

May 19, 2020

To: Plan Holders for Improvements to the
Memphis Memorial Airport
Memphis, Missouri
MoDOT Project No. 19-026A-1

Transmitted herewith is Addendum **No. 1** to the Issued for Bid Contract Documents, Specifications and Plans dated May 4, 2020 for Improvements to the Memphis Memorial Airport.

Schedule I - Apron Expansion
Schedule II - 8 Unit T-Hangar
Schedule III - 2 Additional T-Hangars
Schedule IV - 2 Additional T-Hangars

- Changes/Clarifications

As a reminder, bids are due Friday, June 5, 2020 at 2:00 PM as provided in this addendum.

Sincerely,

Jviation, Inc.



Bryan Gregory, P.E.
Project Manager

**ADDENDUM NO. 1
TO
CONTRACT DOCUMENTS, SPECIFICATIONS AND PLANS
FOR IMPROVEMENTS TO THE
MEMPHIS MEMORIAL AIRPORT
MEMPHIS, MISSOURI
MODOT PROJECT NO. 19-026A-1**

To All Bidders: You are requested to make all changes and/or additions contained in this addendum to the Bidding Documents. Failure to acknowledge this Addendum in Proposal shall result in rejection of bid. Bidders are informed that the above referenced Contract Documents, Specifications and Plans are modified as follows as of May 19, 2020:

1. PLANS

Plans Sheet G002

Revision: Reissued Sheet

Justification: Quantities changes were made to the electrical bid items

Plans Sheet C200

Revision: Reissued Sheet

Justification: Note 7 was added discussing the contractor will be responsible for patching back the electrical crossing, by others.

Plans Sheet E1.00

Revision: New callout added to sheet "1-2.5" pvc conduit (DEB), see sheet E200 for continuation"

Justification: Adjusted connection to building

Plans Sheet E200

Revision: Reissued Sheet

Justification: Clarified what items are to be completed by the contractor vs. Tri-County Electric

Plans Sheet E250

Revision: Reissued Sheet

Justification: Clarified how electrical connections to the proposed T-Hangars would be constructed

2. CONTRACT DOCUMENTS/SPECIFICATIONS

Contract Documents.

Sections:

- ◆ Request for Bids/Invitation for Bids, first paragraph
- ◆ Section 1, page 1-1, first paragraph

- ◆ Section 2, page 2-1, item 5.

Revision: Changed bid opening date to Friday, June 5, 2020 and changed City Hall address to 125 W. Jefferson.

Justification: Bid opening date was moved back and the address for the City Hall was updated to their new address.

Contract Documents – Request for Bids/Invitation for Bids.

Section: Pre-Bid Conference.

Revision: Added paragraph addressing on-going restrictions associated with COVID-19.

Justification: Provided instructions on how any change for the pre-bid conference or bid opening will be addressed.

Contract Documents – Notice to Bidders.

Section: Contract Work Items.

Revision: The table was updated to reflect changes in quantities.

Justification: Quantities changes were made to the electrical bid items.

Contract Documents – Notice to Bidders.

Section: Disadvantaged Business Enterprise – 49 CFR Part 26, page 1-4.

Revision: This paragraph was updated to reflect the DBE goal of 6%.

Justification: The DBE goal of 6% was provided after the documents were released for bid.

Contract Documents – Part 1 General Contract Provisions

Section: Section 70, subsection 70-06, Sanitary, Health, and Safety Provisions, page 3-30.

Revision: This section provides awareness of COVID-19 guidance from the CDC.

Justification: This revision coincides with the recent updated MoDOT Job Special Provision (JSP) language added to MoDOT construction projects.

Contract Documents – Part B – DBE Administration

Section: Item 3, Award Documentation and Procedures, page 4-34.

Revision: Provides new contact information for administrative considerations for DBE good faith efforts.

Justification: Missy Stuedle replaced Lester Woods, Jr. as the new External Civil Rights Director.

Contract Documents – Part C Local Provisions.

Section: Item 18, Liquidated Damages, page 4-41; Section 80-08

Revision:

- Paragraph 3 of Item 18 was corrected to reflect “\$750/calendar day(s) for each day that the work remains uncompleted for non-use compensation to the Owner.
- The “Straight Time” hourly rates for the construction manager and engineer were corrected.

Justification: Updated the rate per calendar day for non-use to the Owner and the straight time hourly rates associated with liquidated damages.

Contract Documents - Technical Specifications

Section: Section 5, Table of Contents.

Revision: The footer was corrected.

Justification: Footer incorrectly referred to review status.

Contract Documents - Appendix B

Section: Construction Safety and Phasing Plan

Revision: The footer was corrected.

Justification: Footer incorrectly referred to review status.

Contract Documents - Appendix C

Section: Geotechnical Report

Revision: The footer was corrected.

Justification: Footer incorrectly referred to review status.

Contract Documents – Proposal Form.

Section: Pages B1 through B37 (excludes the Bid Proposal Summary and the bid forms for the four schedules).

Revision:

- Page B-1 – Added the description of the four bid schedules.
- Page B-3
 - ◆ Updated paragraph g. to include the number of calendar days;
 - ◆ Updated paragraph h. to reflect \$750 per calendar day for non-penal amount to the Owner for non-use; and
 - ◆ Provided the established DBE goal of 6%.

- Page B-25 – Added the description of the four bid schedules.
- Page B-29 – Added the description of the four bid schedules.
- Page B-33 – Added the description of the four bid schedules.
- Page B-34
 - ◆ Clarified 210 calendar for the contract time.
 - ◆ Clarified \$750 per calendar day in liquidated damages to Owner for non-use if not completed in the authorized contract time.

Justification: Correct missing information and updates for the bid form.

Note duplicate pages at the end of the document were removed.

No changes were made to Section 5, the technical specifications, or the contents of the appendices.

**** END OF ADDENDUM NO. 1 ****

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 C:\3D11910 Apron Expansion\CAD\PLAN\500403D - 19206A - G002-INDX.dwg


