordinate work for a FAA owned NAVAID shutdown with the local FAA Airways Facilities Office. In addition, procedures that address unanticipated utility outages and cable cuts that could impact FAA NAVAIDs must be addressed.

2-14. WORK SCHEDULING AND ACCOMPLISHMENT.

Airport operators—or tenants having construction on their leased properties—should use predesign, prebid, and preconstruction conferences to introduce the subject of airport operational safety during construction (see AC 150/5300-9, *Predesign, Prebid, and Preconstruction Conferences for Airport Grant Projects).* The airport operator, tenants, and construction contractors should integrate operational safety requirements into their planning and work schedules as early as practical. Operational safety should be a standing agenda item for discussion during progress meetings throughout the project. The contractor and airport operator should carry out onsite inspections throughout the project and immediately remedy any deficiencies, whether caused by negligence, oversight, or project scope change.

CHAPTER 3. SAFETY STANDARDS AND GUIDELINES

Section 1. Runway and Taxiway Safety Areas, Obstacle-Free Zones, and Object-Free Areas

3-1. OVERVIEW.

Airport operators must use these safety guidelines when preparing plans and specifications for construction activities in areas that may interfere with aircraft operations. The safety plan should recognize and address these standards for each airport construction project. However, the safety plan must reflect the specific needs of a particular project, and for this reason, these safety guidelines should not be incorporated verbatim into project specifications. For additional guidance on meeting safety and security requirements, refer to the planning guide template included in Appendix 3 of this AC.

3-2. RUNWAY SAFETY AREA (RSA)/ OBSTACLE-FREE ZONE (OFZ).

A runway safety area is the defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway (see AC 150/5300-13, *Airport Design*). Construction activities within the standard RSA are subject to the following conditions:

a. Runway edges.

(1) No construction may occur closer than 200 feet (60m) from the runway centerline unless the runway is closed or restricted to aircraft operations, requiring an RSA that is equal to the RSA width available during construction, or 400 feet, whichever is less (see AC 150/5300-13, Tables 3-1 through 3-3).

(2) Personnel, material, and/or equipment must not penetrate the OFZ, as defined in AC 150/5300-13.

(3) The airport operator must coordinate the construction activity in the RSA as permitted above with the ATCT and the FAA Regional Airports Division Office or appropriate Airports District Office and issue a local NOTAM.

b. Runway ends.

(1) An RSA must be maintained of such dimensions that it extends beyond the end of the runway a distance equal to that which existed before construction activity, unless the runway is closed or restricted to aircraft operations for which the reduced RSA is adequate (see AC 150/5300-13). The temporary use of declared distances and/or partial runway closures may help provide the necessary RSA. In addition, all personnel, materials, and/or equipment must remain clear of the applicable threshold siting surfaces, as defined in Appendix 2, "Threshold Siting Requirements," of AC 150/5300-13.[1] Consult with the appropriate FAA Regional Airports Division Office or Airports District Office to determine the appropriate approach surface required.

(2) Personnel, material, and/or equipment must not penetrate the OFZ, as defined in AC 150/5300-13.

(3) The safety plan must provide procedures for ensuring adequate distance for blast protection, if required by operational considerations.

(4) The airport operator must coordinate construction activity in this portion of the RSA with the ATCT and the FAA Regional Airports Division Office or appropriate Airports District Office and issue a local NOTAM.

c. Excavations.

(1) Construction contractors must prominently mark open trenches and excavations at the construction site with red or orange flags, as approved by the airport operator, and light them with red lights during hours of restricted visibility or darkness.

(2) Open trenches or excavations are not permitted within 200 feet (60m) of the runway centerline and at least the existing RSA distance from the runway threshold while the runway is open. If the runway must be opened before excavations are backfilled, cover the excavations appropriately. Coverings for open trenches or excavations must be of sufficient strength to support the weight of the heaviest aircraft operating on the runway.

3-3. TAXIWAY SAFETY AREAS/OBJECT-FREE AREAS.

a. Unrestricted construction activity is permissible adjacent to taxiways when the taxiway is restricted to aircraft such that the available taxiway safety area is equal

[1] If a full safety area cannot be obtained through declared distances and partial closures, or other methods such as alternate runway use, construction activity may operate in the RSA as long as conditions cited in paragraph 3-1b(2) thru (4) are met. In addition, various surfaces outlined in AC 150/5300-13 and Terminal Instrument Procedures (TERPS) must be protected through an aeronautical study.

to at least ½ of the widest wingspan of the aircraft expected to use the taxiway and the available taxiway object-free area is equal to at least .7 times the widest wingspan plus 10 feet. (See AC 150/5300-13 for guidance on taxiway safety and object-free areas.)

Construction activity may be accomplished closer to a taxiway, subject to the following restrictions:

(1) The activity is first coordinated with the airport operator.

(2) Appropriate NOTAMs are issued.

(3) Marking and lighting meeting the provisions of paragraph 3-9 are implemented.

(4) Adequate clearance is maintained between equipment and materials and any part of an aircraft. If such clearance can only be maintained if an aircraft does not have full use of the entire taxiway width (with its main landing gear at the edge of the pavement), then it will be necessary to move personnel and equipment for each passing aircraft. In these situations, flag persons will be used to direct construction equipment, and wing walkers may be necessary to guide aircraft. Wing walkers should be airline/aviation personnel rather than construction workers.

b. Construction contractors must prominently mark open trenches and excavations at the construction site, as approved by the airport operator, and light them with red lights during hours of restricted visibility or darkness

c. Excavations and open trenches may be permitted up to the edge of a structural taxiway and apron pavement provided the dropoff is marked and lighted per paragraph 3-9, "Hazard Marking and Lighting."

Section 2. Temporary Runway Thresholds

3-4. OVERVIEW.

Construction activity in a runway approach area may result in the need to partially close a runway or displace the existing runway threshold. In either case, locate the threshold in accordance with Appendix 2 of AC 150/5300-13, *Airport Design*. Objects that do not penetrate these surfaces may still be obstructions to air navigation and may affect standard instrument approach procedures. Coordinate these objects with the FAA's Regional Airports Office or appropriate Airports District Office, as necessary. Refer to the current edition of AC 150/5300-13 for guidance on threshold siting requirements. The partial runway closure, the displacement of the runway threshold, as well as closures of the complete runway and other portions of the movement area also requires coordination with appropriate ATCT personnel and airport users.

Caution regarding partial runway closures: When filing a NOTAM for a partial runway closure, clearly state to FSS personnel that the portion of pavement located prior to the threshold is not available for landing and departing traffic. In this case, the threshold has been moved for both landing and takeoff purposes (this is different than a displaced threshold).

Example NOTAM: "North 1,000 feet of Runway 18/36 is closed; 7,000 feet remain available on Runway 18 and Runway 36 for arrivals and departures." There may be situations where the portion of closed runway is available for taxiing only. If so, the NOTAM must reflect this condition.

Caution regarding displaced thresholds: Implementation of a displaced threshold affects runway length available for aircraft landing over the displacement. Depending on the reason for the displacement (to provide obstruction clearance or RSA), such a displacement may also require an adjustment in the landing distance available and accelerate-stop distance available in the opposite direction. If project scope includes personnel, equipment, excavation, etc. within the RSA of any usable runway end, we do not recommend a displaced threshold unless arrivals and departures toward the construction activity are prohibited. Instead, implement a partial closure.

3-5. MARKING GUIDELINES FOR TEMPORARY THRESHOLD.

Ensure that markings for temporary displaced thresholds are clearly visible to pilots approaching the airport to land. When construction personnel and equipment are located close to any threshold, a temporary visual NAVAID, such as runway end identifier lights (REIL), may be required (even on unlighted runways) to define the new beginning of the runway clearly. A visual vertical guidance device, such as a visual approach slope indicator (VASI), pulse light approach slope indicator (PLASI), or precision approach path indicator (PAPI), may be necessary to assure landing clearance over personnel, vehicles, equipment, and/or above-grade stockpiled materials. If such devices are installed, ensure an appropriate descriptive NOTAM is issued to inform pilots of these conditions. The current edition of AC 150/5340-1, *Standards for Airport Markings*, describes standard marking colors and layouts. In addition, we recommend that a temporary runway threshold be marked using the following guidelines:

a. Airport markings must be clearly visible to pilots; not misleading, confusing, or deceptive; secured in place to prevent movement by prop wash, jet blast, wing vortices, or other wind currents; and constructed of

materials that would minimize damage to an aircraft in the event of inadvertent contact.

(1) Pavement markings for temporary closed portions of the runway should consist of yellow chevrons to identify pavement areas that are unsuitable for takeoff/landing (see AC 150/5340-1). If unable to paint the markings on the pavement, construct them from any of the following materials: double-layered painted snow fence, colored plastic, painted sheets of plywood, or similar materials. They must be properly configured and secured to prevent movement by prop wash, jet blast, or other wind currents.

(2) It may be necessary to remove or cover runway markings, such as runway designation markings and aiming point markings, depending on the length of construction and type of activity at the airport.

(3) When threshold markings are needed to identify the temporary beginning of the runway that is available for landing, use a white threshold bar of the dimensions specified in AC 150/5340-1.

(4) If temporary outboard elevated or flush threshold bars are used, locate them outside of the runway pavement surface, one on each side of the runway. They should be at least 10 feet (3m) in width and extend outboard from each side of the runway so they are clearly visible to landing and departing aircraft. These threshold bars are white. If the white threshold bars are not discernable on grass or snow, apply a black background with appropriate material over the ground to ensure the markings are clearly visible.

(5) A temporary threshold may also be marked with the use of retroreflective, elevated markers. One side of such markers is green to denote the approach end of the runway; the side that is seen by pilots on rollout is red. See AC 150/5345-39, *FAA Specification L-853, Runway and Taxiway Retroreflective Markers.*

(6) At 14 CFR part 139 certificated airports, temporary elevated threshold markers must be mounted with a frangible fitting (see 14 CFR part 139.309). However, at noncertificated airports, the temporary elevated threshold markings may either be mounted with a frangible fitting or be flexible. See AC 150/5345-39.

b. The application rate of the paint to mark a short-term temporary runway threshold may deviate from the standard (see Item P-620, "Runway and Taxiway Painting," in AC 150/5370-10, *Standards for Specifying Construction of Airports*), but the dimensions must meet the existing standards, unless coordinated with the appropriate offices.

c. When a runway is partially closed, the distance remaining signs for aircraft landing in the opposite direction should be covered or removed during the construction.

3-6. LIGHTING GUIDELINES FOR TEMPORARY THRESHOLD.

A temporary runway threshold must be lighted if the runway is lighted and it is the intended threshold for night landings or instrument meteorological conditions. We recommend that temporary threshold lights and related visual NAVAIDs be installed outboard of the edges of the full-strength pavement with bases at grade level or as low as possible, but not to exceed 3 inches (7.6cm) above ground. When any portion of a base is above grade, place properly compacted fill around the base to minimize the rate of gradient change so aircraft can, in an emergency, cross at normal landing or takeoff speeds without incurring significant damage (see AC 150/5370-10). We recommend that the following be observed when using temporary runway threshold lighting:

a. Maintain threshold and edge lighting color and spacing standards as described in AC 150/5340-24, *Runway and Taxiway Edge Lighting System.* Battery-powered, solar, or portable lights that meet the criteria in AC 150/5345-50, *Specification for Portable Runway Lights*, may be used. These systems are intended primarily for visual flight rules (VFR) aircraft operation but may be used for instrument flight rules (IFR) aircraft operations, upon individual approval from the Flight Standards Division of the applicable FAA Regional Office.

b. When the runway has been partially closed, disconnect edge and threshold lights with associated isolation transformers on that part of the runway at and behind the threshold (i.e., the portion of the runway that is closed). Alternately, cover the light fixture in such a way as to prevent light leakage. Avoid removing the lamp from energized fixtures because an excessive number of isolation transformers with open secondaries may damage the regulators and/or increase the current above its normal value.

c. Secure, identify, and place any temporary exposed wiring in conduit to prevent electrocution and fire ignition sources.

d. Reconfigure yellow lenses (caution zone), as necessary. If the runway has centerline lights, reconfigure the red lenses, as necessary, or place the centerline lights out of service.

e. Relocate the visual glide slope indicator (VGSI), such as VASI and PAPI; other airport lights, such as REIL; and approach lights to identify the temporary threshold. Another option is to disable the VGSI or any equipment that would give misleading indications to pilots as to the new threshold location. Installation of temporary visual aids may be necessary to provide adequate guidance to pilots on approach to the affected runway. If the FAA owns and operates the VGSI,

coordinate its installation or disabling with the local Airway Facilities Systems Management Office.

f. Issue a NOTAM to inform pilots of temporary lighting conditions.

Section 3. Other Construction Marking and Lighting Activities

3-7. OVERVIEW.

Ensure that construction areas, including closed runways, are clearly and visibly separated from movement areas and that hazards, facilities, cables, and power lines are identified prominently for construction contractors. Throughout the duration of the construction project, verify that these areas remain clearly marked and visible at all times and that marking and lighting aids remain in place and operational. Routine inspections must be made of temporary construction lighting, especially battery-powered lighting since weather conditions can limit battery life.

3-8. CLOSED RUNWAY AND TAXIWAY MARKING AND LIGHTING.

Closed runway markings consist of a yellow "X" in compliance with the standards of AC 150/5340-1, *Standards for Airport Markings*. A very effective and preferable visual aid to depict temporary closure is the lighted "X" signal placed on or near the runway designation numbers. This device is much more discernible to approaching aircraft than the other materials described. If the lighted "X" is not available, construct the marking of any of the following materials: double-layered painted snow fence, colored plastic, painted sheets of plywood, or similar materials. They must be properly configured and secured to prevent movement by prop wash, jet blast, or other wind currents. In addition, the airport operator may install barricades, traffic cones, activate stop bars, or other acceptable visual devices at major entrances to the runways to prevent aircraft from entering a closed portion of runway. The placement of even a single reflective barricade with a "do not enter" sign on a taxiway centerline can prevent an aircraft from continuing onto a closed runway. If the taxiway must remain open for aircraft crossings, barricades or markings, as described above or in paragraph 3-9, should be placed on the runway.

a. Permanently closed runways.

For runways and taxiways that have been permanently closed, disconnect the lighting circuits. For runways, obliterate the threshold marking, runway designation marking, and touchdown zone markings, and place "X's" at each end and at 1,000-foot (300-m) intervals. For taxiways, place an "X" at the entrance of the closed taxiway.

b. Temporarily closed runway and taxiways.

For runways that have been temporarily closed, place an "X" at the each end of the runway. With taxiways, place an "X" at the entrance of the closed taxiway.

c. Temporarily closed airport.

When the airport is closed temporarily, mark the runways as closed and turn off the airport beacon.

d. Permanently closed airports

When the airport is closed permanently, mark the runways as permanently closed, disconnect the airport beacon, and place an "X" in the segmented circle or at a central location if no segmented circle exists.

3-9. HAZARD MARKING AND LIGHTING.

Provide prominent, comprehensible warning indicators for any area affected by construction that is normally accessible to aircraft, personnel, or vehicles. Using appropriate hazard marking and lighting may prevent damage, injury, traffic delays, and/or facility closures. Hazard marking and lighting must restrict access and make specific hazards obvious to pilots, vehicle drivers, and other personnel. Barricades, traffic cones (weighted or sturdily attached to the surface), or flashers are acceptable methods used to identify and define the limits of construction and hazardous areas on airports.

Provide temporary hazard marking and lighting to prevent aircraft from taxiing onto a closed runway for takeoff and to identify open manholes, small areas under repair, stockpiled material, and waste areas. Also consider less obvious construction-related hazards and include markings to identify FAA, airport, and National Weather Service facilities cables and power lines; instrument landing system (ILS) critical areas; airport surfaces, such as RSA, OFA, and OFZ; and other sensitive areas to make it easier for contractor personnel to avoid these areas.

The construction specifications must include a provision requiring the contractor to have a person on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades. The contractor must file the contact person's information with the airport.

a. Nonmovement areas.

Indicate construction locations on nonmovement areas in which no part of an aircraft may enter by using barricades that are marked with diagonal, alternating orange and white stripes. Barricades may be supplemented with alternating

orange and white flags at least 20 by 20 inches (50 by 50 cm) square and made and installed so they are always in an extended position, properly oriented, and securely fastened to eliminate jet engine ingestion. Such barricades may be many different shapes and made from various materials, including railroad ties, sawhorses, jersey barriers, or barrels. During reduced visibility or night hours, supplement the barricades with red lights, either flashing or steady-burning, which should meet the luminance requirements of the State Highway Department (yellow lights are not acceptable after October 1, 2004). The intensity of the lights and spacing for barricade flags and lights must adequately and without ambiguity delineate the hazardous area.

b. Movement areas.

Use orange traffic cones; red lights, either flashing or steady-burning, which should meet the luminance requirements of the State Highway Department (yellow lights are not acceptable after October 1, 2004); collapsible barricades marked with diagonal, alternating orange and white stripes; and/or signs to separate all construction/maintenance areas from the movement area. All barricades, temporary markers, and other objects placed and left in safety areas associated with any open runway, taxiway, or taxilane must be as low as possible to the ground; of low mass; easily collapsible upon contact with an aircraft or any of its components; and weighted or sturdily attached to the surface to prevent displacement from prop wash, jet blast, wing vortex, or other surface wind currents. If affixed to the surface, they must be frangible at grade level or as low as possible, but not to exceed 3 inches (7.6cm) above the ground. Do not use nonfrangible hazard markings, such as concrete barriers and/or metal-drum-type barricades, in aircraft movement areas. Do not use railroad ties on runways.

Use highly reflective barriers with flashing or steady-burning red lights to barricade taxiways leading to closed runways. Evaluate all operating factors when determining how to mark temporary closures that can last from 10 to 15 minutes to a much longer period of time. However, we strongly recommend that, even for closures of relatively short duration, major taxiway/runway intersections be identified with barricades spaced no greater than 20 feet (6m) apart. Mark the barricades with a flashing or steady-burning red light. At a minimum, use a single barricade placed on the taxiway centerline.

3-10. CONSTRUCTION NEAR NAVIGATIONAL AIDS (NAVAIDS).

Construction activities, materials/equipment storage, and vehicle parking near electronic NAVAIDs require special consideration since they may interfere with signals essential to air navigation. Evaluate the effect of construction activity and the required distance and direction from the NAVAID for each construction project. Pay particular attention to stockpiling material, as well as to movement and parking of equipment that may interfere with line of sight from the ATCT or with electronic emissions. Interference from construction may require NAVAID shutdown or adjustment of instrument approach minimums for IFR. This condition requires that a NOTAM be filed. Construction activities and materials/equipment storage near a NAVAID may also obstruct access to the equipment and instruments for maintenance. Before commencing construction activity, parking vehicles, or storing construction equipment and materials near a NAVAID, consult with the nearest FAA Airway Facilities Office.

3-11. CONSTRUCTION SITE ACCESS AND HAUL ROADS.

Determine the construction contractor's access to the construction sites and haul roads. Do not permit the construction contractor to use any access or haul roads other than those approved. Construction contractors must submit specific proposed routes associated with construction activities to the airport operator for evaluation and approval as part of the safety plan before beginning construction activities. These proposed routes must also provide specifications to prevent inadvertent entry to movement areas. Pay special attention to ensure that ARFF right of way on access and haul roads is not impeded at any time and that construction traffic on haul roads does not interfere with NAVAIDs or approach surfaces of operational runways.

3-12. CONSTRUCTION MATERIAL STOCKPILING.

Stockpiled materials and equipment storage are not permitted within the RSA and OFZ of an operational runway. The airport operator must ensure that stockpiled materials and equipment adjacent to these areas are prominently marked and lighted during hours of restricted visibility or darkness. This includes determining and verifying that materials are stored at an approved location to prevent foreign object damage and attraction of wildlife.

3-13. OTHER LIMITATIONS ON CONSTRUCTION.

Contractors may not use open-flame welding or torches unless adequate fire safety precautions are provided and the airport operator has approved their use. Under no circumstances should flare pots be used within the AOA at any time. The use of electrical blasting caps must not be permitted on or within 1,000 feet (300m) of the airport property (see AC 150/5370-10, *Standards for Specifying Construction of Airports*).

3-14. FOREIGN OBJECT DEBRIS (FOD) MANAGEMENT.

Waste and loose materials, commonly referred to as FOD, are capable of causing damage to aircraft landing gears, propellers, and jet engines. Construction contractors must not leave or place FOD on or near active aircraft movement areas. Materials tracked onto these areas must be continuously removed during the construction project. We also recommend that airport operators and construction contractors carefully control and continuously remove waste or loose materials that might attract wildlife.

Section 4. Safety Hazards and Impacts

3-15. OVERVIEW.

The situations identified below are potentially hazardous conditions that may occur during airport construction projects. Safety area encroachments, unauthorized and improper ground vehicle operations, and unmarked or uncovered holes and trenches near aircraft operating surfaces pose the most prevalent threats to airport operational safety during airport construction projects. Airport operators and contractors should consider the following when performing inspections of construction activity:

a. Excavation adjacent to runways, taxiways, and aprons.

b. Mounds of earth, construction materials, temporary structures, and other obstacles near any open runway, taxiway, or taxilane; in the related object-free area and aircraft approach or departure areas/zones; or obstructing any sign or marking.

c. Runway resurfacing projects resulting in lips exceeding 3 inches (7.6cm) from pavement edges and ends.

d. Heavy equipment (stationary or mobile) operating or idle near AOAs, in runway approaches and departures areas, or in OFZs.

e. Equipment or material near NAVAIDs that may degrade or impair radiated signals and/or the monitoring of navigational and visual aids. Unauthorized or improper vehicle operations in localizer or glide slope critical areas, resulting in electronic interference and/or facility shutdown.

f. Tall and especially relatively low-visibility units (i.e., equipment with slim profiles)—cranes, drills, and similar objects—located in critical areas, such as OFZs and approach zones.

g. Improperly positioned or malfunctioning lights or unlighted airport hazards, such as holes or excavations, on any apron, open taxiway, or open taxilane or in a related safety, approach, or departure area.

h. Obstacles, loose pavement, trash, and other debris on or near AOAs. Construction debris (gravel, sand, mud, paving materials, etc.) on airport pavements may result in aircraft propeller, turbine engine, or tire damage. Also, loose materials may blow about, potentially causing personal injury or equipment damage.

i. Inappropriate or poorly maintained fencing during construction intended to deter human and animal intrusions into the AOA. Fencing and other markings that are inadequate to separate construction areas from open AOAs create aviation hazards.

j. Improper or inadequate marking or lighting of runways (especially thresholds that have been displaced or runways that have been closed) and taxiways that could cause pilot confusion and provide a potential for a runway incursion. Inadequate or improper methods of marking, barricading, and lighting of temporarily closed portions of AOAs create aviation hazards.

k. Wildlife attractants—such as trash (food scraps not collected from construction personnel activity), grass seeds, or ponded water—on or near airports.

l. Obliterated or faded markings on active operational areas.

m. Misleading or malfunctioning obstruction lights. Unlighted or unmarked obstructions in the approach to any open runway pose aviation hazards.

n. Failure to issue, update, or cancel NOTAMs about airport or runway closures or other construction-related airport conditions.

o. Failure to mark and identify utilities or power cables. Damage to utilities and power cables during construction activity can result in the loss of runway/taxiway lighting; loss of navigational, visual, or approach aids; disruption of weather reporting services; and/or loss of communications.

p. Restrictions on ARFF access from fire stations to the runway-taxiway system or airport buildings.

q. Lack of radio communications with construction vehicles in airport movement areas.

r. Objects, regardless of whether they are marked or flagged, or activities anywhere on or near an airport

that could be distracting, confusing, or alarming to pilots during aircraft operations.

s. Water, snow, dirt, debris, or other contaminants that temporarily obscure or derogate the visibility of runway/taxiway marking, lighting, and pavement edges. Any condition or factor that obscures or diminishes the visibility of areas under construction.

t. Spillage from vehicles (gasoline, diesel fuel, oil, etc.) on active pavement areas, such as runways, taxiways, ramps, and airport roadways.

u. Failure to maintain drainage system integrity during construction (e.g., no temporary drainage provided when working on a drainage system).

v. Failure to provide for proper electrical lockout and tagging procedures. At larger airports with multiple maintenance shifts/workers, construction contractors should make provisions for coordinating work on circuits.

w. Failure to control dust. Consider limiting the amount of area from which the contractor is allowed to strip turf.

x. Exposed wiring that creates an electrocution or fire ignition hazard. Identify and secure wiring, and place it in conduit or bury it.

y. Site burning, which can cause possible obscuration.

z. Construction work taking place outside of designated work areas and out of phase.

APPENDIX 1. RELATED READING MATERIAL

1. Obtain the latest version of the following free publications from the FAA on its Web site at **http://www.faa.gov/arp/.** In addition, these ACs are available by contacting the U.S. Department of Transportation, Subsequent Distribution Office, SVC-121.23, Ardmore East Business Center, 3341 Q 75th Avenue, Landover, MD 20785.

a. AC 150/5200-28, *Notices to Airmen (NOTAM) for Airport Operators.* Provides guidance for the use of the NOTAM System in airport reporting.

b. AC 150/5200-30, *Airport Winter Safety and Operations.* Provides guidance to airport owners/operators on the development of an acceptable airport snow and ice control program and on appropriate field condition reporting procedures.

c. AC 150/5200-33, *Hazardous Wildlife Attractants On or Near Airports.* Provides guidance on locating certain land uses having the potential to attract hazardous wildlife to public-use airports.

d. AC 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport.* Provides guidance, specifications, and standards for painting, marking, and lighting vehicles operating in the airport air operations areas.

e. AC 150/5220-4, *Water Supply Systems for Aircraft Fire and Rescue Protection.* Provides guidance for the selection of a water source and standards for the design of a distribution system to support aircraft rescue and fire fighting service operations on airports.

f. AC 150/5340-1, *Standards for Airport Markings.* Contains FAA standards for markings used on airport runways, taxiways, and aprons.

g. AC 150/5340-14B, *Economy Approach Lighting Aids.* Describes standards for the design, selection, siting, and maintenance of economy approach lighting aids.

h. AC 150/5340-18, *Standards for Airport Sign Systems.* Contains FAA standards for the siting and installation of signs on airport runways and taxiways.

i. AC 150/5345-28, *Precision Approach Path Indicator (PAPI) Systems.* Contains the FAA standards for PAPI systems, which provide pilots with visual glide slope guidance during approach for landing.

j. AC 150/5380-5, *Debris Hazards at Civil Airports.* Discusses problems at airports, gives information on foreign objects, and explains how to eliminate such objects from operational areas.

k. AC 70/7460-2, *Proposed Construction or Alteration of Objects that May Affect the Navigable Airspace.* Provides information to persons proposing to erect or alter an object that may affect navigable airspace and explains the need to notify the FAA before construction begins and the FAA's response to those notices, as required by 14 CFR part 77.

2. Obtain copies of the following publications from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Send a check or money order made payable to the Superintendent of Documents in the amount stated with your request. The Government Printing Office does not accept C.O.D. orders. In addition, the FAA makes these ACs available at no charge on the Web site at **http://www.faa.gov/arp/.**

a. AC 150/5300-13, *Airport Design.* Contains FAA standards and recommendations for airport design, establishes approach visibility minimums as an airport design parameter, and contains the object-free area and the obstacle free-zone criteria. ($26. Supt. Docs.) SN050-007-01208-0.

b. AC 150/5370-10, *Standards for Specifying Construction of Airports.* Provides standards for construction of airports. Items covered include earthwork, drainage, paving, turfing, lighting, and incidental construction. ($18. Supt. Docs.) SN050-007-0821-0.

APPENDIX 2. DEFINITIONS OF TERMS USED IN THE AC

1. **AIR OPERATIONS AREA (AOA).** Any area of the airport used or intended to be used for the landing, takeoff, or surface maneuvering of aircraft. An air operations area includes such paved or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runways, taxiways, or aprons.

2. **CONSTRUCTION.** The presence and movement of construction-related personnel, equipment, and materials in any location that could infringe upon the movement of aircraft.

3. **CERTIFICATED AIRPORT.** An airport that has been issued an Airport Operating Certificate by the FAA under the authority of 14 CFR part 139, Certification and Operation: Land Airports Serving Certain Air Carriers, or its subsequent revisions.

4. **FAA FORM 7460-1, NOTICE OF PROPOSED CONSTRUCTION OR ALTERATION.** The form submitted to the FAA Regional Air Traffic or Airports Division Office as formal written notification of any kind of construction or alteration of objects that affect navigable airspace, as defined in 14 CFR part 77, Objects Affecting Navigable Airspace (see AC 70/7460-2, *Proposed Construction or Alteration of Objects that May Affect the Navigable Airspace*, found at **http://www.faa.gov/arp/**).

5. **FAA FORM 7480-1, NOTICE OF LANDING AREA PROPOSAL.** Form submitted to the FAA Airports Regional Division Office or Airports District Office as formal written notification whenever a project without an airport layout plan on file with the FAA involves the construction of a new airport; the construction, realigning, altering, activating, or abandoning of a runway, landing strip, or associated taxiway; or the deactivation or abandoning of an entire airport (found at **http://www.faa.gov/arp/**).

6. **MOVEMENT AREA.** The runways, taxiways, and other areas of an airport that are used for taxiing or hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and aircraft parking areas (reference 14 CFR part 139).

7. **OBSTRUCTION.** Any object/obstacle exceeding the obstruction standards specified by 14 CFR part 77, subpart C.

8. **OBJECT-FREE AREA (OFA).** An area on the ground centered on the runway, taxiway, or taxilane centerline provided to enhance safety of aircraft operations by having the area free of objects except for those objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes (see AC 150/5300-13, *Airport Design*, for additional guidance on OFA standards and wingtip clearance criteria).

9. **OBSTACLE-FREE ZONE (OFZ).** The airspace below 150 feet (45m) above the established airport elevation and along the runway and extended runway centerline that is required to be clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function, in order to provide clearance protection for aircraft landing or taking off from the runway and for missed approaches (refer to AC 150/5300-13 for guidance on OFZs).

10. **RUNWAY SAFETY AREA (RSA).** A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway, in accordance with AC 150/5300-13.

11. **TAXIWAY SAFETY AREA.** A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway, in accordance with AC 150/5300-13.

12. **THRESHOLD.** The beginning of that portion of the runway available for landing. In some instances, the landing threshold may be displaced.

13. **DISPLACED THRESHOLD.** The portion of pavement behind a displaced threshold that may be available for takeoffs in either direction or landing from the opposite direction.

14. **VISUAL GLIDE SLOPE INDICATOR (VGSI).** This device provides a visual glide slope indicator to landing pilots. These systems include precision approach path indicators (PAPIs), visual approach slope indicators (VASIs), and pulse light approach slope indicators (PLASIs).

APPENDIX 3. AIRPORT CONSTRUCTION SAFETY PLANNING GUIDE

Aviation Safety Requirements During Construction

PURPOSE. *This appendix provides airport operators with boilerplate format and language for developing a safety plan for an airport construction project. Adapt this appendix, as applicable, to specific conditions found on the airport for which the plan is being developed. Consider including a copy of this safety plan in the construction drawings for easy access by contractor personnel. Plans should contain the following:*

1. GENERAL SAFETY REQUIREMENTS.

Throughout the construction project, the following safety and operational practices should be observed:

- Operational safety should be a standing agenda item during progress meetings throughout the construction project.
- The contractor and airport operator must perform onsite inspections throughout the project, with immediate remedy of any deficiencies, whether caused by negligence, oversight, or project scope change.
- Airport runways and taxiways should remain in use by aircraft to the maximum extent possible.
- Aircraft use of areas near the contractor's work should be controlled to minimize disturbance to the contractor's operation.
- Contractor, subcontractor, and supplier employees or any unauthorized persons must be restricted from entering an airport area that would be hazardous.
- Construction that is within the safety area of an active runway, taxiway, or apron that is performed under normal operational conditions must be performed when the runway, taxiway, or apron is closed or use-restricted and initiated only with prior permission from the airport operator.
- The contracting officer, airport operator, or other designated airport representative may order the contractor to suspend operations; move personnel, equipment, and materials to a safe location; and stand by until aircraft use is completed.

2. CONSTRUCTION MAINTENANCE AND FACILITIES MAINTENANCE.

Before beginning any construction activity, the contractor must, through the airport operator, give notice [using the Notice to Airmen (NOTAM) System] of proposed location, time, and date of commencement of construction. Upon completion of work and return of all such areas to standard conditions, the contractor must, through the airport operator, verify the cancellation of all notices issued via the NOTAM System. Throughout the duration of the construction project, the contractor must—

a. Be aware of and understand the safety problems and hazards described in AC 150/5370-2, *Operational Safety on Airports During Construction.*

b. Conduct activities so as not to violate any safety standards contained in AC 150/5370-2 or any of the references therein.

c. Inspect all construction and storage areas as often as necessary to be aware of conditions.

d. Promptly take all actions necessary to prevent or remedy any unsafe or potentially unsafe conditions as soon as they are discovered.

3. APPROACH CLEARANCE TO RUNWAYS.

Runway thresholds must provide an unobstructed approach surface over equipment and materials. (Refer to Appendix 2 in AC 150/5300-13, *Airport Design*, for guidance in this area.)

4. RUNWAY AND TAXIWAY SAFETY AREA (RSA AND TSA).

Limit construction to outside of the approved RSA, as shown on the approved airport layout plan—unless the runway is closed or restricted to aircraft operations, requiring a lesser standard RSA that is equal to the RSA available during construction (see AC 150/5370-2 for exceptions). Construction activity within the TSA is permissible when the taxiway is open to aircraft traffic if adequate wingtip clearance exists between the aircraft and equipment/material; evacuations, trenches, or other conditions are conspicuously marked and lighted; and local NOTAMs are in effect for the activity (see AC 150/5300-13 for wingtip clearance requirements). The NOTAM should state that, "personnel and equipment are working adjacent to Taxiway____."

a. Procedures for protecting runway edges.

- Limit construction to no closer than 200 feet (60m) from the runway centerline—unless the runway is closed or restricted to aircraft operations, requiring a lesser standard RSA

that is equal to the RSA available during construction.

- Prevent personnel, material, and/or equipment, as defined in AC 150/5300-13, Paragraph 306, "Obstacle Free Zone (OFZ)," from penetrating the OFZ.
- Coordinate construction activity with the Airport Traffic Control Tower (ATCT) and FAA Regional Airports Division Office or Airports District Office, and through the airport operator, issue an appropriate NOTAM.

Complete the following chart to determine the area that must be protected along the runway edges:

Runway	Aircraft Approach Category* A, B, C, or D	Airplane Design Group* I, II, III, or IV	RSA Width in Feet Divided by 2*
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

*See AC 150/5300-13, *Airport Design*, to complete the chart for a specific runway.

b. Procedures for protecting runway ends.

- Maintain the RSA from the runway threshold to a point at least the distance from the runway threshold as existed before construction activity—unless the runway is closed or restricted to aircraft operations, requiring an RSA that is equal to the RSA length available during construction in accordance with AC 150/5300-13. This may involve the use of declared distances and partial runway closures (see AC 150/5370-2 for exceptions).
- Ensure all personnel, materials, and/or equipment are clear of the applicable threshold siting criteria surface, as defined in Appendix 2, "Threshold Siting Requirements," of AC 150/5300-13.
- Prevent personnel, material, and/or equipment, as defined in AC 150/5300-13, from penetrating the obstacle-free zone.
- Ensure adequate distance for blast protection is provided, as needed.
- Coordinate construction activity with the ATCT and FAA Regional Airports Division Office or Airports District Office, and through the airport operator, issue an appropriate NOTAM.
- Provide a drawing showing the profile of the appropriate surfaces of each runway end where construction will take place. Where operations by turbojet aircraft are anticipated, review takeoff procedures and jet blast characteristics of aircraft and incorporate safety measures for construction workers in the contract documents.

Complete the following chart to determine the area that must be protected before the runway threshold:

Runway End Number	Airplane Design Group* I, II, III, or IV	Aircraft Approach Category* A, B, C, or D	Minimum Safety Area Prior to the Threshold*	Minimum Unobstructed Approach Slope
_____	_____	_____	_____: FEET	____: 1 to (threshold)
_____	_____	_____	_____: FEET	____: 1 to (threshold)
_____	_____	_____	_____: FEET	____: 1 to (threshold)
_____	_____	_____	_____: FEET	____: 1 to (threshold)

*See AC 150/5300-13, *Airport Design*, to complete the chart for a specific runway.

5. MARKING AND LIGHTING FOR TEMPORARY THRESHOLDS.

Marking and lighting for a temporary threshold is____/is not____ required. The airport owner or contractor, as specified in the contract, will furnish and maintain markings for temporary thresholds. Precision approach path indicators (PAPIs) or runway end identification lights (REIL) are____/are not____ required. The airport owner or contractor, as specified in the contract, will furnish and install all temporary lighting. Include appropriate items per AC 150/5370-2, Chapter 3, "Safety Standards and Guidelines." *If marking and lighting for the temporary threshold is not required, delete this section of the safety plan. If visual aids and/or markings are necessary, provide details. (Include applicable 14 CFR part 77 surfaces in the contract documents.)*

6. CLOSED RUNWAY MARKINGS AND LIGHTING.

The following must be specified for closed runways. Closed runway marking are ____/are not____ required. Closed runway markings will be as shown on the plans____/as furnished by the airport owner____/other____ (specify). Barricades, flagging, and flashers are____/are not____required at Taxiway____ and Runway____and will be supplied by the airport ____/other____(specify).

7. HAZARDOUS AREA MARKING AND LIGHTING.

Hazardous areas on the movement area will be marked with barricades, traffic cones, flags, or flashers (specify). These markings restrict access and make hazards obvious to aircraft, personnel, and vehicles. During periods of low visibility and at night, identify hazardous areas with red flashing or steady-burning lights (specify). The hazardous area marking and lighting will be supplied by the airport operator/contractor, as specified in the contract, and will be depicted on the plans.

8. TEMPORARY LIGHTING AND MARKING.

Airport markings, lighting, and/or signs will be altered in the following manner (specify) during the period from _____ to _____. The alterations are depicted on the plans.

9. VEHICLE OPERATION MARKING AND CONTROL.

Include the following provisions in the construction contract, and address them in the safety plans:

a. When any vehicle, other than one that has prior approval from the airport operator, must travel over any portion of an aircraft movement area, it will be escorted and properly identified. To operate in those areas during daylight hours, the vehicle must have a flag or beacon attached to it. Any vehicle operating on the movement areas during hours of darkness or reduced visibility must be equipped with a flashing dome-type light, the color of which is in accordance with local or state codes.

b. It may be desirable to clearly identify the vehicles for control purposes by either assigned initials or numbers that are prominently displayed on each side of the vehicle. The identification symbols should be at minimum 8-inch (20-cm) block-type characters of a contrasting color and easy to read. They may be applied either by using tape or a water-soluble paint to facilitate removal. Magnetic signs are also acceptable. In addition, vehicles must display identification media, as specified in the approved security plan. *(This section should be revised to conform to the airport operator's requirements.)*

c. Employee parking shall be _____ (specify location), as designated by the airport manager_____/ project engineer_____/other_____ (specify).

d. Access to the job site shall be via_____ (specify route), as shown on the plans_____/designated by the engineer_____/designated by the superintendent_____/designated by the airport manager_____/other_____ (specify).

e. At 14 CFR part 139 certificated and towered airports, all vehicle operators having access to the movement area must be familiar with airport procedures for the operation of ground vehicles and the consequences of noncompliance.

f. If the airport is certificated and/or has a security plan, the airport operator should check for guidance on the additional identification and control of construction equipment.

10. NAVIGATIONAL AIDS.

The contractor must not conduct any construction activity within navigational aid restricted areas without prior approval from the local FAA Airway Facilities sector representative. Navigational aids include instrument landing system components and very high-frequency omnidirectional range, airport surveillance radar. Such restricted areas are depicted on construction plans.

11. LIMITATIONS ON CONSTRUCTION.

Additional limitations on construction include—

a. Prohibiting open-flame welding or torch cutting operations unless adequate fire safety precautions are provided and these operations have been authorized by the airport operator *(as tailored to conform to local requirements and restrictions).*

b. Prominently marking open trenches, excavations, and stockpiled materials at the construction and lighting these obstacles during hours of restricted visibility and darkness.

c. Marking and lighting closed, deceptive, and hazardous areas on airports, as appropriate.

d. Constraining stockpiled material to prevent its movement as a result of the maximum anticipated aircraft blast and forecast wind conditions.

12. RADIO COMMUNICATIONS.

Vehicular traffic located in or crossing an active movement area must have a working two-way radio in contact with the control tower or be escorted by a person in radio contact with the tower. The driver, through personal observation, should confirm that no aircraft is approaching the vehicle position. Construction personnel may operate in a movement area without two-way radio communication provided a NOTAM is issued closing the area and the area is properly marked to prevent incursions. Two-way radio communications are ____/are not____required between contractors and the Airport Traffic Control Tower_____/FAA Flight Service Station_____/Airport Aeronautical Advisory Stations (UNICOM/CTAF)_____. Radio contact is _____/is not_____ required between the hours of ____and _____. Continuous monitoring is required _____/or is required only when equipment movement is necessary in certain areas_____. *(This section may be tailored to suit the specific vehicle and safety requirements of the airport sponsor.)*

13. DEBRIS.

Waste and loose material must not be placed in active movement areas. Materials tracked onto these areas must be removed continuously during the work project.

APPENDIX 4. SAMPLE NOTAM

_____ **AIRPORT**

FAA NOTAM # _____ **DATE:** _____

AIRPORT I.D. # _____ **TIME:** _____

NOTAM TEXT:

NOTIFICATON:

TOWER _____ _____ _____ _____

PHONE # INITIALS TIME CALLED IN BY

FSS _____ _____ _____ _____

PHONE # INITIALS TIME CALLED IN BY

AIRLINES

_____ _____

_____ _____

_____ _____

CANCELLED:

NOTIFICATON:

TOWER _____ _____ _____ _____

PHONE # INITIALS TIME CALLED IN BY

FSS _____ _____ _____ _____

PHONE # INITIALS TIME CALLED IN BY

AIRLINES

_____ _____

_____ _____

_____ _____

U.S. Department of Transportation
Federal Aviation Administration

Advisory Circular

Subject:	Date: 5/1/85	AC No:	AC 150/5300-9A
PREDESIGN, PREBID, AND PRECONSTRUCTION CONFERENCES FOR AIRPORT GRANT PROJECTS	Initiated by: AAS-200	Change:	

1. PURPOSE. This advisory circular (AC) provides guidance for conducting predesign, prebid, and preconstruction conferences for projects funded under the Federal Aviation Administration% (FAA) airport grant program.