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SHEET NO.	SHEET I.D.	SHEET DESCRIPTION
1	G001	COVER SHEET
2	G002	INDEX OF DRAWINGS
3	G003	GENERAL NOTES
4	G004	GENERAL NOTES
5	G005	MASTER LEGEND AND ABBREVIATIONS
6	G006	SURVEY CONTROL PLAN
7	G020	GEOTECHNICAL INVESTIGATION PLAN AND BORE LOG LEGEND
8	G021	GEOTECHNICAL INVESTIGATION BORE LOGS
9	G050	CONSTRUCTION SAFETY PLAN - OVERALL PHASING
10	G051	CONSTRUCTION SAFETY NOTES AND DETAILS
11	G052	CONSTRUCTION SAFETY PLAN - SCHEDULE I THROUGH SCHEDULE IV PHASING PLAN
12	C200	GEOMETRY PLAN
13	C220	TYPICAL SECTIONS
14	C250	GEOMETRY DETAILS AND NOTES
15	C300	GRADING AND SPOT ELEVATION PLAN
16	C400	PAVEMENT MARKING PLAN
17	C420	PAVEMENT MARKINGS DETAIL
18	C500	EROSION CONTROL PLAN
19	C550	EROSION CONTROL DETAILS
ARCHITECTURAL		
20	A0.01	GENERAL INFORMATION/INDEX
21	A0.02	CODE ANALYSIS/EGRESS PLAN LEVEL
22	A1.01	BUILDING FLOOR PLAN
23	A2.01	ROOF PLAN
24	A3.01	BUILDING ELEVATIONS
25	A4.01	BUILDING SECTIONS
26	A5.01	WALL SECTIONS
27	A5.02	WALL TYPES AND DETAILS
28	A6.01	DOOR SCHEDULE
29	A7.01	EXTERIOR DETAILS
30	E0.01	ELECTRICAL LEGEND AND GENERAL NOTES
31	E1.00	ELECTRICAL LIGHTING AND POWER PLAN
32	E2.00	ELECTRICAL PANEL SCHEDULE AND DETAILS
ELECTRICAL		
33	E200	ELECTRICAL GEOMETRY PLAN
34	E250	ELECTRICAL DETAILS

SUMMARY OF APPROXIMATE QUANTITIES										
ITEM NO.	ITEM DESCRIPTION	UNITS	SCHEDULE I		SCHEDULE II		SCHEDULE III		SCHEDULE IV	
			ESTIMATE	AS BUILT	ESTIMATE	AS BUILT	ESTIMATE	AS BUILT	ESTIMATE	AS BUILT
C-100a	CONTRACTOR QUALITY CONTROL PROGRAM	LS	1		0		0		0	
C-102a	TEMPORARY EROSION CONTROL	LS	1		0		0		0	
C-105a	MOBILIZATION	LS	1		1		1		1	
P-101a	PARTIAL DEPTH PAVEMENT REMOVAL	SY	100		0		0		0	
P-101b	REMOVAL OF DRAINAGE	LS	1		0		0		0	
P-152a	UNCLASSIFIED EXCAVATION	CY	2,500		1,500		462		462	
P-152b	SUBGRADE PREPARATION - 24 INCHES	SY	3,700		0		0		0	
P-152c	OVEREXCAVATION AND REPLACEMENT	CY	685		0		0		0	
P-152d	IMPORT AND PLACE LOW VOLUME CHANGE (LVC) GRANULAR FILL	CY	0		1,350		420		420	
P-208a	AGGREGATE BASE COURSE	CY	705		0		0		0	
P-208b	SEPARATION GEOTEXTILE	SY	3,700		0		0		0	
P-401a	ASPHALT SURFACE COURSE	TON	830		0		0		0	
P-401b	ASPHALT BINDER	TON	55		0		0		0	
P-603a	EMULSIFIED ASPHALT TACK COAT	GAL	500		0		0		0	
P-620a	AIRPORT PAVEMENT MARKING - PERMANENT	SF	1,500		0		0		0	
P-620b	AIRPORT PAVEMENT MARKING (BLACK)	SF	2,450		0		0		0	
P-640a	AIRCRAFT TIEDOWN ANCHOR	EA	21		0		0		0	
T-901a	SEEDING	AC	2		0		0		0	
DIV-26a	T-HANGAR BUILDING ELECTRICAL	LS	0		1		1		1	
DIV-26b	INSTALL 3/0 AWG, 600V INSULATED COPPER WIRE	LF	930		0		0		0	
DIV-26c	INSTALL #6 AWG, 600V INSULATED COPPER WIRE	LF	310		0		0		0	
L-110a	INSTALL 1-2.5" SCHEDULE 40 PVC CONDUIT (DEB)	LF	280		0		0		0	
A-100a	CONCRETE FOUNDATION AND SLAB - 8 UNIT T-HANGARS	LS	0		1		0		0	
A-100b	PRE-ENGINEERED METAL BUILDING - 8 UNIT T-HANGARS (COMPLETE)	LS	0		1		0		0	
A-100c	BI-FOLD HANGAR DOOR	EA	0		8		2		2	
A-100d	INSULATE EXTERIOR WALLS, ROOF, AND DOOR WITH MINIMUM R-13 INSULATION	LS	0		1		1		1	
A-101a	ADDITIONAL CONCRETE FOUNDATION AND SLAB - 2 UNIT T-HANGARS	LS	0		0		1		1	
A-101b	ADDITIONAL PRE-ENGINEERED METAL BUILDING - 2 UNIT T-HANGARS	LS	0		0		1		1	
L-126a	RETROREFLECTIVE MARKER	EA	20		0		0		0	

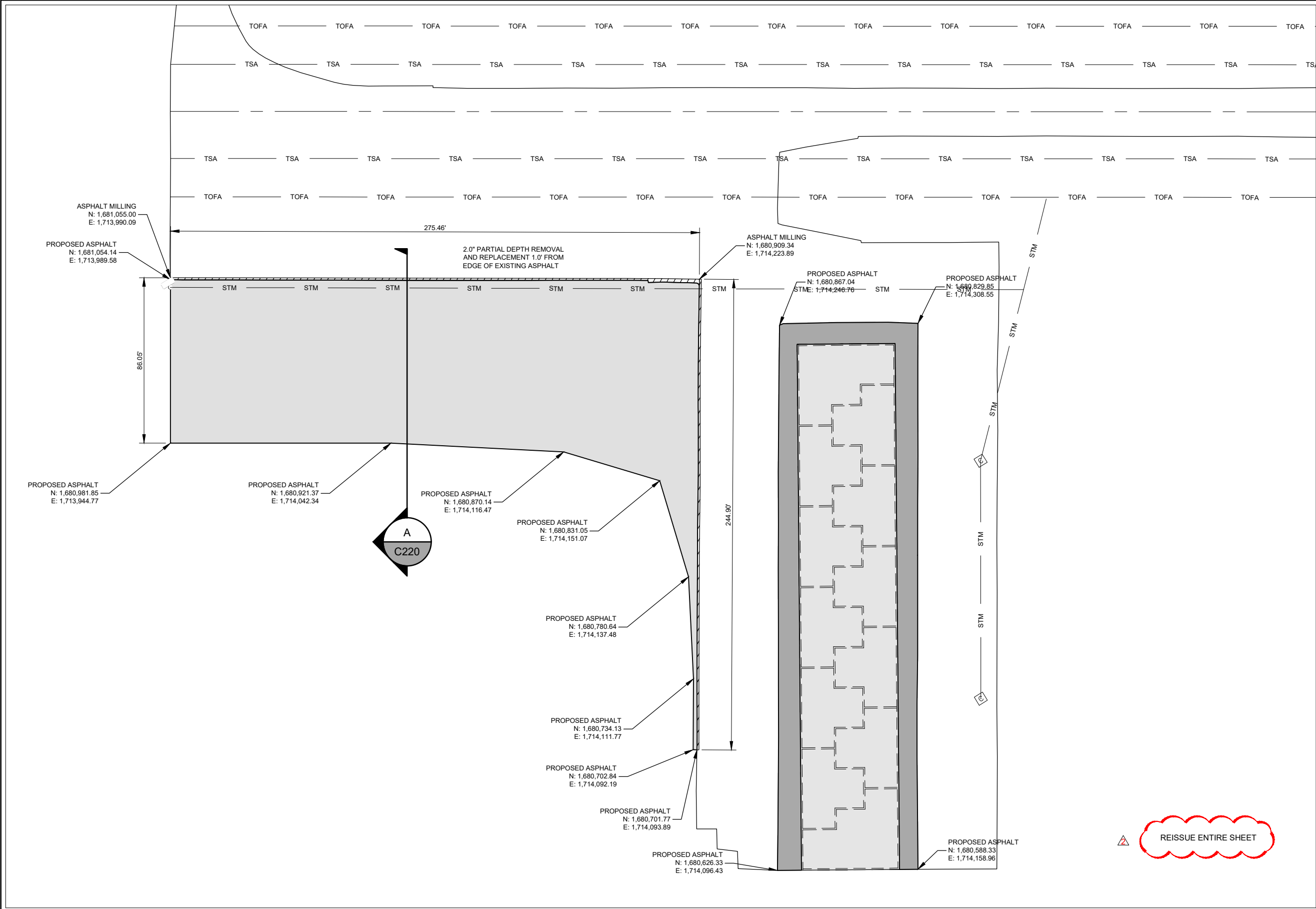


REISSUE ENTIRE SHEET

ISSUED FOR BID		
		
BRYAN S. GREGORY	2006019659	5/4/2020
NAME	REG. NO.	DATE
FOR AND ON BEHALF OF JVIATION, INC.		

	MEMPHIS MEMORIAL AIRPORT	DES: L.K.R.	ISSUE RECORD				APRON EXPANSION AND T-HANGAR CONSTRUCTION	INDEX OF DRAWINGS		SHEET NAME
		DR: L.K.R.	NO.	BY	DATE	DESCRIPTION				G002
		CH: C.L.G.	1	B.S.G.	5/4/2020	ISSUED FOR BID				SHEET NO.
		APP: B.S.G.	2	B.S.G.	5/13/2020	ADDENDUM NO. 1		2 of 34		
				AIP PROJ. NO. MODOT 19-026A-1		JVIATION PROJ. NO. 2019.03D.01				

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GEOMETRY LEGEND

PROPOSED FULL DEPTH ASPHALT PAVEMENT

PARTIAL DEPTH BUTT JOINT

NOTES:

1. CONTRACTOR TO USE SURVEY CONTROL POINTS AS SHOWN ON SHEET G005 "SURVEY CONTROL PLAN"

2. SEE SHEETS G050 THRU G052 FOR CONSTRUCTION PHASING.

3. SEE SHEETS C220 FOR TYPICAL SECTIONS.

4. SEE SHEETS C400 FOR PAVEMENT MARKING INFORMATION.

5. ANY PAVEMENT DAMAGE DURING CONSTRUCTION OUTSIDE OF THE PROPOSED PROJECT REMOVAL LIMITS SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER. ALL COSTS ASSOCIATED WITH CONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

6. CONTRACTOR SHALL PROTECT ALL EXISTING UTILITIES.

7. CONTRACTOR SHALL PATCH ASPHALT AT LOCATION WHERE NEW ELECTRIC LINE CROSSES ENTRANCE ROAD. ASPHALT PATCH SHALL BE 4" THICK. ASPHALT REMOVAL, TRENCHING AND TRENCH BACKFILL WILL BE COMPLETED BY OTHERS.

GRAPHIC SCALE

25 0 25 50

(IN FEET)

ISSUED FOR BID

STATE OF MISSOURI

BRYAN S. GREGORY

NUMBER 2006019659

PROFESSIONAL ENGINEER

BRYAN S. GREGORY

2006019659

5/4/2020

NAME

REG. NO.

DATE

FOR AND ON BEHALF OF JVIATION , INC.

DES: ----

DR: ----

CH: C.L.G.

APP: B.S.G.

NO.

BY

DATE

DESCRIPTION

1

B.S.G.

5/4/2020

ISSUED FOR BID

2

B.S.G.

5/13/2020

ADDENDUM NO. 1

APRON EXPANSION AND T-HANGAR CONSTRUCTION

GEOMETRY PLAN

AIP PROJ. NO. MODOT 19-026A-1

JVIATION PROJ. NO. 2019.03D.01

SHEET NAME C200

SHEET NO. 12 of 34

JVIATION®

MEMPHIS MEMORIAL AIRPORT

APRON EXPANSION AND T-HANGAR CONSTRUCTION

GEOMETRY PLAN

AIP PROJ. NO. MODOT 19-026A-1

JVIATION PROJ. NO. 2019.03D.01

SHEET NAME

C200

SHEET NO.

12 of 34

C:\Users\joei.wiechmann\Documents\19.02 T-hangars_2020_joei.wiechmann.rvt

5/13/2020 11:53:31 AM
V.M.

JVIATION®

MEMPHIS MEMORIAL AIRPORT,

DES: E.H.M

DR: E.H.M

CH: J.A.W

APP: B.S.G

ISSUE RECORD

No.	Issued by	Date	Description
1	A.J.R	05/04/2020	ISSUED FOR BID
2	A.J.R.	05/13/2020	ADDENDUM #1

APRON EXPANSION AND
T-HANGAR CONSTRUCTION

ELECTRICAL LIGHTIING AND
POWER PLAN

AIP PROJ NO:
MODOT 19-026A-1

JVIATION PROJ NO:
2019.03D.03

E1.00

31 of 34

NOTES:

- THE CONTRACTOR SHALL COORDINATE WITH TRI-COUNTY ELECTRIC (TCE) FOR THE INSTALLATION OF NEW TCE EQUIPMENT AND PRIMARY UTILITY EXTENSION. ALL COSTS INCURRED BY TRI-COUNTY ELECTRIC WILL BE PAID BY THE MEMPHIS AIRPORT.
- THE CONTRACTOR SHALL USE CAUTION AND PROTECT ALL EXISTING UNDERGROUND UTILITIES. ANY DAMAGE TO EXISTING UTILITIES SHALL BE PAID AT THE CONTRACTORS EXPENSE.
- THE CONTRACTORSHALL OBTAIN AND PAY FOR ALL REQUIRED PERMITS, LICENSES, ETC., PRIOR TO THE COMMENCEMENT OF WORK. THE COST OF PERMITS, LICENSES, ETC., SHALL BE INCIDENTAL TO, AND INCLUDED IN THE BID PRICE FOR EACH RESPECTIVE BID ITEM.
- THE CONTRACTOR SHALL VERIFY EXISTING CONDITIONS PRIOR TO STARTING WORK.
- ALL WORK, EQUIPMENT, AND MATERIALS SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE AND ALL LOCAL CODES.
- NOTIFY THE RESIDENT ENGINEER OF ANY SIGNIFICANT DIFFERENCES BETWEEN DRAWINGS AND FIELD CONDITIONS.
- LOCATION OF EXISTING UTILITIES AND STRUCTURES IS BASED ON THE BEST AVAILABLE INFORMATION AND IS NOT WARRANTED TO BE EXACT, NOR IS IT WARRANTED THAT ALL UTILITIES ARE SHOWN.
- ITEM DIV-26a SHALL CONSIST OF A LUMP SUM OF WORK TO BE PERFORMED BY THE CONTRACTOR AT THE T-HANGAR BUILDING. ALL LABOR, EQUIPMENT, AND SUPPLIES NEEDED TO COMPLETE THE PROPOSED ELECTRICAL POWER AND LIGHTING PLAN FALL UNDER THIS ITEM. THIS INCLUDES THE WORK NEEDED TO INSTALL ALL LED LIGHTING FIXTURES, WIRING, ELECTRICAL PANELBOARDS, RECEPTACLES, SWITCHES, ETC.