2. CANCELLATION. AC 150/5300-9, Predesign and Preconstruction Conferences (ADAP Projects), dated September 10, 1973, is cancelled.

3. BACKGROUND. Predesign, prebid, and preconstruction conferences should be conducted to ensure that the sponsor, the engineer, the contractor and other interested parties are aware of design, safety, and construction requirements and have an understanding of their individual responsibilities, as well as the technical and legal requirements of the contract. The magnitude, type, location of project, and the nature of airport use will determine the need for such conferences.

4. PREDESIGN CONFERENCE.

a. Purpose. A predesign conference, convened and conducted by the sponsor or an authorized agent, should be used to discuss various items relating to design parameters, airport safety, routing of aircraft and equipment, sequencing of construction operations, environmental considerations and civil rights requirements. A predesign conference is essential when a project is of sufficient magnitude to affect airport operations during construction. Possible conflicts between construction activities and the operation of the airport should be resolved at this meeting.

b. Timing. The meeting should be held as soon as sufficient preliminary design work has been completed and always prior to preparation of the final plans and specifications. Sufficient time should be allowed to notify all parties so that schedules can be arranged accordingly. A minimum of 10 working days is recommended.

c. Participants.

(1) The participants will vary according to the effect that the proposed construction will have on the operations of the airport. As applicable, the sponsor should invite the following parties to participate:

(i) Sponsor's design engineer.

(ii) Airport management.

(iii) Air Transport Association regional representatives.

(iv) Air Line Pilots Association representatives.

(v) Fixed base operators.

(vi) Airline representatives.

(vii) FAA airport certification inspector at all airports certified under FAR Part 139.

(viii) Representative of FAA Airports field office.

(2) The FAA Airports field office should assure that all appropriate FAA offices (Air Traffic, Flight Standards, etc.), military installations, and Federal agencies that may have an interest in the project are notified.

d. Agenda Items. The sponsor should prepare an agenda of items to be discussed at the predesign conference. A list of typical items is contained in appendix 1. This list is not all inclusive and items should be added, as necessary.

5. PREBID CONFERENCE.

a. Purpose. A prebid conference should be conducted by the sponsor's engineer for large projects or projects with unique features in an effort to clarify and explain construction methods, procedures, and safety measures required by the contract.

b. Timing. The meeting should be held a minimum of 10 days prior to the bid opening date.

c. Participants. The participants should normally include prospective bidders, subcontractors and material suppliers. Under normal circumstances, FAA participation is not required but is desirable.

d. Agenda Items. Typical agenda items include:

(1) New or unique construction methods.

(2) New construction procedures, i.e., statistical acceptance testing.

(3) Operational safety requirements.

(4) Minority Business Enterprise (MBO) and other civil rights requirements. See AC 150/5100-15, Civil Rights Requirements for the Airport Improvement Program (AIP), current edition.

(5) Labor requirements. See AC 150/5100-6, Labor Requirements for the Airport Improvement Program (AIP), current edition.

Any changes or modifications approved during the conference shall be included in an addendum to the bid documents. A copy shall be furnished to each prospective bidder who purchased or borrowed bid documents, including those who did not attend the conference.

Copies of the proceedings, containing all items discussed and resolved, including responses to questions, shall be made available to each of the participants, upon request.

e. Availability of Advisory Circulars. Copies of AC's applicable to a project should be available for distribution to prospective bidders, including:

(1) AC 150/5345-1--Approved Airport Lighting Equipment.

(2) AC 150/5100-6--Labor Requirements for the Airport Improvement Program (AIP).

(3) AC 150/5100-15--Civil Rights Requirements for the Airport Improvement Program (AIP).

AC 150/5345-1 lists the names and addresses of manufacturers of airport lighting equipment. AC's 150/5100-6 and 5100-15, respectively, contain the basic labor and civil rights requirements that contractors are required to meet.

6. PRECONSTRUCTION CONFERENCE.

a. Purpose. A preconstruction conference, convened and conducted by the sponsor or an authorized agent, should be used to discuss various items including operational safety, testing, quality control, security, safety, labor requirements and environmental factors. This meeting, among all parties affected by the construction, should assist in a better understanding of potential problems and possible solutions.

b. Timing. The preconstruction conference should be conducted as soon as practicable after the contract has been awarded and before issuance of the notice to proceed. Sufficient time should be allowed to notify all parties so that schedules can be arranged accordingly. A minimum of 10 days is recommended.

c. Participants.

(1) The participants will vary according to the effect that the proposed construction will have on the operation of the airport.' As applicable, the sponsor should invite the following parties.

(i) Sponsor's engineer.

(ii) Resident engineer.

(iii) Airport management.

(iv) Testing laboratory.

(v) Contractor and subcontractor(s).

(vi) Contractor% project superintendent.

(vii) Contractors project clerk.

(viii) Airport users including airline representatives, fixed base operators, Air Line Pilots Association representative, Air Transport Association regional representative, and military representative (joint use airport).

(ix) Utility companies affected by the proposed construction.

(x) Federal, state or local agencies affected by the proposed construction.

(xi) Representative of FAA Airports field office.

(2) The FAA Airports field office should assure that all appropriate FAA offices (Air Traffic, Flight Standards, etc.) military installations, and Federal agencies that may have an interest in the project are notified.

d. AGENDA ITEMS. The sponsor or authorized agent should prepare an agenda prior to the preconstruction conference. A list of typical discussion items is contained in appendix 2. This list is not all inclusive and items should be added, as necessary.

A written report or minutes should be furnished to the contractor. The report should consist of a summary of the discussions, with the conference agenda and a list of attendees attached. Copies should be made available to each of the participants, upon request.

Leonard E. Mudd

LEONARD E. MUDD
Director, Office of Airport Standards

APPENDIX 1. AGENDA ITEMS FOR PREDESIGN CONFERENCE

1. DESIGN PHASE.

a. Discussion of scope of work and design parameters peculiar to the project, including items such as design aircraft, local conditions and materials, use of recycled materials, design options, use of FAA standards, and materials furnished by others.

b. Submission of an engineer% report with the plans and specifications. The report should include:

(1) Scope of proposed project.

(2) Design alternatives and reason for selected design.

(3) Pavement design, including summary on FAA Form 5100-1, Pavement Design.

(4) Drainage design computations.

(5) Explain choice of equipment for lighting design.

(6) Explanation of deviation from FAA design standards.

(7) Reasons for modifications to construction standards.

(8) Description of non-Federally funded work to be included in the contract.

(9) Engineer's estimate of contract cost.

(10) Provisions included in the plans and specifications to carry out environmental mitigation actions resulting from the environmental coordination process.

2. CONSTRUCTION PHASE.

a. The sequence of construction phases and any necessary special routing of aircraft considering airline schedules, lead time for clearance of runway, taxiway, or apron by construction equipment, notification of schedule changes, and procedures for emergency handling of aircraft.

b. Location of auto parking lot for use of contractor's employees and access from public road.

c. Marking and lighting of construction areas.

d. Location of contractor's stockpiles, construction office, and plant.

e. Location of on-site haul roads.

f. Designation of on-site waste areas.

g. Control of air, water, and noise pollution and other environmental considerations and requirements.

h. Access from public road to construction area and construction office and the need for security measures.

i. Establishment of minimum distance restrictions for construction vehicles, equipment, workers and materials with relation to runway, taxiways and navigational aids (NAVAIDS) that remain in operational use. See AC 150/5370-2, Operational Safety on Airports During Construction, current edition.

3. OPERATIONAL SAFETY. The provisions of AC 150/5370-2 should be discussed and the appropriate provisions incorporated into the plans and specifications in a section on airport safety.

4. NOTICE TO AIRMEN (NOTAMS). The party responsible for issuing and maintaining the currency of NOTAM's during the construction period and the point of issuance.

5. MARKING AND LIGHTING.

a. Threshold displacement.

b. Temporary or permanent runway or taxiway closing, including marking.

c. Installation and maintenance of marking and lighting for threshold displacement or closing of runway and taxiway.

6. TRAFFIC CONTROL.

a. The requirement of a signal person or vehicular traffic control at point of conflict between aircraft and surface vehicles.

b. The marking and/or lighting of construction equipment and vehicles.

c. The parking of construction equipment and vehicles when not engaged in construction, during nonworking days and at night.

d. Any required communications between construction or inspection forces and the Air Traffic Control Tower (ATCT) or the Flight Service Station (FSS).

7. NAVAIDS.

a. The impact of proposed construction on instrument approach procedures and takeoff or landing minimums. The need for temporary NAVAID's and/or visual aids. See AC 150/5370-2, paragraph 6.

b. The time sequence of contractor events related to the required temporary shutdown of a NAVAID system, assuring minimum facility shutdown time.

cm Identification of buried cables and utilities within the construction area.

8. SECURITY. Requirements to maintain temporary airport security, i.e., security control at gates where contractor personnel and equipment enter the airport.

9. ENVIRONMENTAL. Environmental mitigation actions resulting from the environment coordination process.

10. CIVIL RIGHTS AND LABOR REQUIREMENTS. Civil rights and labor requirements applicable to the project.

APPENDIX 2. AGENDA ITEMS FOR PRECONSTRUCTION CONFERENCE

The conference should be scheduled so that items of general interest to all participants are discussed prior to special interest items.

1. GENERAL INTEREST AND SAFETY ITEMS.

a. The scope of the project and the sequence and timing of all operations.

b. Relationship of the resident engineer to the sponsor With emphasis on the authority of the resident engineer to act in the sponsor's behalf. Advise that the resident engineer has the authority to suspend operations, wholly or in part, when safety violations or nonconformance to the contract specifications are noted.

cm Relationship between the FAA and the sponsor.

d. Identification of the contractor's superintendent and a discussion of his/her authority and responsibilities.

e. Designation of sponsor representative responsible for notifying the Flight Service Station serving the airport of the proposed start and completion dates of construction or of any circumstances requiring a NOTAM.

f. Scheduling of work and the need to perform certain items at various stages of the project, including operational safety problems which might arise because of the proposed work.

g. Notice to proceed date.

h. Safety during construction, including the responsibility for marking and lighting of closed and hazardous areas. See AC 150/5370-2 and 150/5370-1, Marking of Paved Areas on Airports, current edition, for detailed information.

i. Security requirements.

j. Discuss the need for continuing vigilance for potential or existing hazards relative to any of the items listed in appendix 1. In addition to these items, all responsible parties must be alert to the following hazard-producing situations which may develop during the construction period.

(1) Open trenches and settlement of backfill adjacent to pavement.

(2) Pavement "drop offs" or "lips" at pavement tie-in areas.

(3) The obliteration, inadvertent relocation or disturbance of the marking and/or lighting of displaced threshold and marking of closed runways or taxiways.

(4) Damage to existing in-use pavement lighting, marking or NAVAIDS by construction forces.

(5) Spillage from vehicles on active airport pavement.

(6) Temporary stockpiling of material for an extended period of time.

(7) Contractor vehicular traffic through restricted critical areas of NAVAID facilities and the airport operating area.

(8) Dust control and environmental factors, such as burning, waste disposal, etc.

(9) Maintenance of sanitary facilities on the project site.

2. CONSTRUCTION ITEMS.

a. The general requirements of quality control and testing should be discussed. It should be clearly understood who will do the testing, what is to be tested, when it is to be tested, and the location and number of tests.

b. Discussion of Test Reports. Each report should, as a minimum, contain the following information.

(1) Test performed.

(2) Applicable standard.

(3) Test location.

(4) Test result.

(5) Action taken for failing tests.

A copy of all test reports should be furnished to the resident engineer in a timely manner. Failing test results should be reported to the resident engineer immediately. Explain that FAA is not obligated to financially participate in construction that does not meet contract plans and specifications.

c. Emphasize the Role of the Resident Engineer. Duties include the following:

(1) Ensure all required testing is performed.

(2) Ensure tests are performed at the frequency stated in the specifications. If not stated in the specifications make sure an adequate number of tests are taken to document an acceptable level.

(3) Review test results for conformance to specifications.

(4) Inform the contractor of deficiencies so that corrections can be made and retests performed prior to covering any substandard work with additional material.

(5) Maintain record of quantity of materials used on the project.

(6) Maintain copies of test reports on file.

(7) Maintain a diary. Contents of a diary should include:

(i) Weather conditions and temperature.

(ii) Work in progress and location.

(iii) Equipment in use - types and numbers.

(iv> Size of work force including supervision.

(v) Hours worked per day for contractor and subcontractors.

(vi) Materials delivered.

(vii) Any instructions to the contractor.

(viii) Principal visitors.

(8) Maintain set of working drawings which can be used to prepare "as-constructed" drawing.

d. Discussion of periodic construction report, Construction Progress and Inspection Report (FAA Form 5370-1).

e. Change orders, time extensions, periodic cost estimates, and liquidated damages.

3. LABOR REQUIREMENTS. Labor requirements including items such as:

a. Minimum wage rates.

b. Employee classification and payrolls.

c. Review of payrolls by sponsor.

AC 150/5100-6 contains the basic labor requirements for sponsors and contractors working on AIP projects.

4. CIVIL RIGHTS REQUIREMENTS. Civil rights requirements including items such as:

a. Minority Business Enterprise Program (MBE).

b. Equal Employment Opportunity.

c. Certification of Nonsegregated Facilities.

AC 150/5100-15 contains the basic civil rights requirements for sponsors and contractors working on AIP projects.

5. ENVIRONMENTAL.

a. Compliance with applicable Federal, state, and local air and water quality standards during construction.

b. Environmental mitigation actions resulting from the environmental coordination process.

U.S. Department of Transportation
Federal Aviation Administration

Advisory Circular

Subject: PREDESIGN, PREBID, AND PRECONSTRUCTION CONFERENCES FOR AIRPORT GRANT PROJECTS

Date: 5/1/85 Initiated by: AAS-200

AC No: AC 150/5300-9A
Change:

1. PURPOSE. This advisory circular (AC) provides guidance for conducting predesign, prebid, and preconstruction conferences for projects funded under the Federal Aviation Administration% (FAA) airport grant program.

2. CANCELLATION. AC 150/5300-9, Predesign and Preconstruction Conferences (ADAP Projects), dated September 10, 1973, is cancelled.

3. BACKGROUND. Predesign, prebid, and preconstruction conferences should be conducted to ensure that the sponsor, the engineer, the contractor and other interested parties are aware of design, safety, and construction requirements and have an understanding of their individual responsibilities, as well as the technical and legal requirements of the contract. The magnitude, type, location of project, and the nature of airport use will determine the need for such conferences.

4. PREDESIGN CONFERENCE.

a. Purpose. A predesign conference, convened and conducted by the sponsor or an authorized agent, should be used to discuss various items relating to design parameters, airport safety, routing of aircraft and equipment, sequencing of construction operations, environmental considerations and civil rights requirements. A predesign conference is essential when a project is of sufficient magnitude to affect airport operations during construction. Possible conflicts between construction activities and the operation of the airport should be resolved at this meeting.

b. Timing. The meeting should be held as soon as sufficient preliminary design work has been completed and always prior to preparation of the final plans and specifications. Sufficient time should be allowed to notify all parties so that schedules can be arranged accordingly. A minimum of 10 working days is recommended.

c. Participants.

(1) The participants will vary according to the effect that the proposed construction will have on the operations of the airport. As applicable, the sponsor should invite the following parties to participate:

(i) Sponsor's design engineer.

(ii) Airport management.

(iii) Air Transport Association regional representatives.

(iv) Air Line Pilots Association representatives.

(v) Fixed base operators.

(vi) Airline representatives.

(vii) FAA airport certification inspector at all airports certified under FAR Part 139.

(viii) Representative of FAA Airports field office.

(2) The FAA Airports field office should assure that all appropriate FAA offices (Air Traffic, Flight Standards, etc.), military installations, and Federal agencies that may have an interest in the project are notified.

d. Agenda Items. The sponsor should prepare an agenda of items to be discussed at the predesign conference. A list of typical items is contained in appendix 1. This list is not all inclusive and items should be added, as necessary.

5. PREBID CONFERENCE.

a. Purpose. A prebid conference should be conducted by the sponsor's engineer for large projects or projects with unique features in an effort to clarify and explain construction methods, procedures, and safety measures required by the contract.

b. Timing. The meeting should be held a minimum of 10 days prior to the bid opening date.

c. Participants. The participants should normally include prospective bidders, subcontractors and material suppliers. Under normal circumstances, FAA participation is not required but is desirable.

d. Agenda Items. Typical agenda items include:

(1) New or unique construction methods.

(2) New construction procedures, i.e., statistical acceptance testing.

(3) Operational safety requirements.

(4) Minority Business Enterprise (MBO) and other civil rights requirements. See AC 150/5100-15, Civil Rights Requirements for the Airport Improvement Program (AIP), current edition.

(5) Labor requirements. See AC 150/5100-6, Labor Requirements for the Airport Improvement Program (AIP), current edition.

Any changes or modifications approved during the conference shall be included in an addendum to the bid documents. A copy shall be furnished to each prospective bidder who purchased or borrowed bid documents, including those who did not attend the conference.

Copies of the proceedings, containing all items discussed and resolved, including responses to questions, shall be made available to each of the participants, upon request.

e. Availability of Advisory Circulars. Copies of AC's applicable to a project should be available for distribution to prospective bidders, including:

(1) AC 150/5345-1--Approved Airport Lighting Equipment.

(2) AC 150/5100-6--Labor Requirements for the Airport Improvement Program (AIP).

(3) AC 150/5100-15--Civil Rights Requirements for the Airport Improvement Program (AIP).

AC 150/5345-1 lists the names and addresses of manufacturers of airport lighting equipment. AC's 150/5100-6 and 5100-15, respectively, contain the basic labor and civil rights requirements that contractors are required to meet.

6. PRECONSTRUCTION CONFERENCE.

a. Purpose. A preconstruction conference, convened and conducted by the sponsor or an authorized agent, should be used to discuss various items including operational safety, testing, quality control, security, safety, labor requirements and environmental factors. This meeting, among all parties affected by the construction, should assist in a better understanding of potential problems and possible solutions.

b. Timing. The preconstruction conference should be conducted as soon as practicable after the contract has been awarded and before issuance of the notice to proceed. Sufficient time should be allowed to notify all parties so that schedules can be arranged accordingly. A minimum of 10 days is recommended.

c. Participants.

(1) The participants will vary according to the effect that the proposed construction will have on the operation of the airport.' As applicable, the sponsor should invite the following parties.

(i) Sponsor's engineer.

(ii) Resident engineer.

(iii) Airport management.

(iv) Testing laboratory.

(v) Contractor and subcontractor(s).

(vi) Contractor% project superintendent.

(vii) Contractors project clerk.

(viii) Airport users including airline representatives, fixed base operators, Air Line Pilots Association representative, Air Transport Association regional representative, and military representative (joint use airport).

(ix) Utility companies affected by the proposed construction.

(x) Federal, state or local agencies affected by the proposed construction.

(xi) Representative of FAA Airports field office.

(2) The FAA Airports field office should assure that all appropriate FAA offices (Air Traffic, Flight Standards, etc.) military installations, and Federal agencies that may have an interest in the project are notified.

d. AGENDA ITEMS. The sponsor or authorized agent should prepare an agenda prior to the preconstruction conference. A list of typical discussion items is contained in appendix 2. This list is not all inclusive and items should be added, as necessary.

A written report or minutes should be furnished to the contractor. The report should consist of a summary of the discussions, with the conference agenda and a list of attendees attached. Copies should be made available to each of the participants, upon request.

Leonard E. Mudd

LEONARD E. MUDD
Director, Office of Airport Standards

APPENDIX 1. AGENDA ITEMS FOR PREDESIGN CONFERENCE

1. DESIGN PHASE.

a. Discussion of scope of work and design parameters peculiar to the project, including items such as design aircraft, local conditions and materials, use of recycled materials, design options, use of FAA standards, and materials furnished by others.

b. Submission of an engineer% report with the plans and specifications. The report should include:

(1) Scope of proposed project.

(2) Design alternatives and reason for selected design.

(3) Pavement design, including summary on FAA Form 5100-1, Pavement Design.

(4) Drainage design computations.

(5) Explain choice of equipment for lighting design.

(6) Explanation of deviation from FAA design standards.

(7) Reasons for modifications to construction standards.

(8) Description of non-Federally funded work to be included in the contract.

(9) Engineer's estimate of contract cost.

(10) Provisions included in the plans and specifications to carry out environmental mitigation actions resulting from the environmental coordination process.

2. CONSTRUCTION PHASE.

a. The sequence of construction phases and any necessary special routing of aircraft considering airline schedules, lead time for clearance of runway, taxiway, or apron by construction equipment, notification of schedule changes, and procedures for emergency handling of aircraft.

b. Location of auto parking lot for use of contractor's employees and access from public road.

c. Marking and lighting of construction areas.

d. Location of contractor's stockpiles, construction office, and plant.

e. Location of on-site haul roads.

f. Designation of on-site waste areas.

g. Control of air, water, and noise pollution and other environmental considerations and requirements.

h. Access from public road to construction area and construction office and the need for security measures.

i. Establishment of minimum distance restrictions for construction vehicles, equipment, workers and materials with relation to runway, taxiways and navigational aids (NAVAIDS) that remain in operational use. See AC 150/5370-2, Operational Safety on Airports During Construction, current edition.

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a. The impact of proposed construction on instrument approach procedures and takeoff or landing minimums. The need for temporary NAVAID's and/or visual aids. See AC 150/5370-2, paragraph 6.

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cm Identification of buried cables and utilities within the construction area.

8. SECURITY. Requirements to maintain temporary airport security, i.e., security control at gates where contractor personnel and equipment enter the airport.

9. ENVIRONMENTAL. Environmental mitigation actions resulting from the environment coordination process.

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The conference should be scheduled so that items of general interest to all participants are discussed prior to special interest items.

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a. The scope of the project and the sequence and timing of all operations.

b. Relationship of the resident engineer to the sponsor With emphasis on the authority of the resident engineer to act in the sponsor's behalf. Advise that the resident engineer has the authority to suspend operations, wholly or in part, when safety violations or nonconformance to the contract specifications are noted.

cm Relationship between the FAA and the sponsor.

d. Identification of the contractor's superintendent and a discussion of his/her authority and responsibilities.

e. Designation of sponsor representative responsible for notifying the Flight Service Station serving the airport of the proposed start and completion dates of construction or of any circumstances requiring a NOTAM.

f. Scheduling of work and the need to perform certain items at various stages of the project, including operational safety problems which might arise because of the proposed work.

g. Notice to proceed date.

h. Safety during construction, including the responsibility for marking and lighting of closed and hazardous areas. See AC 150/5370-2 and 150/5370-1, Marking of Paved Areas on Airports, current edition, for detailed information.

i. Security requirements.

j. Discuss the need for continuing vigilance for potential or existing hazards relative to any of the items listed in appendix 1. In addition to these items, all responsible parties must be alert to the following hazard-producing situations which may develop during the construction period.

(1) Open trenches and settlement of backfill adjacent to pavement.

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(4) Damage to existing in-use pavement lighting, marking or NAVAIDS by construction forces.

(5) Spillage from vehicles on active airport pavement.

(6) Temporary stockpiling of material for an extended period of time.

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(9) Maintenance of sanitary facilities on the project site.

2. CONSTRUCTION ITEMS.

a. The general requirements of quality control and testing should be discussed. It should be clearly understood who will do the testing, what is to be tested, when it is to be tested, and the location and number of tests.

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(3) Test location.

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(5) Action taken for failing tests.

A copy of all test reports should be furnished to the resident engineer in a timely manner. Failing test results should be reported to the resident engineer immediately. Explain that FAA is not obligated to financially participate in construction that does not meet contract plans and specifications.

c. Emphasize the Role of the Resident Engineer. Duties include the following:

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(2) Ensure tests are performed at the frequency stated in the specifications. If not stated in the specifications make sure an adequate number of tests are taken to document an acceptable level.

(3) Review test results for conformance to specifications.

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(7) Maintain a diary. Contents of a diary should include:

(i) Weather conditions and temperature.

(ii) Work in progress and location.

(iii) Equipment in use - types and numbers.

(iv) Size of work force including supervision.

(v) Hours worked per day for contractor and subcontractors.

(vi) Materials delivered.

(vii) Any instructions to the contractor.

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(8) Maintain set of working drawings which can be used to prepare "as-constructed" drawing.

d. Discussion of periodic construction report, Construction Progress and Inspection Report (FAA Form 5370-1).

e. Change orders, time extensions, periodic cost estimates, and liquidated damages.

3. LABOR REQUIREMENTS. Labor requirements including items such as:

a. Minimum wage rates.

b. Employee classification and payrolls.

c. Review of payrolls by sponsor.

AC 150/5100-6 contains the basic labor requirements for sponsors and contractors working on AIP projects.

4. CIVIL RIGHTS REQUIREMENTS. Civil rights requirements including items such as:

a. Minority Business Enterprise Program (MBE).

b. Equal Employment Opportunity.

c. Certification of Nonsegregated Facilities.

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5. ENVIRONMENTAL.

a. Compliance with applicable Federal, state, and local air and water quality standards during construction.

b. Environmental mitigation actions resulting from the environmental coordination process.

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Richard Byrd North Pavement Replacement
Preliminary Cost Estimate Options

Prepared by: Michael A. Hutchison, P.E.
Date: February 11, 2005

Richard Byrd South Pavement Replacement

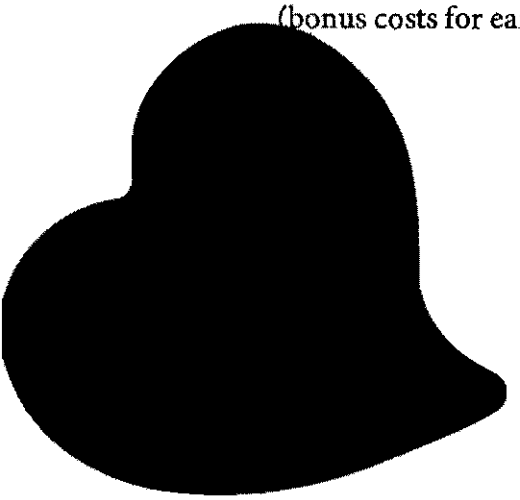
- Pavement Section: Three-inches HMAC, three inches CTB, eight inches lime stabilized subgrade
- Bid amount: $238,000

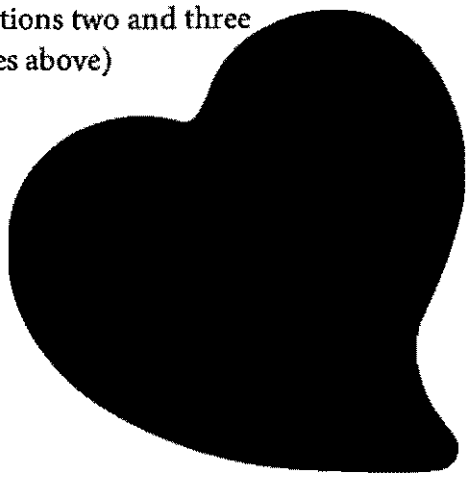
Richard Byrd North Pavement Replacement

- Option 1
  - Pavement Section: Eight-Inch HMAC Pavement, four inches granular base, Tensar BX 1200 Geogrid
  - Construction estimate: $375,000
- Option 2
  - Pavement Section: Six-Inch HMAC Pavement, four inches granular base, Tensar BX 1200 Geogrid
  - Construction estimate: $315,000
- Option 3
  - Pavement Section: Three-inches HMAC, three inches CTB, eight inches lime stabilized subgrade
  - Construction estimate: $314,000

Major Factors Affecting Cost

- 10% Contingency included
- Pavement area is 25% higher than R.B. South project
- "Worst case" quantities and unit prices used (no geotechnical report and design yet)
- Options 1 and 2 save time, but not cost
- A+B bidding could be used to determine cost savings between options two and three (bonus costs for early completion are not included in the estimates above)





RICHARD BYRD DRIVE PAVEMENT REPLACEMENT
ENGINEER'S ESTIMATE OF PROBABLE CONSTRUCTION COST
OPTION 1
8-INCH HMAC PAVEMENT W/ TENSAR GEOGRID

ITEM NO.	DESCRIPTION & UNIT PRICE IN WORDS	UNIT	UNIT PRICE	EST. QTY.	AMOUNT BID
101	Mobilization	L.S.	$ 15,000.00	1	$ 15,000.00
102	Maintenance of Traffic	L.S.	$ 20,000.00	1	$ 20,000.00
103	Unclassified Pavement excavation (12")	C.Y.	$ 10.00	2,998	$ 29,975.93
104	Furnish and install Tensar BX1200 or equivalent	S.Y.	$ 4.50	8,993	$ 40,467.50
105	Furnish, place and compact 4" thick granular base material	C.Y.	$ 50.00	333	$ 16,653.29
106	Furnish and place 8" Bituminous Pavement	TON	$ 50.00	3,957	$ 197,841.11
107	Tack Coat (0.15 Gal/SY)	GAL	$ 10.00	1,349	$ 13,489.17
108	Furnish and place 6" Solid Yellow Taxiway Centerline Stripe	L.F.	$ 3.50	1,200	$ 4,200.00
109	Furnish and place 6" Double Solid Yellow Stripe	L.F.	$ 3.50	65	$ 227.50
110	Silt Fence	L.F.	$ 2.50	1,200	$ 3,000.00
111	SW3P - Inlet Protection	EA	$ 100.00	1	$ 100.00

SUBTOTAL:	$	340,954.50
Project Contingency (10%)	$	34,095.45
GRAND TOTAL:	$	375,000.00

RICHARD BYRD DRIVE PAVEMENT REPLACEMENT
ENGINEER'S ESTIMATE OF PROBABLE CONSTRUCTION COST
OPTION 2
6-INCH HMAC PAVEMENT W/ TENSAR GEOGRID

ITEM NO.	DESCRIPTION & UNIT PRICE IN WORDS	UNIT	UNIT PRICE	EST. QTY.	AMOUNT BID
101	Mobilization	L.S.	$ 15,000.00	1	$ 15,000.00
102	Maintenance of Traffic	L.S.	$ 20,000.00	1	$ 20,000.00
103	Unclassified Pavement excavation (10")	C.Y.	$ 10.00	2,498	$ 24,979.94
104	Furnish and install Tensar BX1200 or equivalent	S.Y.	$ 4.50	8,993	$ 40,467.50
105	Furnish, place and compact 4" thick granular base material	C.Y.	$ 50.00	333	$ 16,653.29
106	Furnish and place 6" Bituminous Pavement	TON	$ 50.00	2,968	$ 148,380.83
107	Tack Coat (0.15 Gal/SY)	GAL	$ 10.00	1,349	$ 13,489.17
108	Furnish and place 6" Solid Yellow Taxiway Centerline Stripe	L.F.	$ 3.50	1,200	$ 4,200.00
109	Furnish and place 6" Double Solid Yellow Stripe	L.F.	$ 3.50	65	$ 227.50
110	Silt Fence	L.F.	$ 2.50	1,200	$ 3,000.00
111	SW3P - Inlet Protection	EA	$ 100.00	1	$ 100.00

SUBTOTAL:	$	286,498.23
Project Contingency (10%)	$	28,649.82
GRAND TOTAL:	$	315,000.00

RICHARD BYRD DRIVE PAVEMENT REPLACEMENT
ENGINEER'S ESTIMATE OF PROBABLE CONSTRUCTION COST
OPTION 3
3-INCH HMAC, 3-INCH CEMENT TREATED BASE, 8-INCH LIME TREATED SUBGRADE

ITEM NO.	DESCRIPTION & UNIT PRICE IN WORDS	UNIT	UNIT PRICE	EST. QTY.	AMOUNT BID
101	Mobilization	L.S.	$ 15,000.00	1	$ 15,000.00
102	Maintenance of Traffic	L.S.	$ 20,000.00	1	$ 20,000.00
103	Unclassified Pavement excavation (14")	C.Y.	$ 10.00	3,497	$ 34,971.91
104	Furnish, place and compact 8" thick lime stabilized subgrade, including proof rolling	S.Y.	$ 2.50	8,993	$ 22,481.94
105	Furnish and place hydrated lime (8%)	TON	$ 100.00	259	$ 25,899.20
106	Furnish and place 3" Cement Treated Base	S.Y.	$ 8.00	8,993	$ 71,942.22
107	Furnish and place 3" Bituminous Pavement	TON	$ 50.00	1,484	$ 74,190.42
108	Tack Coat (0.15 Gal/SY)	GAL	$ 10.00	1,349	$ 13,489.17
109	Furnish and place 6" Solid Yellow Taxiway Centerline Stripe	L.F.	$ 3.50	1,200	$ 4,200.00
110	Furnish and place 6" Double Solid Yellow Stripe	L.F.	$ 3.50	65	$ 227.50
111	Silt Fence	L.F.	$ 2.50	1,200	$ 3,000.00
112	SW3P - Inlet Protection	EA	$ 100.00	1	$ 100.00

SUBTOTAL:	$	285,502.36
Project Contingency (10%)	$	28,550.24
GRAND TOTAL:	$	314,000.00

Richard Byrd North Pavement Replacement
Preliminary Cost Estimate Options

Prepared by: Michael A. Hutchison, P.E.
Date: February 11, 2005

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Major Factors Affecting Cost

- 10% Contingency included
- Pavement area is 25% higher than R.B. South project
- "Worst case" quantities and unit prices used (no geotechnical report and design yet)
- Options 1 and 2 save time, but not cost
- A+B bidding could be used to determine cost savings between options two and three (bonus costs for early completion are not included in the estimates above)

RICHARD BYRD DRIVE PAVEMENT REPLACEMENT
ENGINEER'S ESTIMATE OF PROBABLE CONSTRUCTION COST
OPTION 1
8-INCH HMAC PAVEMENT W/ TENSAR GEOGRID

ITEM NO.	DESCRIPTION & UNIT PRICE IN WORDS	UNIT	UNIT PRICE	EST. QTY.	AMOUNT BID
101	Mobilization	L.S.	$ 15,000.00	1	$ 15,000.00
102	Maintenance of Traffic	L.S.	$ 20,000.00	1	$ 20,000.00
103	Unclassified Pavement excavation (12")	C.Y.	$ 10.00	2,998	$ 29,975.93
104	Furnish and install Tensar BX1200 or equivalent	S.Y.	$ 4.50	8,993	$ 40,467.50
105	Furnish, place and compact 4" thick granular base material	C.Y.	$ 50.00	333	$ 16,653.29
106	Furnish and place 8" Bituminous Pavement	TON	$ 50.00	3,957	$ 197,841.11
107	Tack Coat (0.15 Gal/SY)	GAL	$ 10.00	1,349	$ 13,489.17
108	Furnish and place 6" Solid Yellow Taxiway Centerline Stripe	L.F.	$ 3.50	1,200	$ 4,200.00
109	Furnish and place 6" Double Solid Yellow Stripe	L.F.	$ 3.50	65	$ 227.50
110	Silt Fence	L.F.	$ 2.50	1,200	$ 3,000.00
111	SW3P - Inlet Protection	EA	$ 100.00	1	$ 100.00

SUBTOTAL:	$	340,954.50
Project Contingency (10%)	$	34,095.45
GRAND TOTAL:	$	375,000.00

RICHARD BYRD DRIVE PAVEMENT REPLACEMENT
ENGINEER'S ESTIMATE OF PROBABLE CONSTRUCTION COST
OPTION 2
6-INCH HMAC PAVEMENT W/ TENSAR GEOGRID

ITEM NO.	DESCRIPTION & UNIT PRICE IN WORDS	UNIT	UNIT PRICE	EST. QTY.	AMOUNT BID
101	Mobilization	L.S.	$ 15,000.00	1	$ 15,000.00
102	Maintenance of Traffic	L.S.	$ 20,000.00	1	$ 20,000.00
103	Unclassified Pavement excavation (10")	C.Y.	$ 10.00	2,498	$ 24,979.94
104	Furnish and install Tensar BX1200 or equivalent	S.Y.	$ 4.50	8,993	$ 40,467.50
105	Furnish, place and compact 4" thick granular base material	C.Y.	$ 50.00	333	$ 16,653.29
106	Furnish and place 6" Bituminous Pavement	TON	$ 50.00	2,968	$ 148,380.83
107	Tack Coat (0.15 Gal/SY)	GAL	$ 10.00	1,349	$ 13,489.17
108	Furnish and place 6" Solid Yellow Taxiway Centerline Stripe	L.F.	$ 3.50	1,200	$ 4,200.00
109	Furnish and place 6" Double Solid Yellow Stripe	L.F.	$ 3.50	65	$ 227.50
110	Silt Fence	L.F.	$ 2.50	1,200	$ 3,000.00
111	SW3P - Inlet Protection	EA	$ 100.00	1	$ 100.00

SUBTOTAL:	$	286,498.23
Project Contingency (10%)	$	28,649.82
GRAND TOTAL:	$	315,000.00

RICHARD BYRD DRIVE PAVEMENT REPLACEMENT
ENGINEER'S ESTIMATE OF PROBABLE CONSTRUCTION COST
OPTION 3
3-INCH HMAC, 3-INCH CEMENT TREATED BASE, 8-INCH LIME TREATED SUBGRADE

ITEM NO.	DESCRIPTION & UNIT PRICE IN WORDS	UNIT	UNIT PRICE	EST. QTY.	AMOUNT BID
101	Mobilization	L.S.	$ 15,000.00	1	$ 15,000.00
102	Maintenance of Traffic	L.S.	$ 20,000.00	1	$ 20,000.00
103	Unclassified Pavement excavation (14")	C.Y.	$ 10.00	3,497	$ 34,971.91
104	Furnish, place and compact 8" thick lime stabilized subgrade, including proof rolling	S.Y.	$ 2.50	8,993	$ 22,481.94
105	Furnish and place hydrated lime (8%)	TON	$ 100.00	259	$ 25,899.20
106	Furnish and place 3" Cement Treated Base	S.Y.	$ 8.00	8,993	$ 71,942.22
107	Furnish and place 3" Bituminous Pavement	TON	$ 50.00	1,484	$ 74,190.42
108	Tack Coat (0.15 Gal/SY)	GAL	$ 10.00	1,349	$ 13,489.17
109	Furnish and place 6" Solid Yellow Taxiway Centerline Stripe	L.F.	$ 3.50	1,200	$ 4,200.00
110	Furnish and place 6" Double Solid Yellow Stripe	L.F.	$ 3.50	65	$ 227.50
111	Silt Fence	L.F.	$ 2.50	1,200	$ 3,000.00
112	SW3P - Inlet Protection	EA	$ 100.00	1	$ 100.00

SUBTOTAL:	$	285,502.36
Project Contingency (10%)	$	28,550.24
GRAND TOTAL:	$	314,000.00

HNTB Corporation	5910 West Plano Parkway	Telephone (972) 661-5626
Engineers Architects Planners	Suite 200	Facsimile (972) 661-5614
	Plano, Texas 75093	www.hntb.com

Letter of Transmittal

HNTB Job # 41308
VIA Hand Delivered
Date: February 11, 2005

HNTB

To: Mr. Jim Pierce, Jr., P.E.
16801 Westgorve Drive
Addison, Texas
75001

Regarding: Richard Byrd "North" pavement replacement

We are forwarding to you:

X	Estimates	___	Plans
___	Reports	___	Shop Drawings
___	Change Order	___	Disk
___	Book	___	Other

Engineering not yet Auth. Must go to Council

# of Copies	Drawing #	Last Dated	Code	Descript

These are transmitted:

___	For approval	___	As requested	___	Copies for distribution
X	For your use	___	Resubmit	___	For Review & comment
___	Return	___	Copies for review	___	No exception taken
___	Corrected prints	___	Submit	___	Amend and resubmit
				___	Make corrections noted

Please note:

By: Michael A. Hutchison, P.E.

Copy to: Project File

Airport Fuel Truck Roadway 1-30-05

Need unit prices for bidding following page PF 3 in proposal. (A+B)

GP 2 - Check need for umbrella policy against new insurance requirements.

SP-9 Total Incentive Payment ~~of~~ $500 shall not exceed $5,000.00. Over 120 days non-responsive is good.

SP-12 - Traffic control should be modified to suit this project being done on the airport.

SP-13 Contractor should submit the mix design for approval. The Town will hire a testing lab to take samples & do testing.

SP-14 Modify for airport

SP-19 - Para 53 A project trailer is not required for this project. Staging area requirements shall be discussed at the pre construction conference.

P 54...

P 57 REMOVE THIS PARA IN ITS ENTIRETY No contractor will agree to this - This para caused major problems with Arapaho Ph. III Bidders and had to be eliminated.