ELECTRICAL PLAN SCHEDULE III AND IV HANGARS

2
E1.00

1" = 10'-0"

ELECTRICAL PLAN SCHEDULE II HANGARS

1
E1.00

1" = 10'-0"

LEGEND:

- NEMA 5-20 DUPLEX RECEPTACLE
- LIGHT SWITCH
- LIGHT FIXTURE - TYPE A
- LIGHT FIXTURE - TYPE B
- PUSHBUTTON CONTROL STATION FOR OVERHEAD DOOR
- PANELBOARD

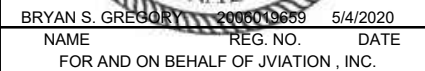
ISSUED FOR BID



BRYAN S. GREGORY 2006019659 05/04/20
NAME REG. NO DATE
FOR AND ON BEHALF OF JVIATION, INC



REISSUE ENTIRE SHEET



CONTRACT DOCUMENTS AND SPECIFICATIONS

Schedule I

Apron Expansion

Schedule II

8 Unit T-Hangar

Schedule III

2 Additional T-Hangars

Schedule IV

2 Additional T-Hangars

MoDOT Project No. 19-026A-1

Memphis Memorial Airport

Memphis, Missouri

Sponsored By:

City of Memphis

Federal Aviation Administration (FAA)

MoDOT

JVIATION®

931 Wildwood Drive, Suite 101
Jefferson City, MO 65109

Main 573.636.3200
Fax 573.636.3201

Issued for Addendum No. 1
May 13, 2020

JVIATION.COM

REQUEST FOR BIDS/INVITATION FOR BIDS

Memphis Memorial Airport Memphis, MO State Block Grant Project No. 19-026A-1

Sealed bids will be received until 2:00 p.m., **Friday, June 5, 2020**, and then publicly opened and read by the City of Memphis at Memphis City Hall, **125 W. Jefferson**, Memphis, Missouri, for furnishing all labor, materials and equipment and performing all work necessary to

Schedule I - Apron Expansion

Schedule II - 8-Unit T-Hangar

Schedule III - 2-Unit T-Hangar

Schedule IV - 2-Unit T-Hangar

Contract Documents. The complete set of Specifications and Contract Documents can be downloaded from Jviation, Inc.'s bid site (<http://bid.jviation.com>), beginning on May 4, 2020. In order to submit a responsive bid as a Prime Contractor and to receive all necessary addendum(s) for this project, you must be on the Planholder's List. To view all planholder documents (contract documents, plans and addendums) you must fill out the online form located at (<http://www.jviation.com/bidrequest>). By filling out and submitting this form, you agree to be publicly listed on the bid site with your contact information as a planholder for all projects requested. **It is the planholder's responsibility to review the site for addendums and changes before submitting their proposal.** For additional information, please contact us via email at bidinfo@jviation.com.

*Note that contractors will NOT be automatically added to new projects. You will need to re-submit the online form for access to new projects. Once granted access, additional projects will use your same login credentials. **Note:** Plan ahead when submitting the online request form and allow up to 2 business days for approval and access to projects.

Pre-Bid Conference. The non-mandatory pre-bid conference for this project will be held on Wednesday, May 20, 2020 at 2:00 p.m., at Memphis City Hall. All bidders are required to examine the site to become familiar with all site conditions.

Note that due to the ongoing and often-changing restrictions for COVID-19, pre-bid and bid opening procedures may be changed through an official project addendum. Please check addenda or if you have questions, call Bryan Gregory with Jviation at 573-418-1450 or by email at Bryan.Gregory@jviation.com.

Bid Conditions. The bidder is required to provide all information as required within the Contract Documents. The bidder is required to bid on all items of every schedule or as otherwise detailed in the Instructions to Bidders.

Each proposal must be accompanied by a bid guaranty in the amount of five (5) percent of the total amount of the bid. The bid guaranty may be by certified check or bid bond made payable to City of Memphis.

Bids may be held by City of Memphis for a period not to exceed 90 calendar days from the date of the bid opening for the purpose of evaluating bids prior to award of contract.

The right is reserved, as City of Memphis may require, to reject any and all bids and to waive any informality in the bids received.

Construction for this project is expected to take 210 calendar day(s).

In accordance with the Davis-Bacon Act, and the Missouri Prevailing Wage Law, the Contractor will be required to comply with the wage and labor requirements and to pay minimum wages in accordance with the schedule of wage rates established by the United States Department of Labor and the Missouri Division of Labor Standards, respectively. The highest rate between the two (Federal and State) for each job classification shall be considered the prevailing wage.

Equal Employment Opportunity and Affirmative Action Requirement. The proposed contract is under and subject to 41 CFR Part 60-4 and Executive Order 11246 of September 24, 1965, as amended, and to the equal opportunity clause and the Standard Federal Equal Employment Opportunity Construction Contract specifications including the goals and timetables for minority and female participation.

Title VI Solicitation Notice: The City of Memphis, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

DBE Requirement.

Information Submitted as a matter of bidder responsiveness: The Owner's award of this contract is conditioned upon Bidder or Offeror satisfying the good faith effort requirements of 49 CFR §26.53. As a condition of bid responsiveness, the Bidder or Offeror must submit the following information with its proposal on the forms provided herein:

- (1) The names and addresses of Disadvantaged Business Enterprise (DBE) firms that will participate in the contract;
- (2) A description of the work that each DBE firm will perform;
- (3) The dollar amount of the participation of each DBE firm listed under (1)
- (4) Written statement from Bidder or Offeror that attests their commitment to use the DBE firm(s) listed under (1) to meet the Owner's project goal; and
- (5) If Bidder or Offeror cannot meet the advertised project DBE goal, evidence of good faith efforts undertaken by the Bidder or Offeror as described in appendix A to 49 CFR part 26.

The requirements of 49 CFR part 26 apply to this contract. It is the policy of the City of Memphis to practice nondiscrimination based on race, color, sex or national origin in the award or performance of this contract. The Owner encourages participation by all firms qualifying under this solicitation regardless of business size or ownership.