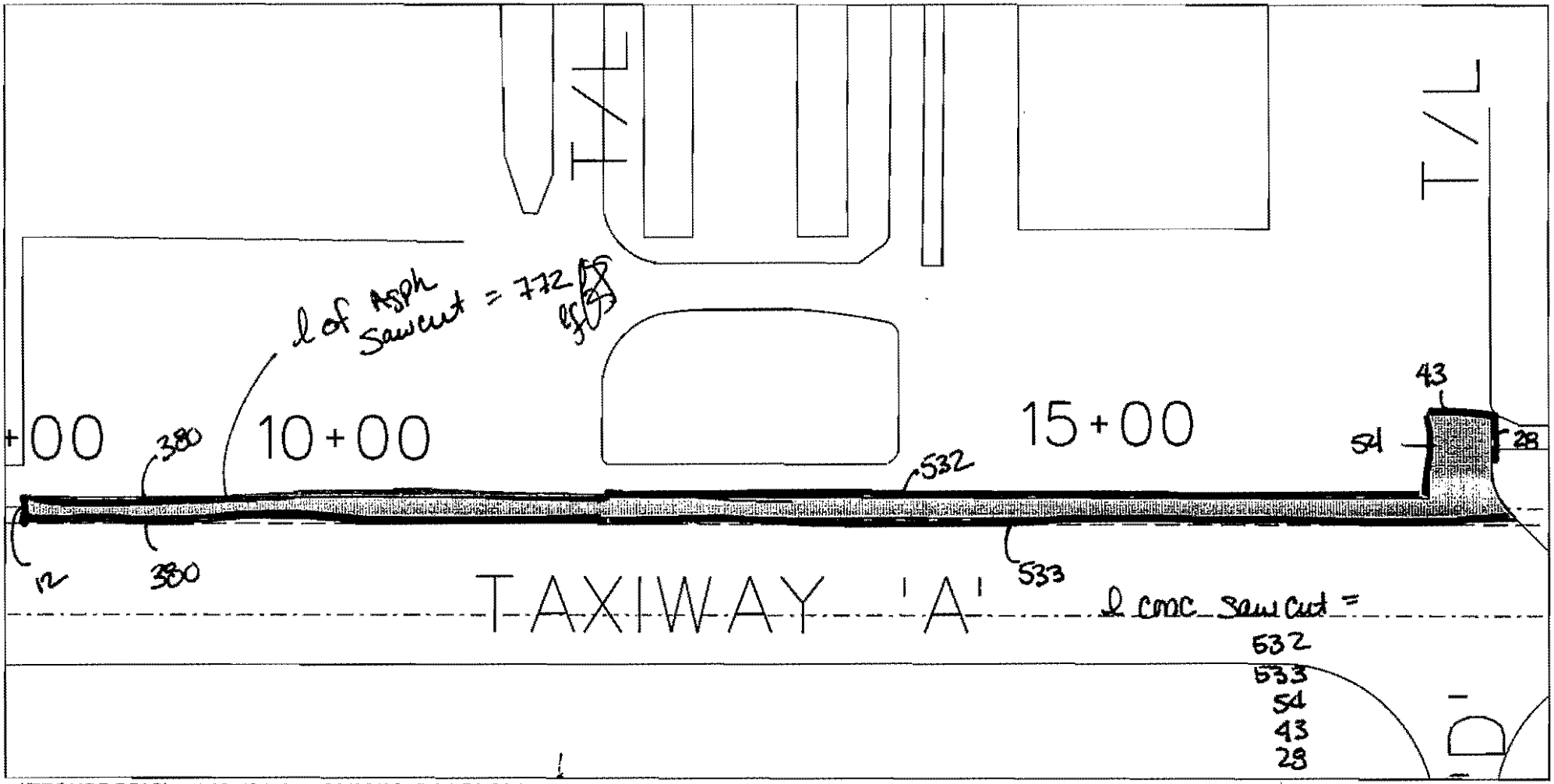
ROADWAY QUANTITIES
<<PROJECT NAME>>
<<PROJECT LIMITS>>

ITEM NO.	NCTCOG NO.	DESCRIPTION & UNIT PRICE IN WORDS	UNIT	UNIT PRICE	EST QTY.	AMOUNT BID
101		Mobilization	LS		1	
		Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit				
102	3.3.1	Unclassified Street Excavation	CY	425		
		Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit		= AREA of CONC. removal * 10" = 1508 SF $(\frac{10}{12})(\frac{1}{3}) = 419$		
103	3.6	Borrow	CY			
		Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit				
104	3.7	Embankment	CY	215		
		Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit		ASSUME 1/2' OVER		SODE AREA
105	3.9	Sodding 3749 SF	SY	425		
		Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit		See quantity dgn		
106	3.12	Temporary Erosion, sediment and water Pollution Prevention and Control	LS	1		
		Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit				
107	4.1	Sprinkling for Dust Control	GAL			
		Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit				

ROADWAY QUANTITIES
<<PROJECT NAME>>
<<PROJECT LIMITS>>

ITEM NO	NCTCOG NO	DESCRIPTION & UNIT PRICE IN WORDS	UNIT	UNIT PRICE	EST QTY	AMOUNT BID
108	4.3	Subgrade Preparation				
		Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit				
109						
		Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit				
110	5.7	Hot-Mix Asphalt Concrete Pavement	Tons			
		Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit				
111	5.8	Portland Cement Concrete Pavement	SY	1520		
		Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit		1508 Sy By DGN ROUND UP TO 1520		
112						
		Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit				

TOTAL AMOUNT BID FOR MATERIALS AND SERVICES, SCHEDULE I, ITEMS 101 THROUGH 155, $ _____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l of Asph Sawcut = 772 lf
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15+00
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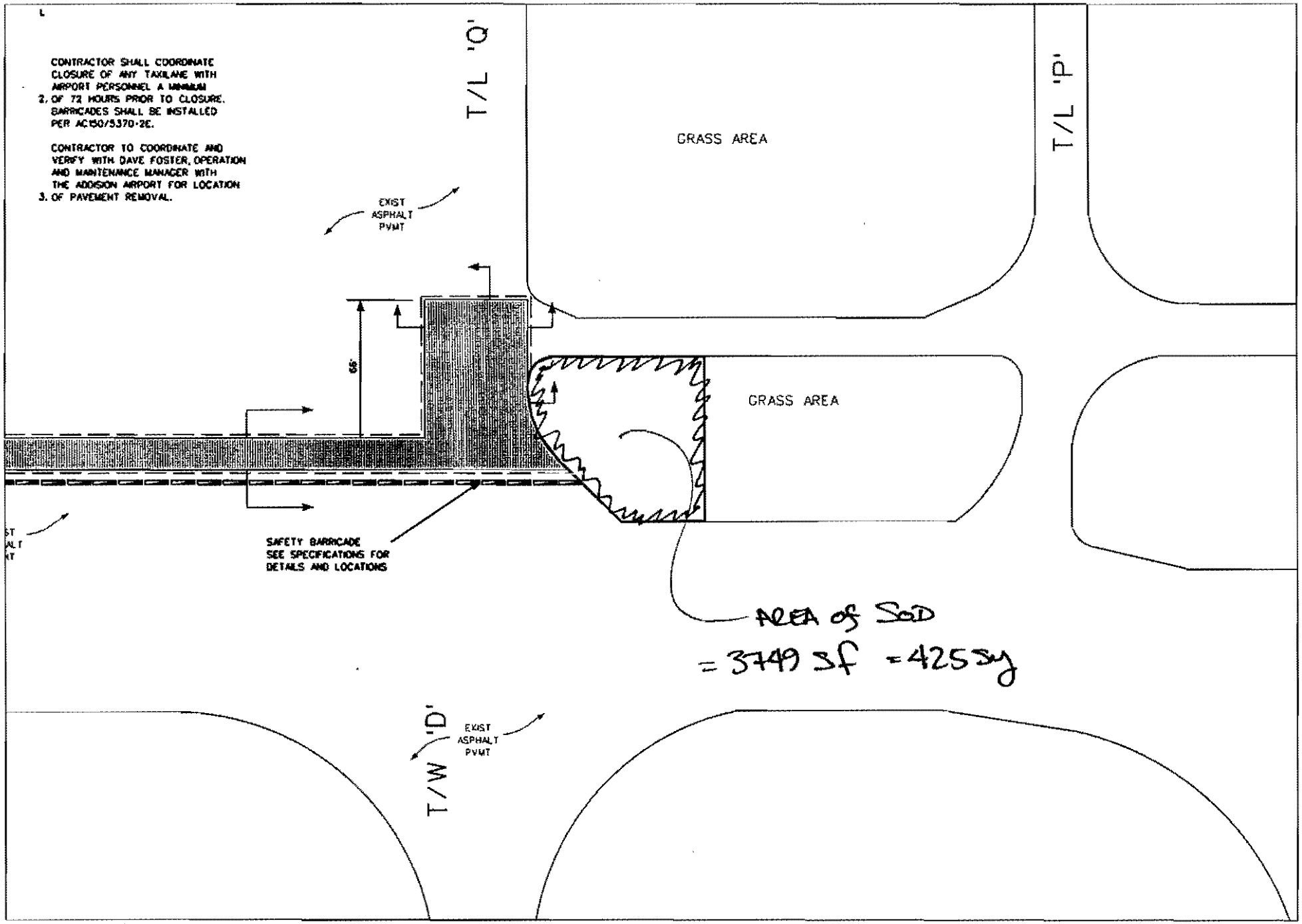

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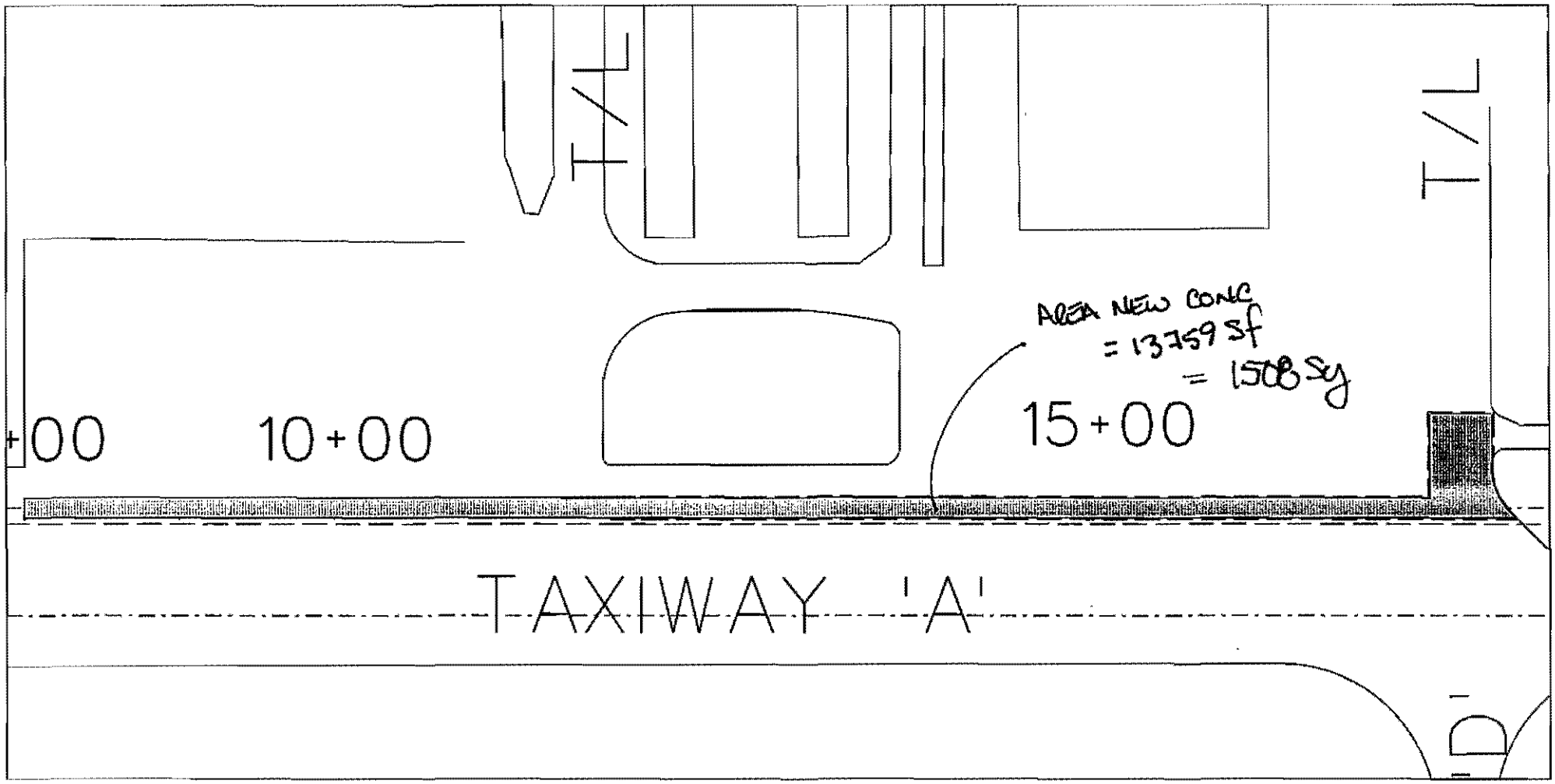

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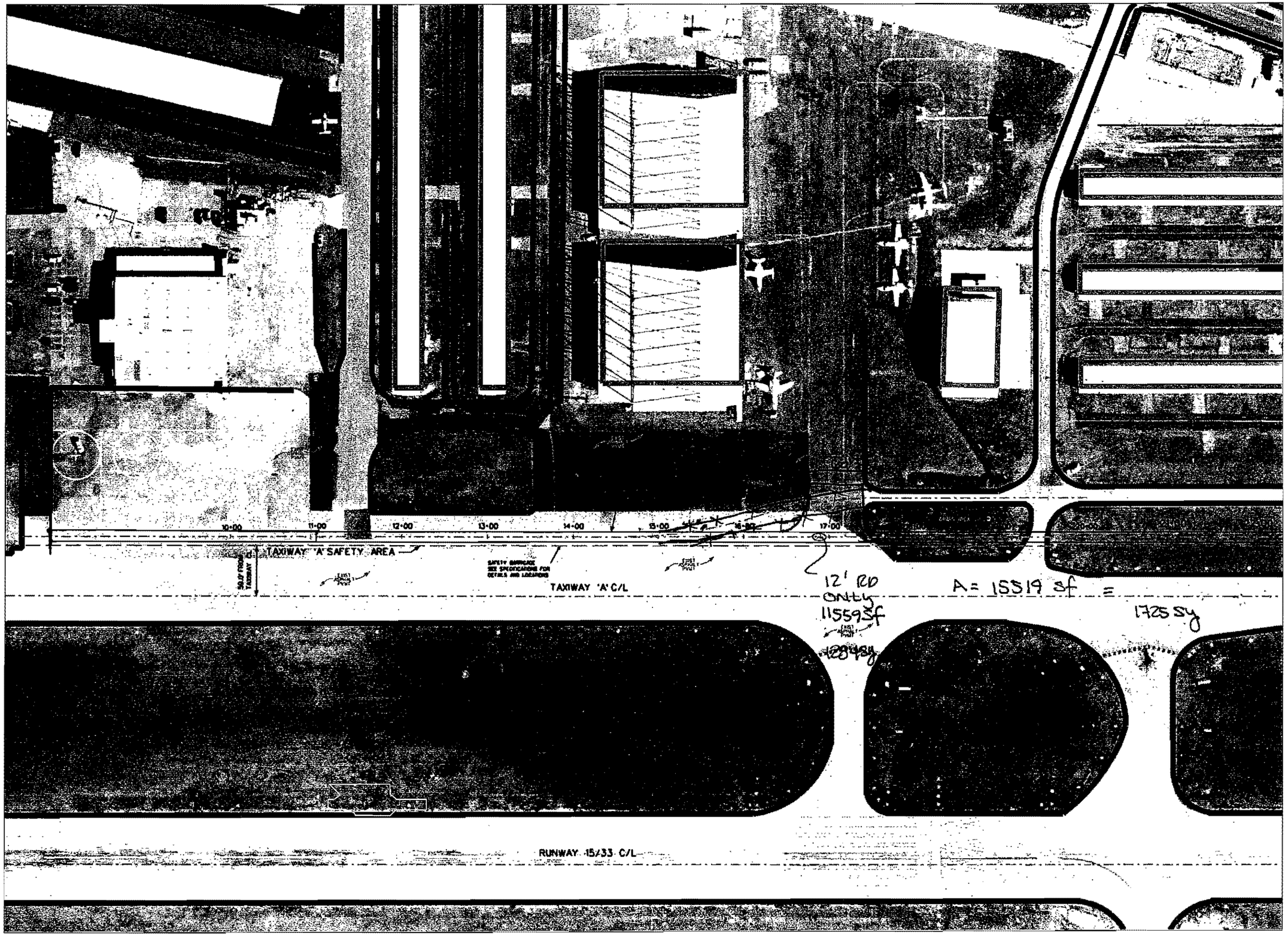

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SCALE IN FEET

1. CONTRACTOR SHALL COORDINATE CLOSURE OF TAXILANE 'P' WITH AIRPORT PERSONNEL A MINIMUM OF 72 HOURS PRIOR TO CLOSURE. BARRICADES SHALL BE INSTALLED PER AC150/5370-2E.

2. ~~REPAIR AREAS 'C1 AND 'C2' SHALL BE COMPLETED WITHIN 3 CALENDAR DAYS FROM THE TIME OF CLOSURE. NIGHTWORK IS PERMITTED FOR THESE AREAS ONLY, AND SHALL BE COORDINATED WITH THE TOWN OF ADDISON 72 HOURS PRIOR.~~

T/L 'R'

T/L 'Q'

EXIST ASPHALT PVMT

GRASS AREA

PROPOSED 12'-FOOT WIDE PCCP ROAD

10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00 19

59.0' FROM TAXIWAY CL

TAXIWAY 'A' SAFETY AREA

SAFETY BARRICADE SEE SPECIFICATIONS FOR DETAILS AND LOCATIONS

TAXIWAY 'A' C/L

T/W 'C'

NO.	DATE	REVISION	APPROV.	NO.	DATE	REVISION	APPROV.

FOR INTERIM REVIEW ONLY
BY JENNIFER S. NICEWANDER, P.E. # 87843
TOWN OF ADDISON
DATE ###DATE###
NOT FOR CONSTRUCTION, BIDDING, OR PERMIT PURPOSES

DESIGN	XXX	PROJECT NO. AIRPORT FUEL RD
CHECK	XXX	
DRAWN	XXX	
CHECK	XXX	
DATE	JAN 2005	
SCALE		

TOWN OF ADDISON
FUEL TRUCK DELIVERY ROAD
TOWN OF ADDISON, TEXAS

SHEET

###SYTIME###
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T/L 'R'

T/L 'Q'

1. CONTRACTOR SHALL COORDINATE CLOSURE OF TAXILANE "T" WITH AIRPORT PERSONNEL A MINIMUM OF 72 HOURS PRIOR TO CLOSURE. BARRICADES SHALL BE INSTALLED PER AC150/5370-2E.

2. REPAIR AREAS 'C1 AND 'C2' SHALL BE COMPLETED WITHIN 3 CALENDAR DAYS FROM THE TIME OF CLOSURE. NIGHTWORK IS PERMITTED FOR THESE AREAS ONLY AND SHALL BE COORDINATED WITH THE TOWN OF ADDISON 72 HOURS PRIOR.

0 20 40 60 80
SCALE IN FEET

EXIST ASPHALT PVMT

GRASS AREA

PROPOSED ***-FOOT WIDE PCCP ROAD

500'R

500'L

10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00 19

59.0' FROM TAXIWAY CL

TAXIWAY 'A' SAFETY AREA

SAFETY BARRICADE SEE SPECIFICATIONS FOR DETAILS AND LOCATIONS

TAXIWAY 'A' C/L

T/W 'C'

NO.	DATE	REVISION	APPROV.	NO.	DATE	REVISION	APPROV.

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DESIGN	XXX	PROJECT NO. AIRPORT FUEL RD
CHECK	XXX	
DRAWN	XXX	
CHECK	XXX	
DATE	JAN 2005	
SCALE		

ADDISON

TOWN OF ADDISON
FUEL TRUCK DELIVERY ROAD
TOWN OF ADDISON, TEXAS

SHEET

$$$$SYTIME$$$$
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Staging of proj @ Romeo

Start @ edge of exist new pvmt

CONC PVMT

EXIST ASPHALT PVMT

Conc Seal

Romeo

GRASS AREA

0 20 40 60 80
SCALE IN FEET

PROPOSED 12-FOOT WIDE PCCP ROAD

8+00 9+00 10+00 11+00 12+00 13+

NON MOVEMENT STRIPE

SAFETY BARRICADE SEE SPECIFICATIONS FOR DETAILS AND LOCATIONS

59.0' FROM TAXIWAY CL

TAXIWAY 'A' SAFETY AREA

Conc

EXIST ASPHALT PVMT

Asph

TAXIWAY A

MATCH LINE STA 13+00

NO.	DATE	REVISION	APPROV.	NO.	DATE	REVISION	APPROV.

FOR INTERIM REVIEW ONLY
BY JENNIFER S. NICENHOUSE, P.E. 87843
TOWN OF ADDISON
DATE ***DATE***
NOT FOR CONSTRUCTION, BIDDING, OR PERMIT PURPOSES

DESIGN	XXX	PROJECT NO. AIRPORT FUEL RD
CHECK	XXX	
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CHECK	XXX	
DATE	JAN 2005	
SCALE		

ADDISON

TOWN OF ADDISON
FUEL TRUCK DELIVERY ROAD

TOWN OF ADDISON, TEXAS

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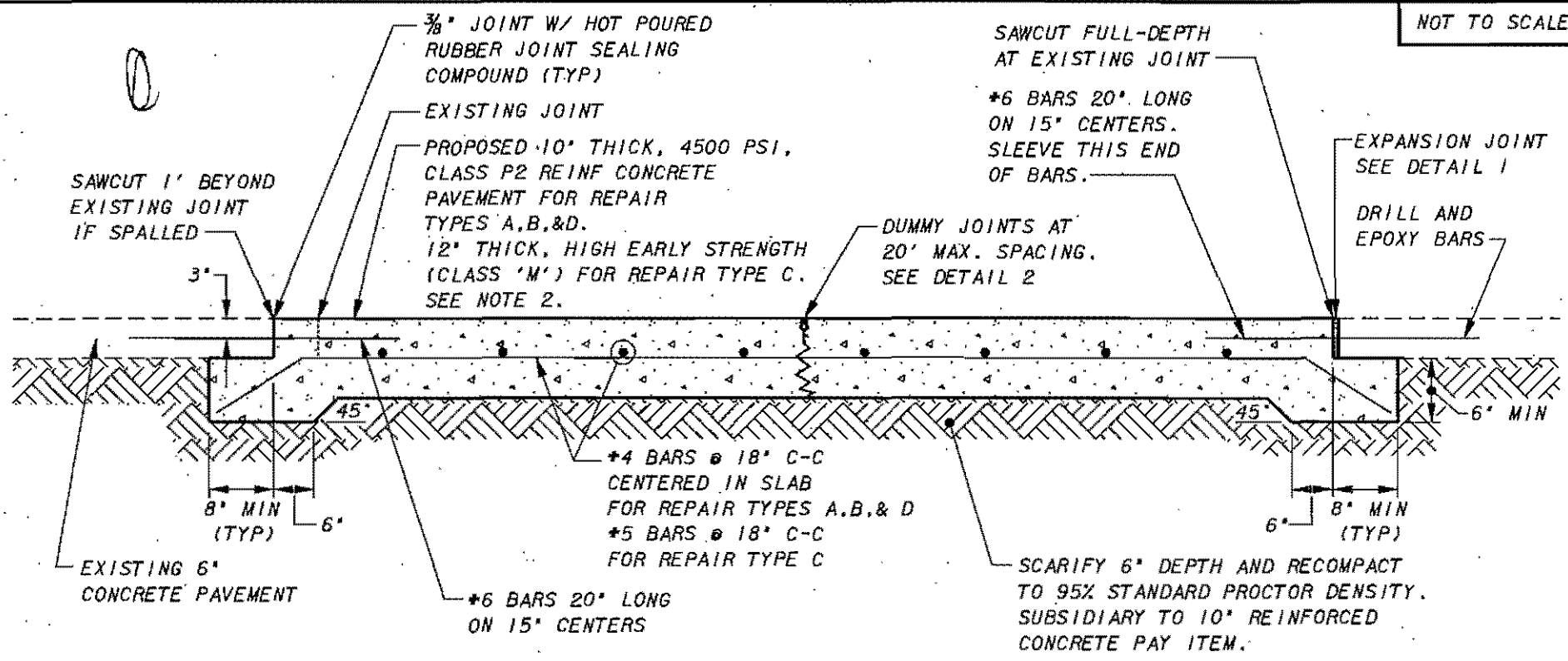

NOTES:

1. REPAIR AREAS SHALL BE LEVELLED TO MATCH EXISTING GRADE OF ADJACENT CONCRETE PAVEMENT. IF ADDITIONAL FILL MATERIAL IS NEEDED, FLEXIBLE BASE MEETING THE REQUIREMENTS OF NCTCOG STANDARD SPECIFICATIONS 301.5 SHALL BE USED. ADDITIOANL FILL MATERIAL IS SUBSIDIARY TO BID ITEMS.

2. CLASS 'M' CONCRETE FOR REPAIR AREA TYPE 'C' SHALL MEET ALL OF THE REQUIREMENTS OF CLASS 'P2' CONCRETE, PLUS ACHIEVE A COMPRESSIVE STRENGTH OF 3600 PSI WITHIN 24 HOURS.

HNTB ARCHITECTS ENGINEERS PLANNERS The HNTB Companies

STATE OF TEXAS
MICHAEL A. HUTCHISON
89329
07/01/04

11

ADDISON AIRPORT

FUEL TRUCK DELIVERY ROAD

TYPICAL SECTION 1A

CONCRETE PAVEMENT REPLACEMENT ADJACENT TO CONCRETE

T/L 'R'

T/L 'Q'

1. CONTRACTOR SHALL COORDINATE CLOSURE OF TAXILANE 'T' WITH AIRPORT PERSONNEL A MINIMUM OF 72 HOURS PRIOR TO CLOSURE. BARRICADES SHALL BE INSTALLED PER AC150/5370-2E.

2. REPAIR AREAS 'C1 AND 'C2' SHALL BE COMPLETED WITHIN 3 CALENDAR DAYS FROM THE TIME OF CLOSURE. NIGHTWORK IS PERMITTED FOR THESE AREAS ONLY, AND SHALL BE COORDINATED WITH THE TOWN OF ADDISON 72 HOURS PRIOR.

0 20 40 60 80
SCALE IN FEET

GRASS AREA

EXIST ASPHALT PVMT

GRASS AREA

EXIST ASPHALT PVMT

EXIST ASPHALT PVMT

begin of hilo pad

12'

300'

PROPOSED **'-FOOT WIDE PCCP ROAD

GRASS AREA

10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00 19

TAXIWAY 'A' SAFETY AREA

59.0' FROM TAXIWAY CL

EXIST ASPHALT PVMT

SAFETY BARRICADE SEE SPECIFICATIONS FOR DETAILS AND LOCATIONS

EXIST ASPHALT PVMT

TAXIWAY 'A' C/L

EXIST ASPHALT PVMT

T/W 'C'

CONVERS w/ LOU
12/11/05

NO.	DATE	REVISION	APPROV.	NO.	DATE	REVISION	APPROV.

FOR INTERIM REVIEW ONLY
BY JENNIFER S. NICEVANDER, P.E. 87843
TOWN OF ADDISON
DATE ***DATE****
NOT FOR CONSTRUCTION, BIDDING, OR PERMIT PURPOSES

DESIGN	XXX	PROJECT NO. AIRPORT FUEL RD
CHECK	XXX	
DRAWN	XXX	
CHECK	XXX	
DATE	JAN 2005	
SCALE		

ADDISON

TOWN OF ADDISON
FUEL TRUCK DELIVERY ROAD
TOWN OF ADDISON, TEXAS

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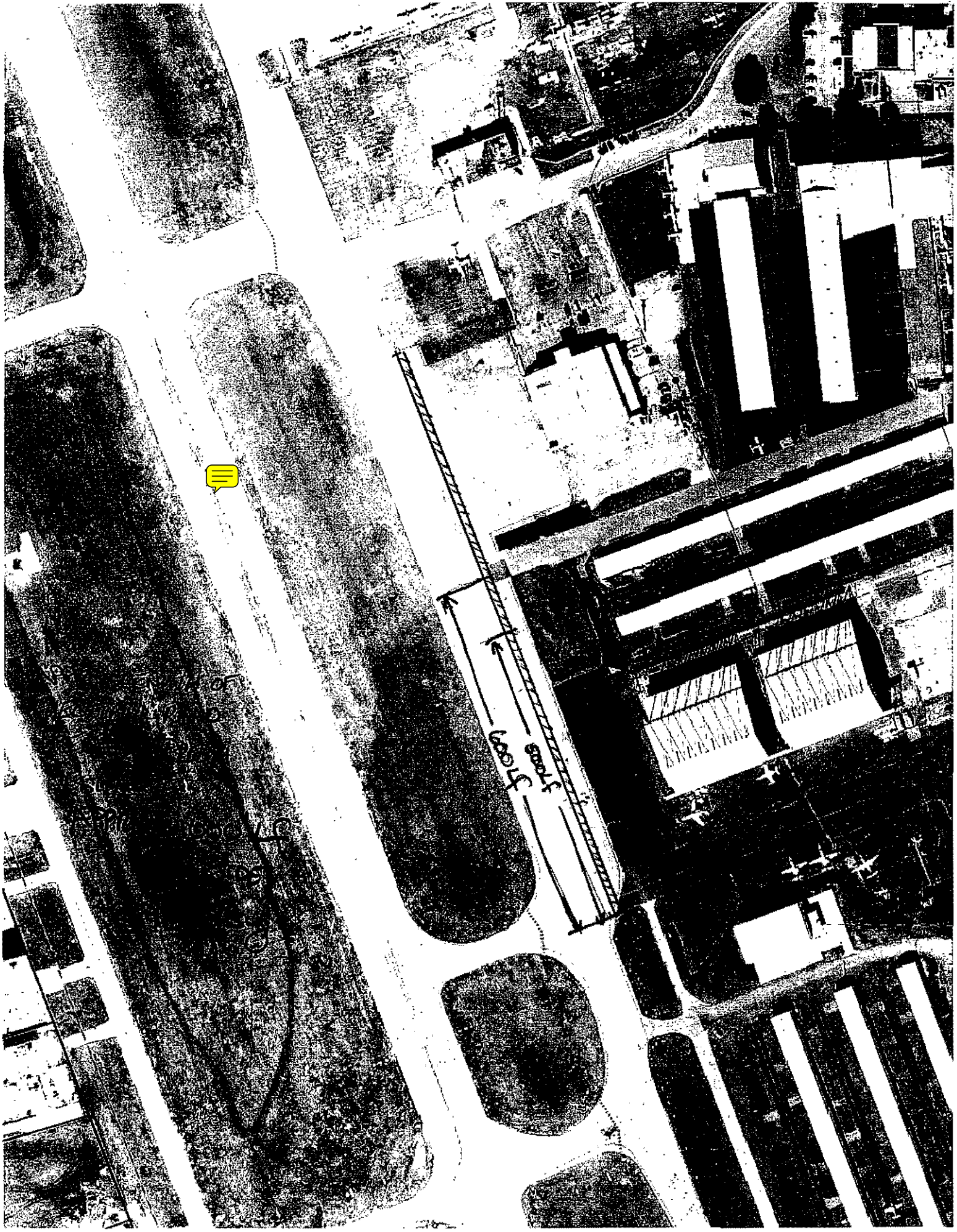
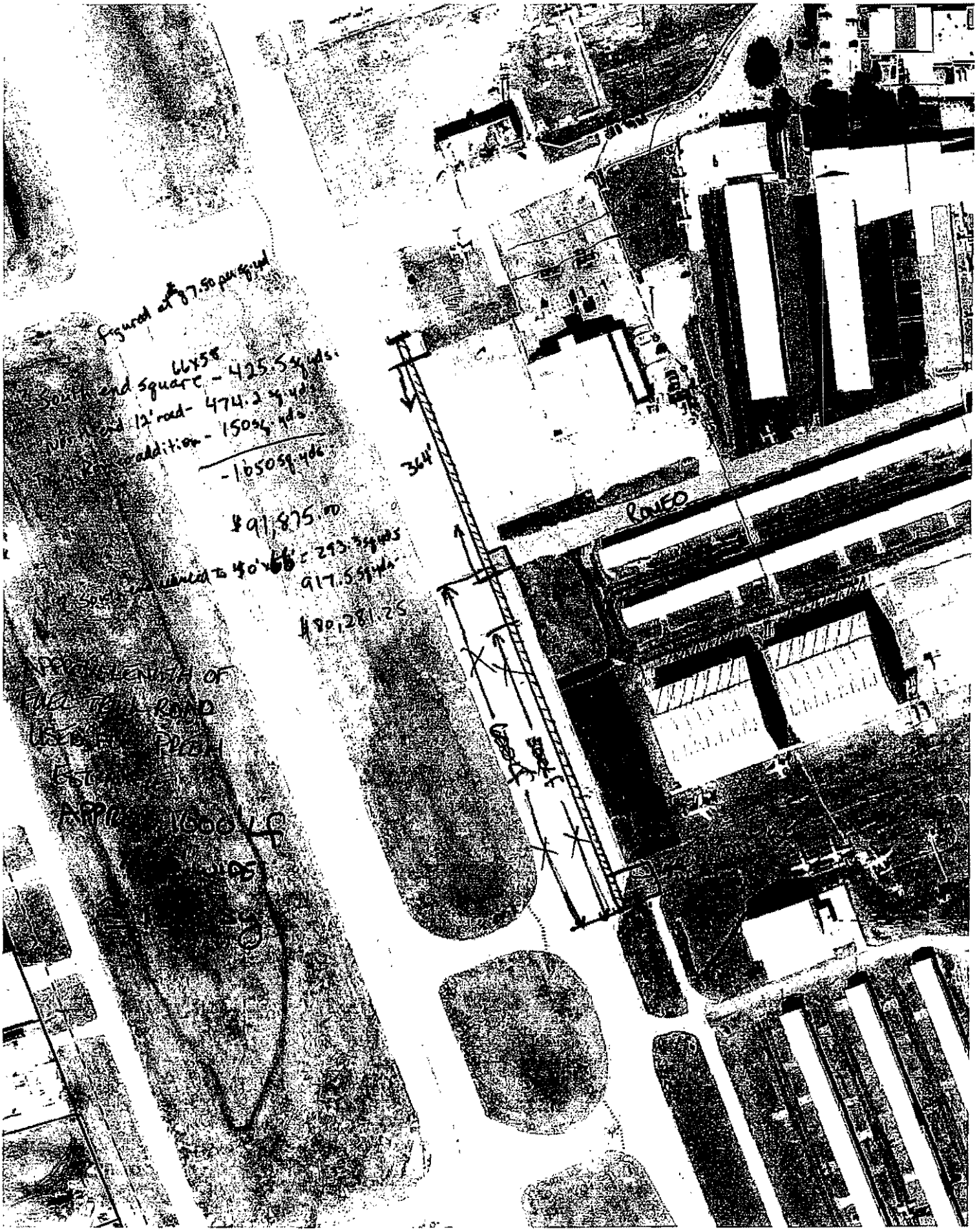

1"=200'
JSN
10/1/04

Fuel Truck Road

	DESCRIPTION	QTY	UNIT	UNIT PRICE	AMOUNT	Approx length of Project
Construction						
	Mobilization	1	LS	$ 5,000.00	$ 5,000.00	600
	Remove Existing Pvmt	800	SY	$ 12.00	$ 9,600.00	
	Unclassified Excavation	20	CY	$ 6.00	$ 120.00	
	10" thick 5000 PSI Conc. Pvmt.	800	SY	$ 55.00	$ 44,000.00	
	Block Sod	100	SF	$ 1.00	$ 100.00	
	SubTotal				**$ 58,820.00**	
Design/Inspection						
	Assume 10% of construction				**$ 5,882.00**	
Boring						
					$ 2,500.00	
					$ 2,500.00	
Testing	ECS				$ 3,000.00	
	SubTotal				**$ 3,000.00**	
				Total	**$ 70,202.00**	

Fuel Truck Road

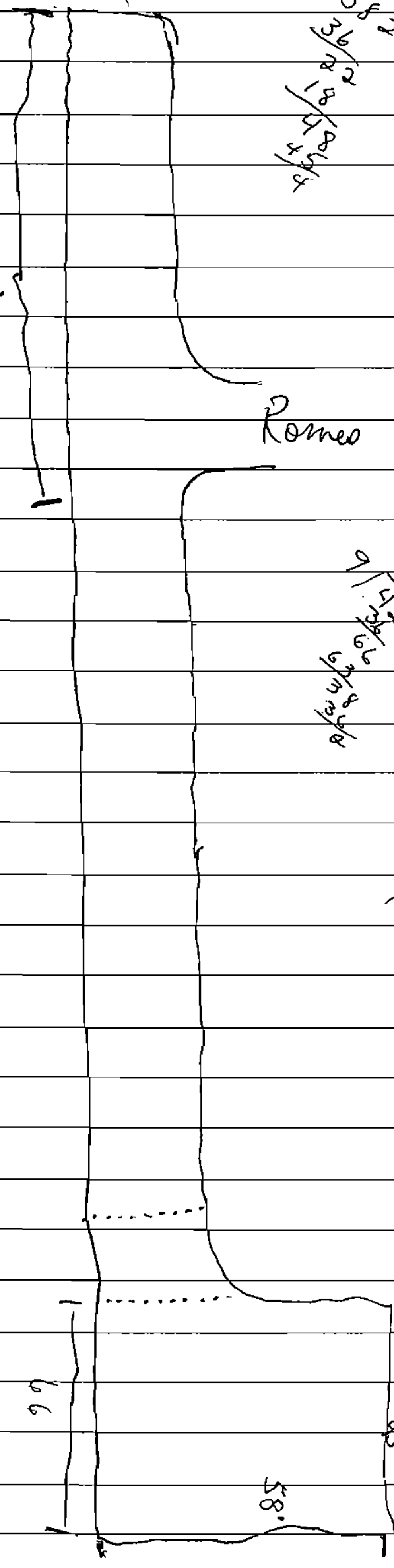
	DESCRIPTION	QTY	UNIT	UNIT PRICE	AMOUNT	Approx length of Project
Construction						
	Mobilization	1	LS	$ 5,000.00	$ 5,000.00	487.5
	Remove Existing Pvmt	650	SY	$ 12.00	$ 7,800.00	
	Unclassified Excavation	20	CY	$ 6.00	$ 120.00	
	10" thick 5000 PSI Conc. Pvmt.	650	SY	$ 55.00	$ 35,750.00	
	Block Sod	100	SF	$ 1.00	$ 100.00	
	SubTotal				**$ 48,770.00**	
Design/Inspection						
	Assume 10% of construction				**$ 4,877.00**	
Boring						
					$ 2,500.00	
					$ 2,500.00	
Testing	ECS				$ 3,000.00	
	SubTotal				**$ 3,000.00**	
				Total	**$ 59,147.00**	



1"=200' SN 10/1/04

9 sq. ft = 1 sq. yd.

9 | 3828 = 425.5



364 × 12 = 728, 364, 4368, 3528, 8496

4268

9 | 4268 = 474.2

600 × 12 = 1200, 600, 7,200

425.5 + 474.2 = 900.0 sq. yd.

900 sq. yds.

58 × 66 = 348, 348, 3828 sq. ft.

58 × 50 = 2900, 4268, 7168

40 × 66 = 240, 240, 2640

9 | 2640

9 | 1350 = 150

293.3

0 20 40 60 80
SCALE IN FEET

REGIONAL CONSTRUCTION CONC FUEL ROAD

STA

SAW CUT FULL DEPTH

PROPOSED 20' CONC ROADWAY

MATCH LINE STA 15+00

MATCH LINE STA 15+00

TALK TO DAVE/ LOU ABOUT TRANSITION

TAXIWAY C

NOTES:

1) STAGING AREA
2) PHASING -> UP TO CONTRACTOR AS LONG AS ACCESS IS MAINTAINED AT ALL TIMES
3) COORD W/ TOWER NOTE
4) BARRICADES PER AC 150/5370-2E
5) PVMT REMOVED SHALL BE DISPOSED OF BY CONTRACTOR, SUBSIDIARY TO OTHER ITEMS

6. CONTRACTOR WILL SOD DISTURBED AREAS SOD BID WILL BE SUBSIDIARY TO OTHER PAY ITEMS
7. REPAIR AREAS SHALL BE LEVELLED TO MATCH EXIST GRADE OF EXISTING PVMT

NO.	DATE	REVISION	APPRV.	NO.	DATE	REVISION	APPRV.

FOR INTERIM REVIEW ONLY
BY JENNIFER S. NICENAMOSE, P.E. - 87843
TOWN OF ADDISON
DATE ***DATE****
NOT FOR CONSTRUCTION, BIDDING, OR PERMIT PURPOSES

DESIGN	XXX	PROJECT NO. AIRPORT FUEL RD
CHECK	XXX	
DRAWN	XXX	
CHECK	XXX	
DATE	JAN 2005	
SCALE		

TOWN OF ADDISON

TOWN OF ADDISON
FUEL TRUCK DELIVERY ROAD

TOWN OF ADDISON, TEXAS

SHEET

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SCALE IN FEET

GENERAL NOTES

PROPOSED 20' CONC PVMT

EXIST ASPH PVMT

MATCH LINE STA 15+00

EXIST ASPH PVMT

MATCH LINE STA 15+00

PROPOSED 20' CONC PVMT

MATCH LINE STA 20+00

EXIST ASPH PVMT

POOR ORIENTATION

SMALLER

NO.	DATE	REVISION	APPROV.	NO.	DATE	REVISION	APPROV.