Award of contract is also subject to the following Federal provisions:

- Affirmative Action to Ensure Equal Employment Opportunity
- Buy American Preference
- Civil Rights – Title VI Assurances
- Davis Bacon Act
- Disadvantaged Business Enterprise
- Government wide Debarment and Suspension
- Foreign Trade Restriction
- Lobbying Federal Employees
- Recovered Materials
- Other Federal Provisions included in Part A of the Special Provisions

BID DOCUMENTS & TECHNICAL SPECIFICATIONS

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SECTION 1

NOTICE TO BIDDERS

Memphis Memorial
Memphis, MO
State Block Grant Project No. 19-026A-1

Sealed bids subject to the conditions and provisions presented herein will be received until 2:00 p.m., **Friday, June 5, 2020**, and then publicly opened and read at Memphis City Hall, **125 W. Jefferson**, Memphis, Missouri, for furnishing all labor, materials, equipment and performing all work necessary to

Schedule I - Apron Expansion
Schedule II - 8-Unit T-Hangar
Schedule III - 2-Unit T-Hangar
Schedule IV - 2-Unit T-Hangar

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Pre-Bid Conference. The non-mandatory pre-bid conference for this project will be held on Wednesday, May 20, 2020, at 2:00 p.m., at Memphis City Hall. All bidders are required to examine the site to become familiar with all site conditions.

Contract Work Items. This project will involve the following work items and estimated quantities. Prospective bidders are hereby advised that the quantities indicated herein are approximate and are subject to change.

SUMMARY OF APPROXIMATE QUANTITIES						
ITEM NO.	ITEM DESCRIPTION	UNITS	SCHEDULE I	SCHEDULE II	SCHEDULE III	SCHEDULE IV
			ESTIMATE	ESTIMATE	ESTIMATE	ESTIMATE
C-105a	MOBILIZATION	LS	1	1	1	1
C-100a	CONTRACTOR QUALITY CONTROL PROGRAM	LS	1	-	-	-
C-102a	TEMPORARY EROSION CONTROL	LS	1	-	-	-
P-101a	PARTIAL DEPTH PAVEMENT REMOVAL	SY	100	-	-	-
P-101b	REMOVAL OF DRAINAGE	LS	1	-	-	-
P-152a	UNCLASSIFIED EXCAVATION	CY	2,500	1,500	462	462
P-152b	SUBGRADE PREPARATION – 24 INCHES	SY	3,700	-	-	-
P-152c	OVEREXCAVATION AND REPLACEMENT	CY	685	-	-	-

ITEM NO.	ITEM DESCRIPTION	UNITS	SCHEDULE I	SCHEDULE II	SCHEDULE III	SCHEDULE IV
			ESTIMATE	ESTIMATE	ESTIMATE	ESTIMATED
P-152d	IMPORT AND PLACE LOW VOLUME CHARGE (LVC) GRANULAR FILL	CY		1,350	420	420
P-208a	AGGREGATE BASE COURSE	CY	705	-	-	-
P-208b	SEPARATION GEOTEXTILE	SY	3,700	-	-	-
P-401a	ASPHALT SURFACE COURSE	TON	830	-	-	-
P-401b	ASPHALT BINDER	TON	55	-	-	-
P-603a	EMULSIFIED ASPHALT TACK COAT	GAL	500	-	-	-
P-620a	AIRPORT PAVEMENT MARKING – TEMPORARY	SF	1,500	-	-	-
P-620b	AIRPORT PAVEMENT MARKING - PERMANENT	SF	2,450	-	-	-
P-640a	AIRCRAFT TIEDOWN ANCHOR	EA	21	-	-	-
T-901a	SEEDING	AC	2	-	-	-
DIV-26a	T-HANGAR BUILDING ELECTRICAL	LS	-	1	1	1
DIV-26b	INSTALL 3/0 AWG, XHHW, 600V INSULATED, COPPER WIRE	LF	930	-	-	-
DIV-26c	INSTALL #6 AWG, XHHW, 600V INSULATED, COPPER WIRE	LF	310	-	-	-
L-110a	INSTALL 1-3" SCHEDULE 40 PVC CONDUIT (DEB)	LF	280	-	-	-
A-100a	CONCRETE FOUNDATION AND SLAB – 8 UNIT T-HANGARS	LS	-	1	-	-
A-100b	PRE-ENGINEERED METAL BUILDING – 8 UNIT T-HANGARS	LS	-	1	-	-
A-100c	BI-FOLD HANGAR DOOR	EA	-	8	2	2
A-100d	INSULATED EXTERIOR WALLS, ROOF, AND DOOR WITH MINIMUM R-13 INSULATION	LS	-	1	1	1
A-101a	ADDITIONAL CONCRETE FOUNDATION AND SLAB	LS	-	-	1	1
A-101b	ADDITIONAL PRE-ENGINEERED METAL BUILDING 2 UNIT T-HANGARS	LS	-	-	1	1
L-126a	RETROFLECTIVE MARKER	EA	20	-	-	-

Contract Time. The owner has established a contract perform time of 210 calendar day(s) from the date of the Notice-to-Proceed. All project work shall be substantially completed within the stated timeframe. This project is subject to liquidated damages as prescribed in the project manual.

Bid Security. No bid will be considered unless accompanied by a certified check or cashier's check on any bank or trust company insured by the Federal Deposit Insurance Corporation, payable to the Owner, for not less than five (5) percent of the total amount of the bid, or by a bid bond secured by an approved surety or sureties, payable to the City of Memphis, for not less than five (5) percent of the total amount of the bid.

Bonding Requirements. The successful bidder will be required to furnish separate performance and payment bonds each in an amount equal to 100% of the contract price at the time of contract execution.

Award of Contract. The Owner intends to award a contract resulting from this solicitation to the lowest, responsive, responsible bidder, whose offer, conforming to the solicitation, will be most advantageous to, and in the best interest of, the Owner, cost or price and other factors considered.

- a. In addition to other factors, bid offers will be evaluated on the basis of advantages and disadvantages to the Owner that might result from offers received.
- b. The Owner reserves the right to reject any or all proposals and to waive informalities and/or irregularities in the bid offer. Bids may be held by the owner for a period not to exceed 90 calendar days from the date of the bid opening for the purpose of conducting the bid evaluation.
- c. Total bid will be evaluated and awarded as follows: It is the Owner's intent to award this bid based on the **TOTAL BASE BID FOR ALL ITEMS, split awards will not be made.**
- d. The Owner will determine which Schedules and/or Bid Alternates will be awarded based on the received bid prices and available funding. The project award will be based on the low bid sum of the Schedules and Bid Alternates awarded by the Owner. Not all Schedules and/or Bid Alternates may be awarded. A combination of Schedules and Bid Alternates may be awarded, including only a single Schedule. The numbering of the Schedules or Bid Alternates does not necessarily indicate the order of award.
- e. The project award is contingent on the availability of funding.