FOR INTERIM REVIEW ONLY
BY JENNIFER S. NICEVANDER, P.E. 87843
TOWN OF ADDISON
DATE 00DATE0000
NOT FOR CONSTRUCTION, BIDDING, OR PERMIT PURPOSES

DESIGN	XXX	PROJECT NO. AIRPORT FUEL RD
CHECK	XXX	
DRAWN	XXX	
CHECK	XXX	
DATE	JAN 2005	
SCALE		

TOWN OF ADDISON

TOWN OF ADDISON
FUEL TRUCK DELIVERY ROAD
FUEL ROAD PLAN
SHEETS
TOWN OF ADDISON, TEXAS
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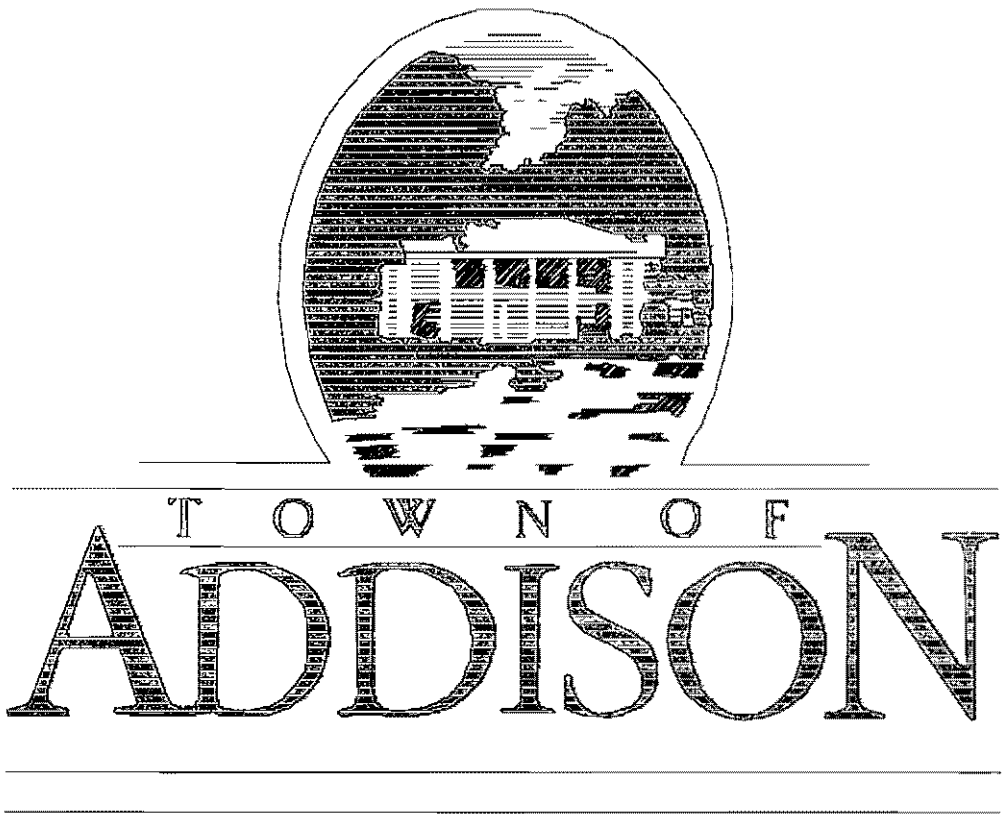
TOWN OF ADDISON

CONSTRUCTION SPECIFICATIONS AND CONTRACT DOCUMENTS

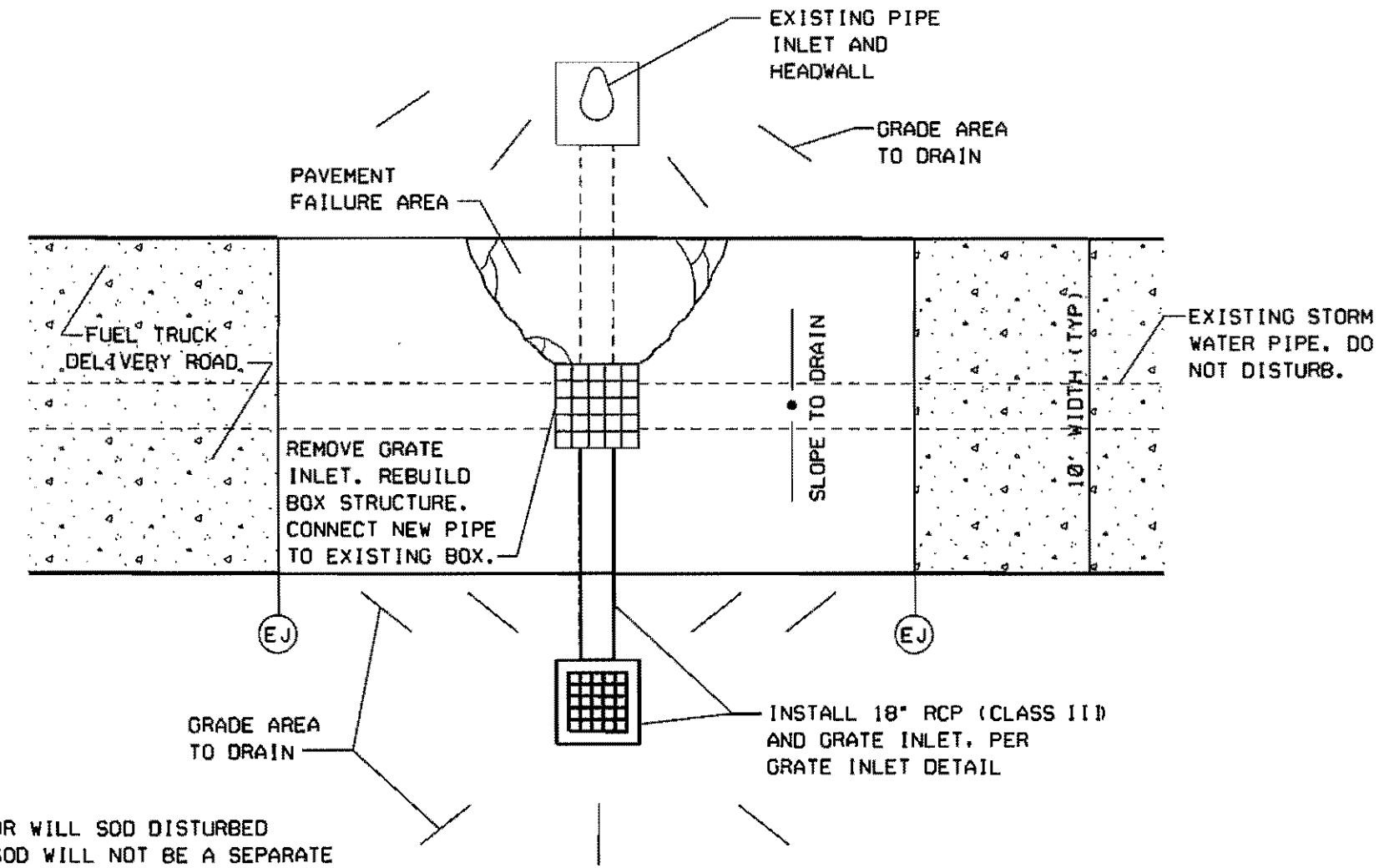
PAVING REPAIR FOR THE FUEL TRUCK ROADWAY
ADDISON AIRPORT



Town of Addison
16801 Westgrove
Addison Texas 75001

February 2005

NOT TO SCALE



NOTES

1. CONTRACTOR WILL SOD DISTURBED AREA. THE SOD WILL NOT BE A SEPARATE PAY ITEM.
2. REMOVED PAVEMENT SHALL BE DISPOSED OF BY CONTRACTOR. SUBSIDIARY TO OTHER ITEMS.
3. REMOVED PAVEMENT WILL BE REPLACED WITH CONCRETE PAVEMENT AS SHOWN IN TYPICAL SECTION 18.

LEGEND

PAVEMENT REMOVAL AREA

EXISTING FUEL TRUCK CONCRETE PAVEMENT

(EJ) EXSISTING JOINT

ADDISON AIRPORT

FUEL TRUCK DELIVERY ROAD

REPAIR AREA TYPE 'A'

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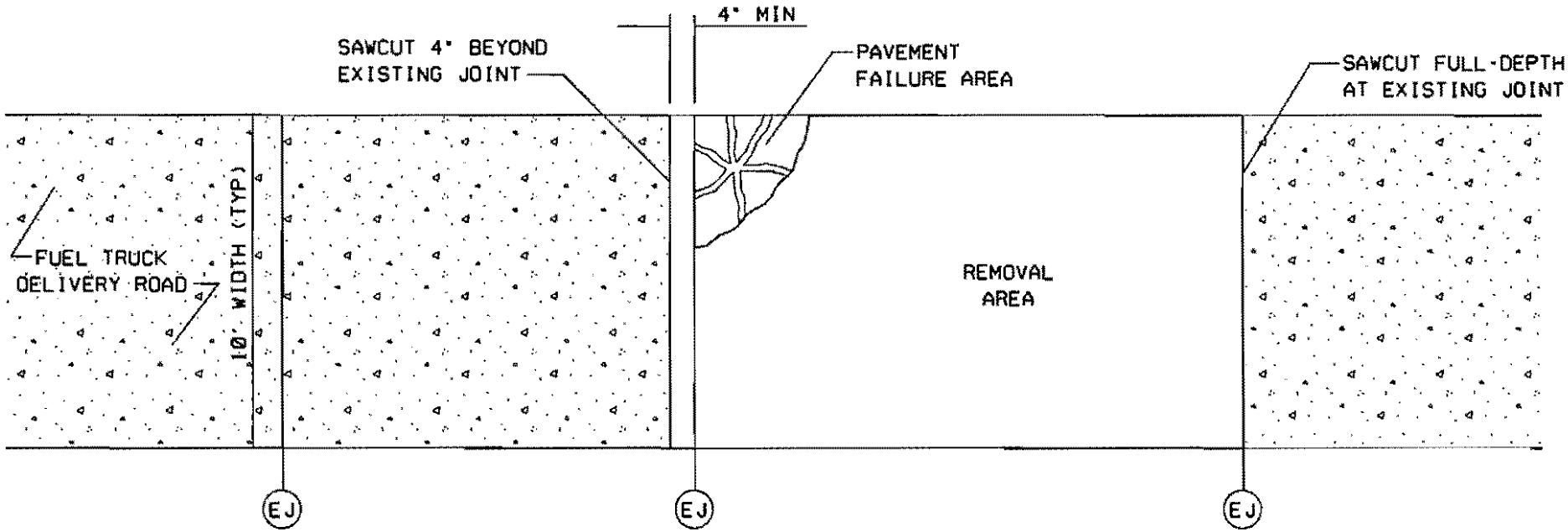
NOT TO SCALE



NOTES

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2. REMOVED PAVEMENT SHALL BE DISPOSED OF BY CONTRACTOR. SUBSIDIARY TO OTHER ITEMS.
3. REMOVED PAVEMENT WILL BE REPLACED WITH CONCRETE PAVEMENT AS SHOWN IN TYPICAL SECTION 1A.

LEGEND

PAVEMENT REMOVAL AREA

EXISTING FUEL TRUCK CONCRETE PAVEMENT

(EJ) EXSISTING JOINT

ADDISON AIRPORT

FUEL TRUCK DELIVERY ROAD

REPAIR AREA TYPE 'B'

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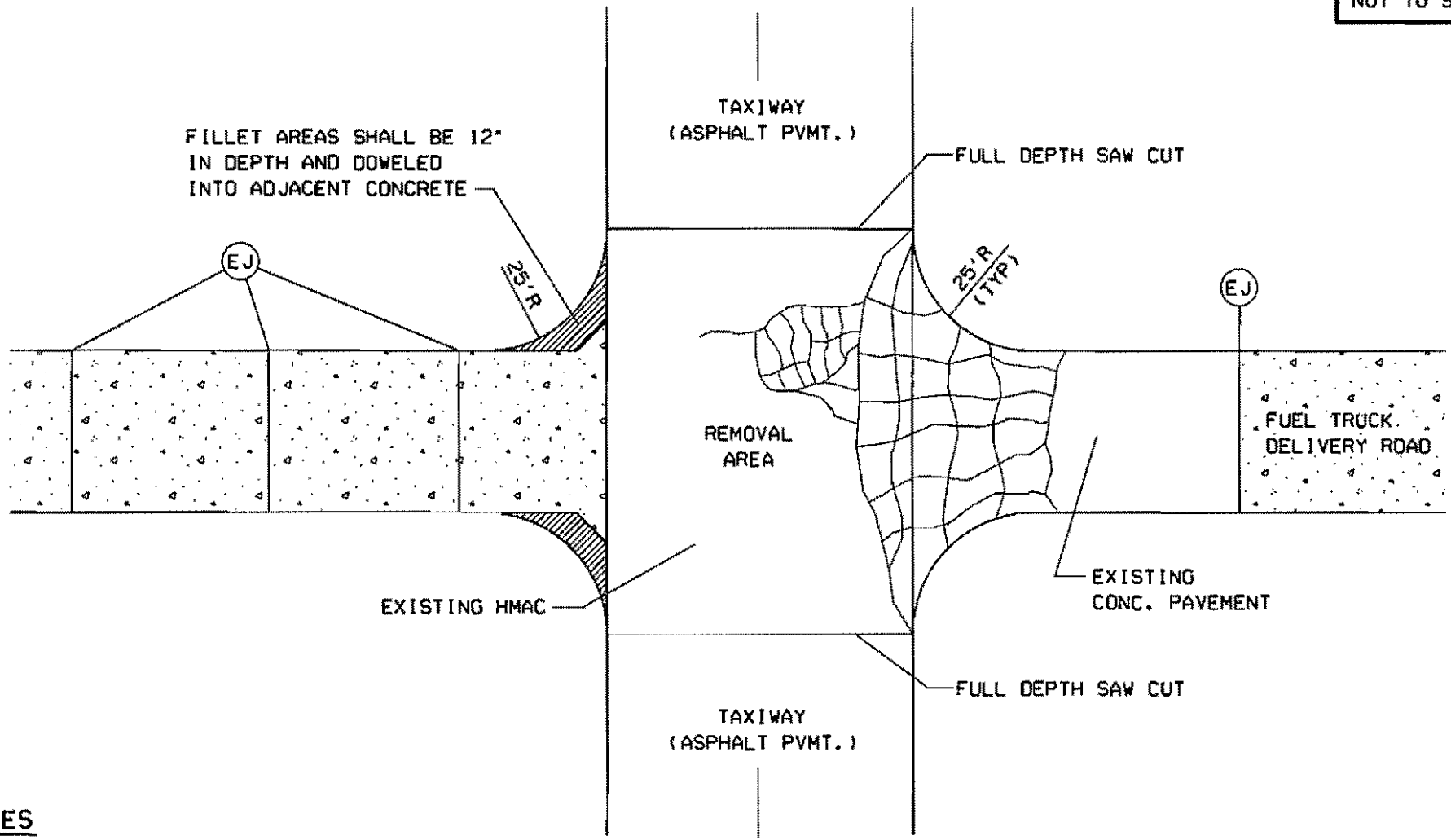
NOT TO SCALE



NOTES

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2. REMOVED PAVEMENT SHALL BE DISPOSED OF BY CONTRACTOR. SUBSIDIARY TO OTHER ITEMS.
3. REMOVED PAVEMENT WILL BE REPLACED WITH CONCRETE PAVEMENT AS SHOWN IN TYPICAL SECTION 1A.

LEGEND

- PAVEMENT REMOVAL AREA
- EXISTING FUEL TRUCK CONCRETE PAVEMENT
- RADIUS FILLETS
- (EJ) EXISTING JOINT

ADDISON AIRPORT

FUEL TRUCK DELIVERY ROAD

REPAIR AREA TYPE 'C'

...\Cad\Exhibits\FuelRoute3.dgn 12/28/2004 11:12:21 AM

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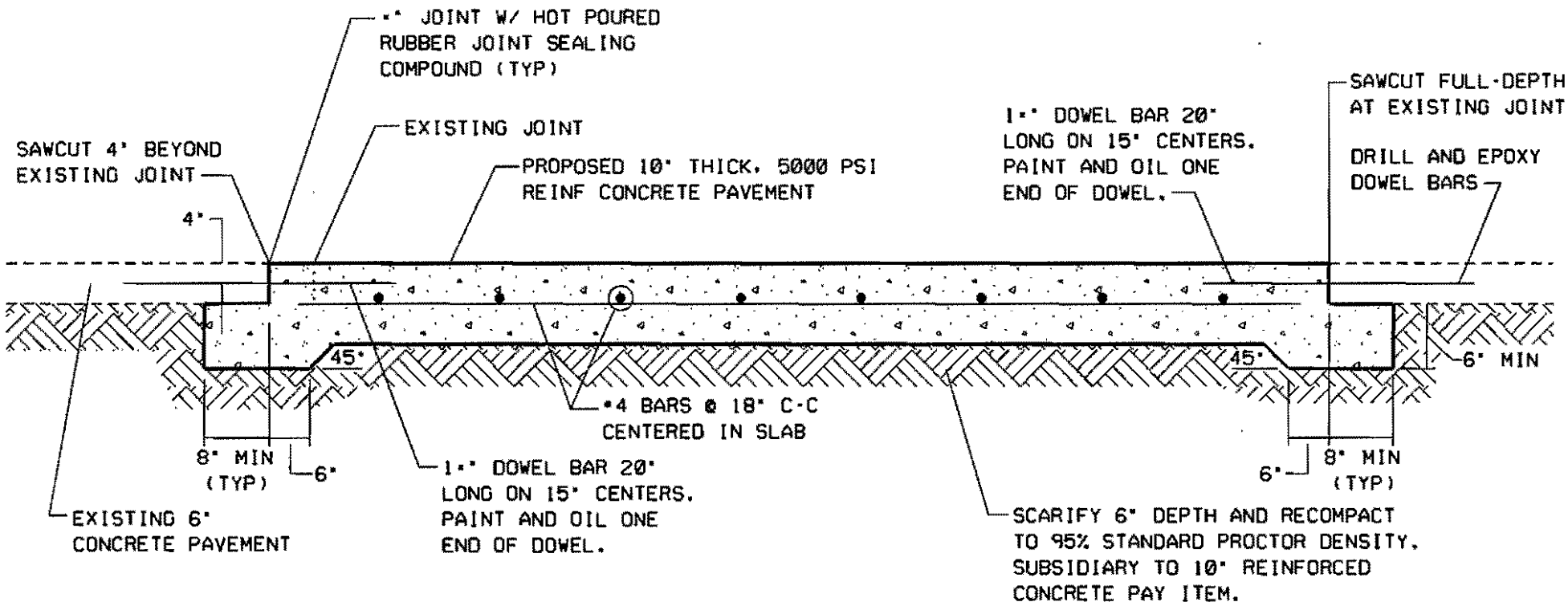

ADDISON AIRPORT

FUEL TRUCK DELIVERY ROAD

TYPICAL SECTION 1A
CONCRETE PAVEMENT REPLACEMENT
ADJACENT TO CONCRETE

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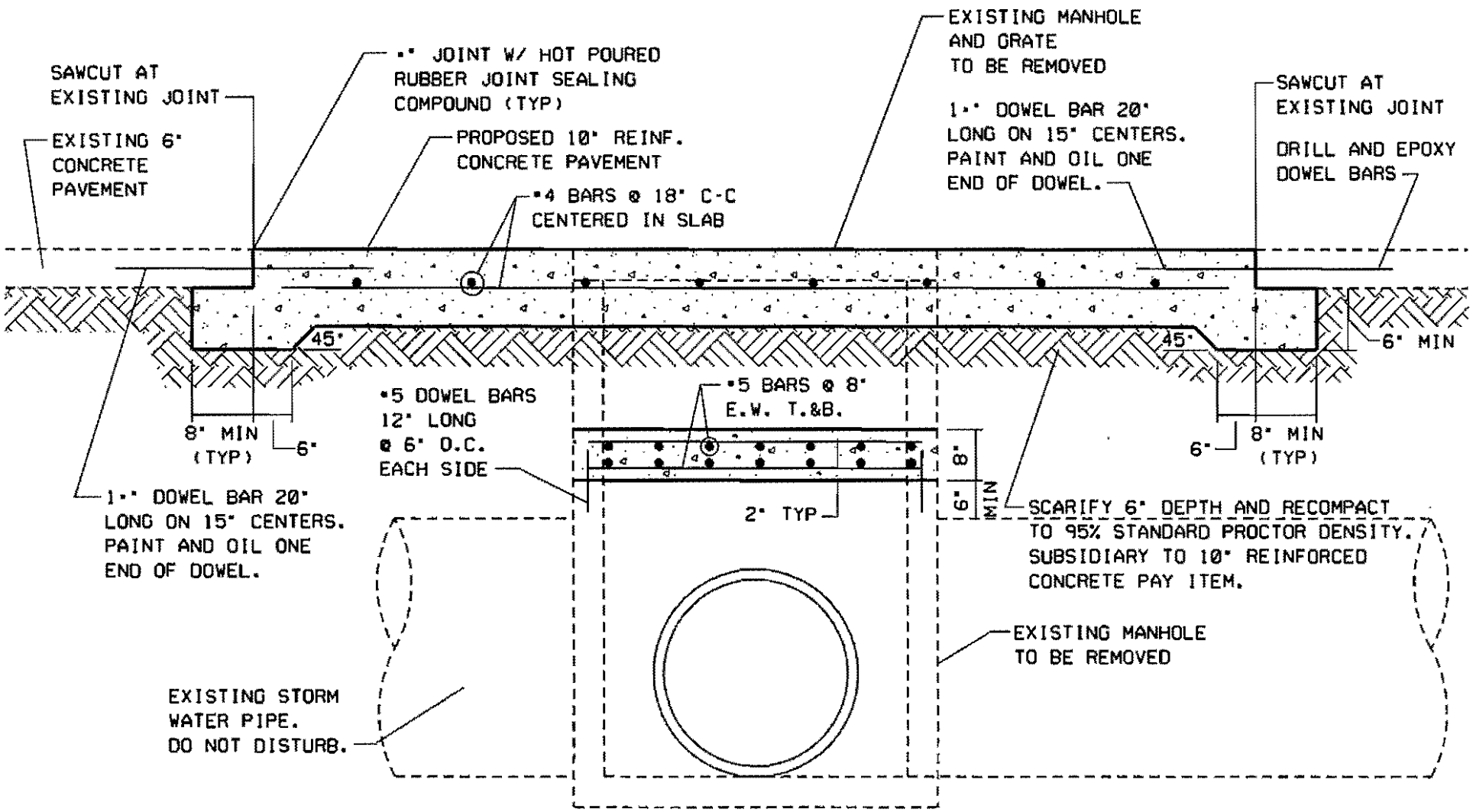