Federal Provision. This project is subject to the following Federal provisions, statutes and regulations;

Equal Employment Opportunity - Executive Order 11246 and 41 CFR Part 60: The Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth within the supplementary provisions. The successful Bidder shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor will take affirmative action to ensure the applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, or national origin.

Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity:

1. The Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth within the supplementary provisions.
2. The goals and timetables for minority and female participation, expressed in percentage terms for the contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Timetables

Goals for minority participation for each trade: 4.00 %

Goals for female participation in each trade: 6.9%.

These goals are applicable to all of the contractor's construction work (whether or not it is Federal or federally-assisted) performed in the covered area. If the contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the contractor is also subject to the goals for both its federally involved and non-federally involved construction.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs (OFCCP) within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed.

As used in this notice and in the contract resulting from this solicitation, the “covered area” is City of Memphis, Scotland County, and state of Missouri.

Disadvantaged Business Enterprise – 49 CFR Part 26: The requirements of 49 CFR Part 26, Regulations of the U.S. Department of Transportation, apply to this contract. It is the policy of MoDOT and the **City of Memphis** to practice nondiscrimination based on race, color, sex or national origin in the award or performance of this contract. All firms qualifying under this solicitation are encouraged to submit bids/proposals regardless of their business size or ownership. Awards of this contract will be conditioned upon satisfying the requirements of this section. These requirements apply to all bidders, including those who qualify as a DBE. The owner’s award of this contract is condition upon the bidder satisfying the good faith effort requirements of 49 CFR §26.53. A DBE contract goal of **6.0** percent has been established for this contract. The non-DBE bidder shall subcontract **6.0** percent of the dollar value of the base bid(s), excluding any additive alternates, to disadvantaged business enterprises (DBE) or make good faith efforts to meet the DBE contract goal. The bidder and any subcontractor who qualifies as a DBE who subcontracts work to another non-DBE firm must subtract the amount of the non-DBE contract from the total DBE work counted toward the goal, as defined in 49 CFR Part 26.55.

The apparent successful competitor will be required to submit the following information as a condition of bid responsiveness: (1) the names and addresses of DBE firms that will participate in the contract; (2) a description of the work that each DBE firm will perform; (3) the dollar amount of the participation of each DBE firm participating; (4) written statement from bidder that attests their commitment to use the DBE firm(s) listed under (1) above to meet the owner’s project goal; and (5) if the contract goal is not met, evidence of good faith efforts undertaken by the bidder, as described in Appendix A to 49 CFR Part 26.

The apparent successful competitor must provide written confirmation of participation from each of the DBE firms listed in their commitment with the proposal documents as a condition of bid responsiveness.

Davis-Bacon Act, as amended – 29 CFR Part 5: The Contractor is required to comply with wage and labor provisions and to pay minimum wages in accordance with the current schedule of wage rates established by the United States Department of Labor included in the supplementary provisions.

In addition, the contractor will also be required to comply with the wage and labor requirements and pay minimum wages in accordance with the schedule of wage rates established by the Missouri Division of Labor Standards included in the Supplementary Provisions.

The highest rate between the two (Federal and State) for each job classification shall be considered the prevailing wage.

Debarment, Suspension, Ineligibility and Voluntary Exclusion – Title 2 CFR Part 180 (Subpart C) Title 2, CFR Part 1200: The bidder certifies, by submission of a proposal or acceptance of a contract, that neither it nor its principals are presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

Foreign Trade Restriction – 49 CFR Part 30: By submission of an offer, the Offeror certifies that with respect to this solicitation and any resultant contract, the Offeror--

- a. is not owned or controlled by one or more citizens of a foreign country included in the list of countries that discriminate against U.S. firms published by the Office of the United States Trade Representative (USTR);
- b. has not knowingly entered into any contract or subcontract for this project with a person that is a citizen or national of a foreign country included on the list of countries that discriminate against U.S. firms as published by the USTR; and

- c. has not entered into any subcontract for any product to be used on the Federal project that is produced in a foreign country included on the list of countries that discriminate against U.S. firms published by the USTR.

Buy American Certificate – Aviation Safety and Capacity Act of 1990: This contract is subject to the “Buy American Preferences” of the Aviation Safety and Capacity Act of 1990. Prospective Bidders are required to certify that steel and manufactured products have been produced in the United States and to clearly identify those items produced or manufactured outside of the United States.

Additional Provisions: Modification to the project documents may only be made by written addendum by the Owner or Owner’s authorized Representative.

The proposal must be made on the forms provided within the bound project manual. Bidders must supply all required information prior to the time of bid opening.

Additional Federal provisions can be found in Section 4 of this document.

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SECTION 2

INSTRUCTIONS TO BIDDERS

This section contains excerpts of the bidding requirements from Section 20 of the General Provisions. The bidder's attention is directed to Section 20 for complete details.

1. THE EXECUTED PROPOSAL FORM MUST BE SUBMITTED WITH EACH PAGE FROM SECTION B-1 THROUGH B-21. EACH FORM MUST BE COMPLETELY FILLED OUT.

2. The apparent low bidder shall submit "evidence of competency" and "evidence of financial responsibility" to the owner with the bid proposal in accordance with Section 20-02 of the General Provisions. In addition, the resumes of all key personnel shall be provided with the bid proposal detailing experience on similar airfield construction projects.

3. Each bidder shall certify in the Proposal Form at the time of bid submittal that they acknowledge receipt of all issued addenda.

4. No bid will be considered unless accompanied by a certified check or cashier's check on any bank or trust company insured by the Federal Deposit Insurance Corporation, payable to the owner, for not less than five (5) percent of the amount of the bid, or by a bid bond secured by an approved surety or sureties (licensed to conduct surety business in the state of Missouri), payable to the owner, for not less than five (5) percent of the amount of the bid.

5. Proposals shall be sent to arrive at the time and date specified in Section 1, Notice to Bidders. Proposals received after the specified time and date will not receive consideration and will be returned unopened. Prior to submittal, the proposal shall be placed in a sealed opaque envelope and addressed to:

Memphis City Hall
125 W. Jefferson
Memphis, MO 63555

The upper left hand corner of the envelope should be marked as follows:

Sealed Bid Proposal
Bid of NAME OF BIDDER
For construction improvements at Memphis Memorial Airport
State Block Grant Project No.: 19-026A-1
To be opened at: 2:00 p.m., **Friday, June 5, 2020**

For a modification to a previously submitted proposal, insert "Modification to Proposal" in place of "Sealed Bid Proposal".

6. The Owner reserves the right to reject any or all bids, as determined to be in the best interest of the Owner. Causes for rejection of proposals include but are not limited to:

- Submittal of more than one proposal from the same partnership, firm or corporation;
- Failure by Bidder to submit the bid prior to the stated time and date for receipt of bids;
- Failure by Bidder to furnish satisfactory bid guarantee;
- Failure by Bidder to provide all information required of the bid forms;
- Failure by Bidder to comply with the requirements of bid instructions;
- Failure by Bidder to complete the applicable Buy American Certification;
- Failure by the Bidder to demonstrate good faith efforts in obtaining participation by certified DBE firms;

- Determination by the Owner that Bidder is not qualified to accomplish the project work;
- Determination by the Owner that the Bidder has placed conditions on or qualified their proposal;
- Discovery of any alteration, interlineations or erasure of any project requirement by the Bidder;
- Inclusion of the Bidder as an Excluded Party in the System for Award Management;
- Evidence of collusion among bidders.

7. Construction and building materials sold to the contractors and subcontractors for use on public works owned by City of Memphis are exempt from State Sales and Use Taxes. However, such materials will be subject to any Sales and Use Taxes imposed by local cities and counties. This change in the State Tax Law has no effect of Sales and Use Taxes imposed by other local taxing authorities. Contractor shall provide proof of exemption prior to commencing work.

SECTION 3**PART 1 – GENERAL CONTRACT PROVISIONS**

SECTION 10	DEFINITION OF TERMS
SECTION 20	PROPOSAL REQUIREMENTS AND CONDITIONS
SECTION 30	AWARD AND EXECUTION OF CONTRACT
SECTION 40	SCOPE OF WORK
SECTION 50	CONTROL OF WORK
SECTION 60	CONTROL OF MATERIALS
SECTION 70	LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC
SECTION 80	PROSECUTION AND PROGRESS
SECTION 90	MEASUREMENT OF PAYMENT

PART 2 - GENERAL CONSTRUCTION ITEMS

ITEM C-100	CONTRACTOR QUALITY CONTROL PROGRAM (CQCP)
ITEM C-102	TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SILT CONTROL
ITEM C-105	MOBILIZATION
ITEM C-110	METHOD OF ESTIMATING PERCENTAGE OF MATERIAL WITHIN SPECIFICATION LIMITS (PWL)

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SECTION 10 DEFINITION OF TERMS

Whenever the following terms are used in these specifications, in the contract, or in any documents or other instruments pertaining to construction where these specifications govern, the intent and meaning shall be interpreted as follows:

Paragraph Number	Term	Definition
10-01	AASHTO	The American Association of State Highway and Transportation Officials.
10-02	Access Road	The right-of-way, the roadway and all improvements constructed thereon connecting the airport to a public roadway.
10-03	Advertisement	A public announcement, as required by local law, inviting bids for work to be performed and materials to be furnished.
10-04	Airport	Airport means an area of land or water which is used or intended to be used for the landing and takeoff of aircraft; an appurtenant area used or intended to be used for airport buildings or other airport facilities or rights of way; airport buildings and facilities located in any of these areas, and a heliport.
10-05	Airport Improvement Program (AIP)	A grant-in-aid program, administered by the Federal Aviation Administration (FAA).
10-06	Air Operations Area (AOA)	The term air operations area (AOA) shall mean any area of the airport used or intended to be used for the landing, takeoff, or surface maneuvering of aircraft. An air operation area shall include such paved or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runway, taxiway, or apron.
10-07	Apron	Area where aircraft are parked, unloaded or loaded, fueled and/or serviced.
10-08	ASTM International (ASTM)	Formerly known as the American Society for Testing and Materials (ASTM).
10-09	Award	The Owner's notice to the successful bidder of the acceptance of the submitted bid.
10-10	Bidder	Any individual, partnership, firm, or corporation, acting directly or through a duly authorized representative, who submits a proposal for the work contemplated.
10-11	Building Area	An area on the airport to be used, considered, or intended to be used for airport buildings or other airport facilities or rights-of-way together with all airport buildings and facilities located thereon.
10-12	Calendar Day	Every day shown on the calendar.
10-13	Certificate of Analysis (COA)	The COA is the manufacturer's Certificate of Compliance (COC) including all applicable test results required by the specifications.
10-14	Certificate of Compliance (COC)	The manufacturer's certification stating that materials or assemblies furnished fully comply with the requirements of the

Paragraph Number	Term	Definition
		contract. The certificate shall be signed by the manufacturer's authorized representative.
10-15	Change Order	A written order to the Contractor covering changes in the plans, specifications, or proposal quantities and establishing the basis of payment and contract time adjustment, if any, for work within the scope of the contract and necessary to complete the project.
10-16	Contract	<p>A written agreement between the Owner and the Contractor that establishes the obligations of the parties including but not limited to performance of work, furnishing of labor, equipment and materials and the basis of payment.</p> <p>The awarded contract includes but may not be limited to: Advertisement, Contract form, Proposal, Performance bond, payment bond, General provisions, certifications and representations, Technical Specifications, Plans, Supplemental Provisions, standards incorporated by reference and issued addenda.</p>
10-17	Contract Item (Pay Item)	A specific unit of work for which a price is provided in the contract.
10-18	Contract Time	The number of calendar days or working days, stated in the proposal, allowed for completion of the contract, including authorized time extensions. If a calendar date of completion is stated in the proposal, in lieu of a number of calendar or working days, the contract shall be completed by that date.
10-19	Contractor	The individual, partnership, firm, or corporation primarily liable for the acceptable performance of the work contracted and for the payment of all legal debts pertaining to the work who acts directly or through lawful agents or employees to complete the contract work.
10-20	Contractors Quality Control (QC) Facilities	The Contractor's QC facilities in accordance with the Contractor Quality Control Program (CQCP).
10-21	Contractor Quality Control Program (CQCP)	Details the methods and procedures that will be taken to assure that all materials and completed construction required by the contract conform to contract plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors.
10-22	Control Strip	A demonstration by the Contractor that the materials, equipment, and construction processes results in a product meeting the requirements of the specification.
10-23	Construction Safety and Phasing Plan (CSPP)	The overall plan for safety and phasing of a construction project developed by the airport operator, or developed by the airport operator's consultant and approved by the airport operator. It is included in the invitation for bids and becomes part of the project specifications.
10-24	Drainage System	The system of pipes, ditches, and structures by which surface or subsurface waters are collected and conducted from the airport area.
10-25	Engineer	The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for engineering,