ADDISON AIRPORT

FUEL TRUCK DELIVERY ROAD

TYPICAL SECTION 1B

CONCRETE PAVEMENT REPLACEMENT ADJACENT TO MANHOLE

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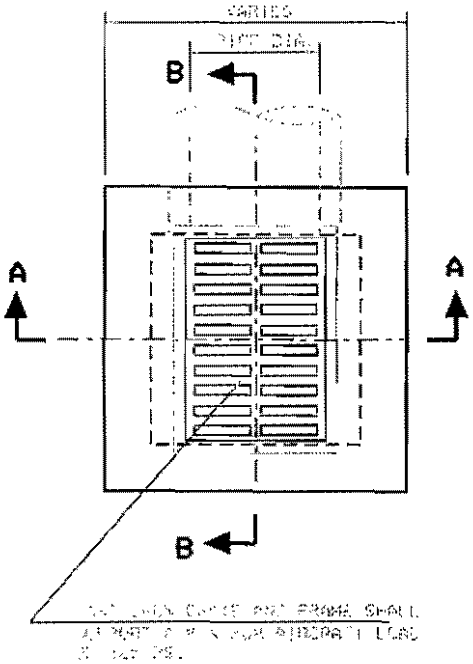
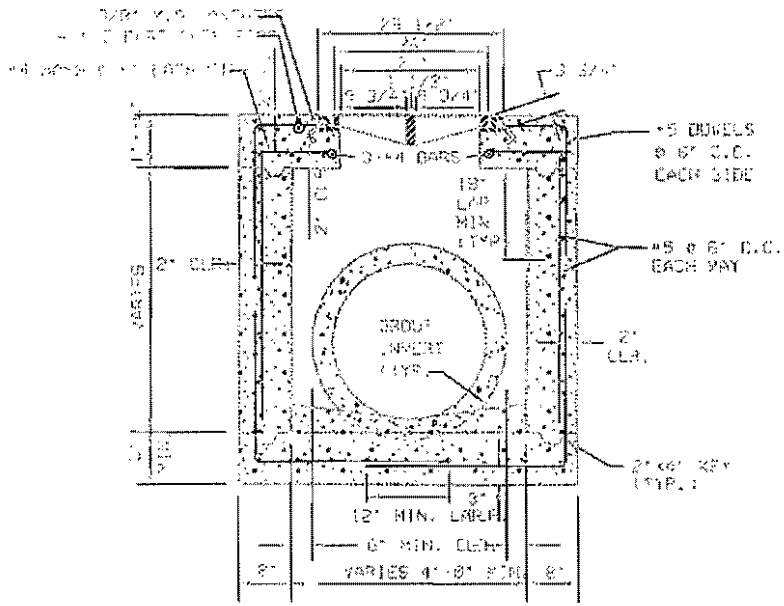
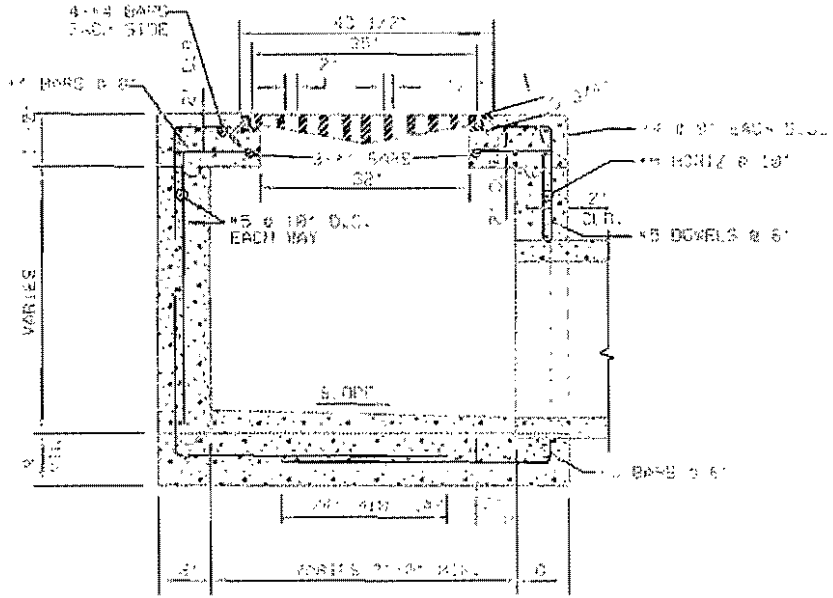
NOT TO SCALE



PLAN - TYPE "B" GRATE INLET
SCALE: NONE



TYPE "B" GRATE INLET - SECTION "A-A"
SCALE: NONE



TYPE "B" GRATE INLET - SECTION "B-B"
SCALE: NONE

ADDISON AIRPORT

FUEL TRUCK DELIVERY ROAD

GRATE INLET DETAILS

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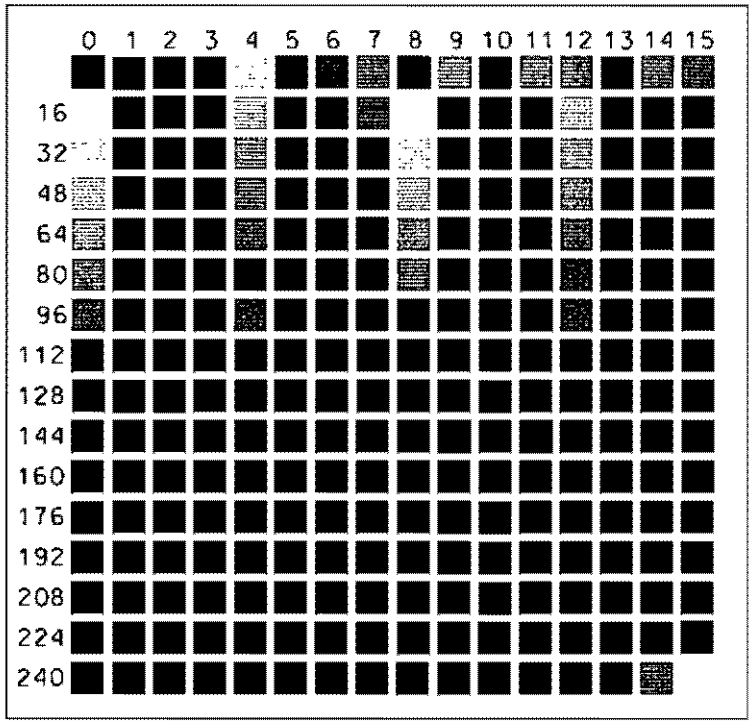


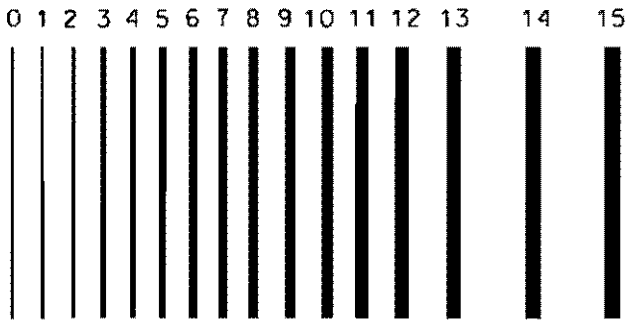
This file can be used as a test file to check mapping of colors. Line weights and Fonts to Acad or MicroStation.

To remap MicroStation Colors to Acad use the DGNtoAcadColor.csv

To remap MicroStation Line Weights to R14 Colors use DGNtoR14LineWt.csv

To remap MicroStation Text to True Type or other Text use Font.csv

Line weight



Font

Standard 0 = Courier New

Fancy 2 = Garamond

Engineering 3 = Monotext

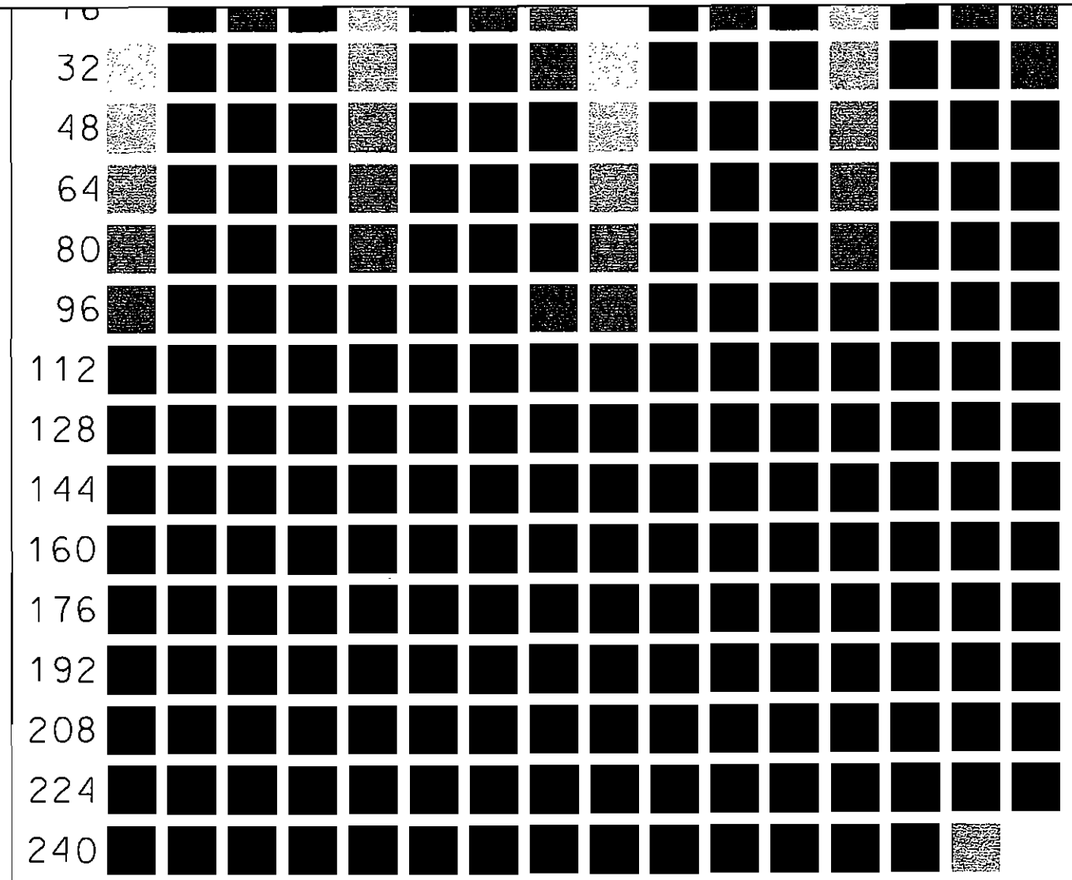
IntlWorking = RomanC

214535193

3d

$3/sf 655

...\General\dgn\ColorTblWt.dgn 02/18/2005 03:34:57 PM



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To remap MicroStation Line Weights
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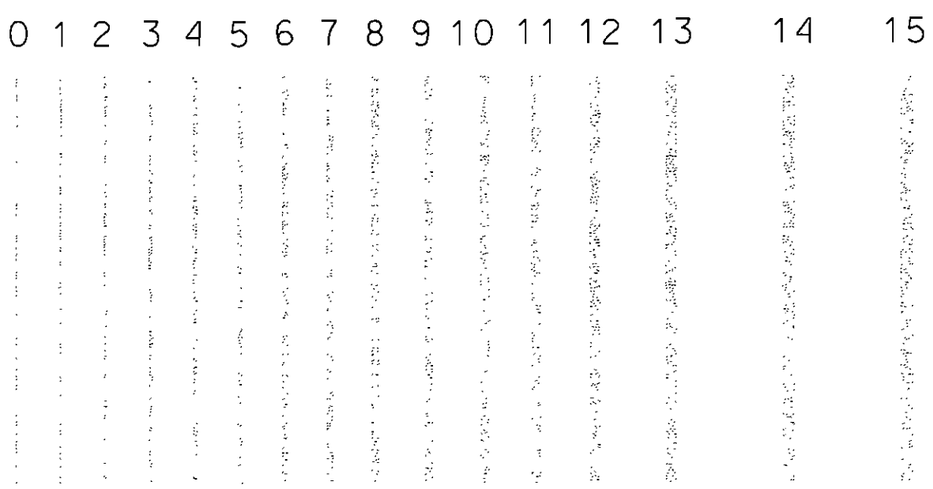
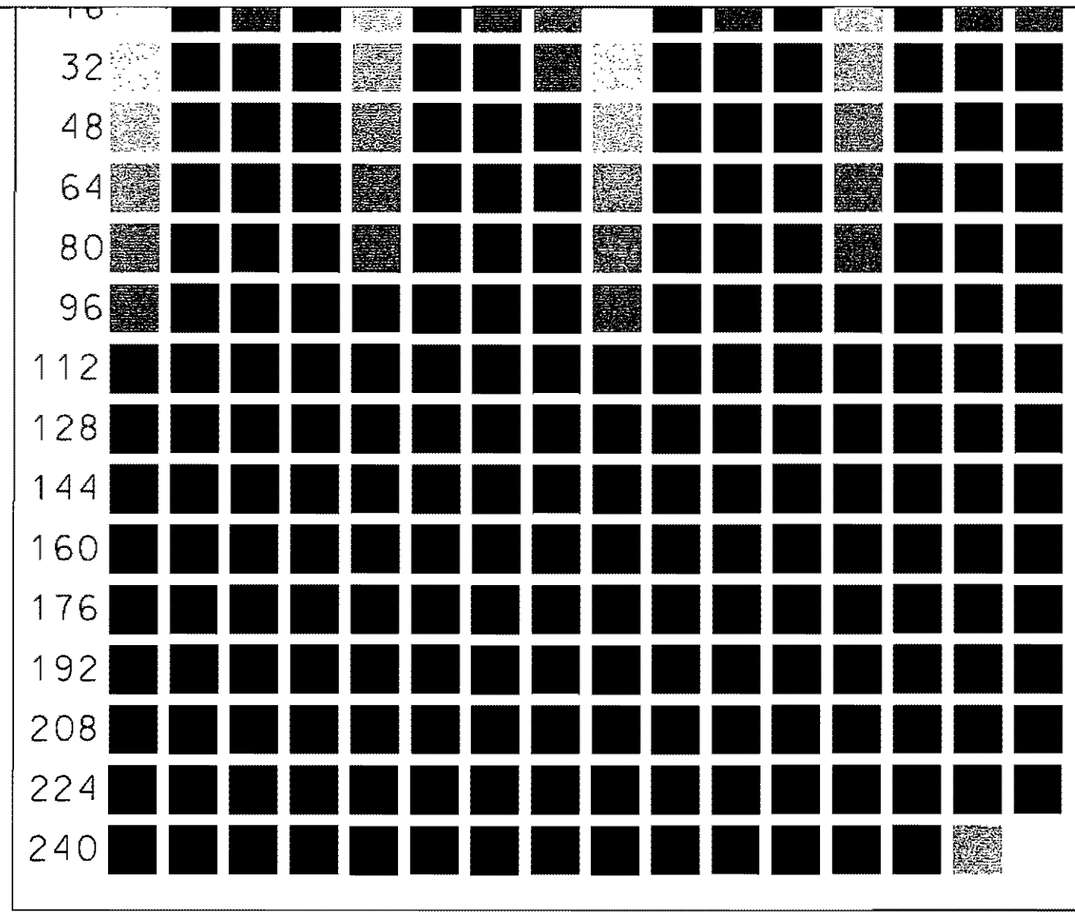
To remap MicroStation Text to True Type
or other Text use Font.csv

Line weight



Font

Standard Ø = Courier New
Fancy 2 = Garamond
Engineering 3 = Monotext
IntlWorking = RomanC



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Line weight

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Font

Standard 0 = Courier New
Fancy 2 = Garamond
Engineering 3 = Monotext
IntlWorking = RomanC

MAS-TEK Engineering
& Associates, Inc.

April 28, 2005
Proposal 4-03-C

Ms. Jennifer Nicewander, P.E.
Project Manager
16801 West Grove Dr.
P.O. Box 9010
Addison, Texas 75001-9010

Re: Material Testing
Airport Vehicle Access Road
Addison Airport
Addison, Texas

Dear Ms. Nicewander:

Mas-Tek Engineering & Associates, INC. (MTE) is honored to submit this proposal for Ms. Jennifer Nicewander with The Town of Addison. MTE is certified with AASHTO in which satisfies ASTM E329. We are confident in our ability to assist you in the near future. Our capabilities are met at very high standards. MTE has performed services with the Addison Airport which demonstrates our familiarity with the specifications and expectation.

MTE appreciate the opportunity to submit this cost proposal. We look forward to providing very high quality construction materials testing services to The Town of Addison. If you have any further question or comments, Please do not hesitate to contact me @ (972) 709-7384. Please sign below as we will accept notice to proceed.

Sincerely,

Mas-Tek Engineering & Associates, Inc.

Stephen Douglas-Mason
President

The Town of Addison

Attachment: Schedule of Fees

SCHEDULE OF FEES
FOR
CONSTRUCTION MATERIALS ENGINEERING & TESTING
Airport Vehicle Access Road, Addison Airport, Addison, Texas PROPOSAL NO. P05-0448C

DESCRIPTION OF SERVICES	QUANTITY		UNIT FEE	UNIT	FEE
A. ASPHALT PAVING TESTING & INSPECTION					
• Asphalt Extraction & Gradation(1 per 500Tons per day)	2	@	$145.00	each	$290.00
• Lab Molded Densities (3 per set)	2	@	$35.00	each	$70.00
• Maximum Theoretical Specific Gravities	2	@	$80.00	each	$160.00
• Stability Tests (3 per set)	2	@	$80.00	each	$160.00
• Asphalt Core Thickness Measurements (6" dia. 3 per set)	2	@	$65.00	each	$130.00
• Asphalt core densities	6	@	$25.00	each	$150.00
• Certified Asphalt Field Technician	16	@	$47.50	hour	$760.00
• Project Manager	2	@	$75.00	hour	$150.00
• Vehicle Charge	2	@	$25.00	trip	$50.00
				Sub-Total	**$1,920.00**
B. Flex. Base Testing					
• Moisture-Density Relationship	1	@	$145.00	each	$145.00
• Atterberg Limints	1	@	$45.00	each	$45.00
• Field Density Testing (ASTM D-2922)	6	@	$15.00	each	$90.00
• Senior Engineering Technician	8	@	$35.00	hour	$280.00
• Vehicle Charge	2	@	$25.00	each	$50.00
				Sub-Total	**$610.00**
C. Concrete Testing and Inspection					
• Concrete Cylinder Test (3 cyls per 100CY per day)	15	@	$15.00	each	$225.00
• Review of concrete mix design (if needed)	1	@	$75.00	each	$75.00
• Aggregate Gradation Test (if needed)	0	@	$45.00	each	$0.00
• Senior Engineering Technician	12	@	$35.00	hour	$420.00
• Vehicle Charge	2	@	$25.00	each	$50.00
				Sub-Total	**$770.00**
				Total Estimate	**$3,300.00**

SCHEDULE OF FEES
FOR
CONSTRUCTION MATERIALS ENGINEERING & TESTING
Airport Vehicle Access Road, Addison Airport, Addison, Texas PROPOSAL NO. P05-0448C

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				Sub-Total	**$770.00**
				Total Estimate	**$3,300.00**

Phone call w/ Mike H

3280

ECS e Serv 34996

Eng aly 28336

↳ Print design only

[ECS - 3 Print des. options

Print Design

WOL - Waiver of Lien - Take out completely ✓ TOC-100

Geotech Report - We dont want to have to furnish this thick document to every bidder -

Para 49 - See comments (Sp 15)
Lets say a complete copy of this report is available for review in Shannas office & Public Wks office

---

Specs - Need concrete, asphalt - - -
put on plans! Make sure everything shown on the plans has a spec.
Call out concrete finish
Call out fine grading before sodding
Call out dust, dirt, gravel control

Airport Fuel Truck Roadway 1-30-05

Need unit prices for bidding following page PF 3 in proposal. (A+B)

GP 2 - Check need for umbrella policy against new insurance requirements.

SP-9 Total Incentive Payment ~~of~~ shall not exceed $5,000.00 $500. Over 120 days non-responsive is good.

SP-12 - Traffic control should be modified to suit this project being done on the airport.

SP-13 Contractor should submit the mix design for approval. The Town will hire a testing lab to take samples & do testing.

SP-14 Modify for airport

SP-19 - Para 53 A project trailer is not required for this project. Staging area requirements shall be discussed at the pre construction conference.

P54...

P 57 REMOVE THIS PARA IN ITS ENTIRETY No contractor will agree to this - This para caused major problems with Arapahoe Ph. III Bidders and had to be eliminated,

SCHEDULE OF FEES

FOR

CONSTRUCTION MATERIALS ENGINEERING & TESTING

Airport Vehicle Access Road, Addison Airport, Addison, Texas PROPOSAL NO. P05-0448C

DESCRIPTION OF SERVICES	QUANTITY	UNIT FEE	UNIT	FEE

NOTES:

1. Overtime rates of 1.5 times the regular hourly rate will be charged for hours worked over eight (8) hours per day Monday thru Friday or any time **before 7:00 a.m. or after 5:00 p.m.** Service performed on Saturdays and Sundays will be billed at 1.5 times the regular hourly rate. Services performed on recognized holidays will be billed at 2.0 times the regular hourly rate.
2. All laboratory test fees are F.O.B. our laboratory; additional charge for sample pickup may apply.
3. Any additional tests will be billed on a hourly rate and charged at the applicable rate, portal-to-portal.
4. Additional test not specified in this proposal will be quoted upon request.
5. This proposal does not include any technician stand-by, non-readiness charges, and/or trips or re-tests of the previous falling tests.