Paragraph Number	Term	Definition
		inspection, and/or observation of the contract work and acting directly or through an authorized representative.
10-26	Equipment	All machinery, together with the necessary supplies for upkeep and maintenance; and all tools and apparatus necessary for the proper construction and acceptable completion of the work.
10-27	Extra Work	An item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, but which is found by the Owner's Engineer or Resident Project Representative (RPR) to be necessary to complete the work within the intended scope of the contract as previously modified.
10-28	FAA	The Federal Aviation Administration. When used to designate a person, FAA shall mean the Administrator or their duly authorized representative.
10-29	Federal Specifications	The federal specifications and standards, commercial item descriptions, and supplements, amendments, and indices prepared and issued by the General Services Administration.
10-30	Force Account	<p>a. Contract Force Account - A method of payment that addresses extra work performed by the Contractor on a time and material basis.</p> <p>b. Owner Force Account - Work performed for the project by the Owner's employees.</p>
10-31	Intention of Terms	<p>Whenever, in these specifications or on the plans, the words "directed," "required," "permitted," "ordered," "designated," "prescribed," or words of like import are used, it shall be understood that the direction, requirement, permission, order, designation, or prescription of the Engineer and/or Resident Project Representative (RPR) is intended; and similarly, the words "approved," "acceptable," "satisfactory," or words of like import, shall mean approved by, or acceptable to, or satisfactory to the Engineer and/or RPR, subject in each case to the final determination of the Owner.</p> <p>Any reference to a specific requirement of a numbered paragraph of the contract specifications or a cited standard shall be interpreted to include all general requirements of the entire section, specification item, or cited standard that may be pertinent to such specific reference.</p>
10-32	Lighting	A system of fixtures providing or controlling the light sources used on or near the airport or within the airport buildings. The field lighting includes all luminous signals, markers, floodlights, and illuminating devices used on or near the airport or to aid in the operation of aircraft landing at, taking off from, or taxiing on the airport surface.
10-33	Major and Minor Contract Items	A major contract item shall be any item that is listed in the proposal, the total cost of which is equal to or greater than 20% of the total amount of the award contract. All other items shall be considered minor contract items.
10-34	Materials	Any substance specified for use in the construction of the contract work.

Paragraph Number	Term	Definition
10-35	Modification of Standards (MOS)	Any deviation from standard specifications applicable to material and construction methods in accordance with FAA Order 5300.1.
10-36	Notice to Proceed (NTP)	A written notice to the Contractor to begin the actual contract work on a previously agreed to date. If applicable, the Notice to Proceed shall state the date on which the contract time begins.
10-37	Owner	The term "Owner" shall mean the party of the first part or the contracting agency signatory to the contract. Where the term "Owner" is capitalized in this document, it shall mean airport Sponsor only. The Owner for this project is City of Memphis.
10-38	Passenger Facility Charge (PFC)	Per 14 Code of Federal Regulations (CFR) Part 158 and 49 United States Code (USC) § 40117, a PFC is a charge imposed by a public agency on passengers enplaned at a commercial service airport it controls.
10-39	Pavement Structure	The combined surface course, base course(s), and subbase course(s), if any, considered as a single unit.
10-40	Payment bond	The approved form of security furnished by the Contractor and their own surety as a guaranty that the Contractor will pay in full all bills and accounts for materials and labor used in the construction of the work.
10-41	Performance bond	The approved form of security furnished by the Contractor and their own surety as a guaranty that the Contractor will complete the work in accordance with the terms of the contract.
10-42	Plans	The official drawings or exact reproductions which show the location, character, dimensions and details of the airport and the work to be done and which are to be considered as a part of the contract, supplementary to the specifications. Plans may also be referred to as 'contract drawings.'
10-43	Project	The agreed scope of work for accomplishing specific airport development with respect to a particular airport.
10-44	Proposal	The written offer of the bidder (when submitted on the approved proposal form) to perform the contemplated work and furnish the necessary materials in accordance with the provisions of the plans and specifications.
10-45	Proposal guaranty	The security furnished with a proposal to guarantee that the bidder will enter into a contract if their own proposal is accepted by the Owner.
10-46	Quality Assurance (QA)	Owner's responsibility to assure that construction work completed complies with specifications for payment.
10-47	Quality Control (QC)	Contractor's responsibility to control material(s) and construction processes to complete construction in accordance with project specifications.
10-48	Quality Assurance (QA) Inspector	An authorized representative of the Engineer and/or Resident Project Representative (RPR) assigned to make all necessary inspections, observations, tests, and/or observation of tests of the work performed or being performed, or of the materials furnished or being furnished by the Contractor.
10-49	Quality Assurance (QA) Laboratory	The official quality assurance testing laboratories of the Owner or such other laboratories as may be designated by the

Paragraph Number	Term	Definition
		Engineer or RPR. May also be referred to as Engineer's, Owner's, or QA Laboratory.
10-50	Resident Project Representative (RPR)	The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for all necessary inspections, observations, tests, and/or observations of tests of the contract work performed or being performed, or of the materials furnished or being furnished by the Contractor, and acting directly or through an authorized representative.
10-51	Runway	The area on the airport prepared for the landing and takeoff of aircraft.
10-52	Runway Safety Area (RSA)	A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to aircraft. See the construction safety and phasing plan (CSPP) for limits of the RSA.
10-53	Safety Plan Compliance Document (SPCD)	Details how the Contractor will comply with the CSPP.
10-54	Specifications	A part of the contract containing the written directions and requirements for completing the contract work. Standards for specifying materials or testing which are cited in the contract specifications by reference shall have the same force and effect as if included in the contract physically.
10-55	Sponsor	A Sponsor is defined in 49 USC § 47102(24) as a public agency that submits to the FAA for an AIP grant; or a private Owner of a public-use airport that submits to the FAA an application for an AIP grant for the airport.
10-56	Structures	Airport facilities such as bridges; culverts; catch basins, inlets, retaining walls, cribbing; storm and sanitary sewer lines; water lines; underdrains; electrical ducts, manholes, handholes, lighting fixtures and bases; transformers; navigational aids; buildings; vaults; and, other manmade features of the airport that may be encountered in the work and not otherwise classified herein.
10-57	Subgrade	The soil that forms the pavement foundation.
10-58	Superintendent	The Contractor's executive representative who is present on the work during progress, authorized to receive and fulfill instructions from the RPR, and who shall supervise and direct the construction.
10-59	Supplemental Agreement	A written agreement between the Contractor and the Owner that establishes the basis of payment and contract time adjustment, if any, for the work affected by the supplemental agreement. A supplemental agreement is required if: (1) in scope work would increase or decrease the total amount of the awarded contract by more than 25%; (2) in scope work would increase or decrease the total of any major contract item by more than 25%; (3) work that is not within the scope of the originally awarded contract; or (4) adding or deleting of a major contract item.
10-60	Surety	The corporation, partnership, or individual, other than the Contractor, executing payment or performance bonds that are furnished to the Owner by the Contractor.

Paragraph Number	Term	Definition
10-61	Taxilane	A taxiway designed for low speed movement of aircraft between aircraft parking areas and terminal areas.
10-62	Taxiway	The portion of the air operations area of an airport that has been designated by competent airport authority for movement of aircraft to and from the airport's runways, aircraft parking areas, and terminal areas.
10-63	Taxiway/Taxilane Safety Area (TSA)	A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an aircraft. See the construction safety and phasing plan (CSPP) for limits of the TSA.
10-64	Work	The furnishing of all labor, materials, tools, equipment, and incidentals necessary or convenient to the Contractor's performance of all duties and obligations imposed by the contract, plans, and specifications.
10-65	Working day	A working day shall be any day other than a legal holiday, Saturday, or Sunday on which the normal working forces of the Contractor may proceed with regular work for at least six (6) hours toward completion of the contract. When work is suspended for causes beyond the Contractor's control, it will not be counted as a working day. Saturdays, Sundays and holidays on which the Contractor's forces engage in regular work will be considered as working days.
10-66	Owner Defined terms	None

END OF SECTION 10

SECTION 20

PROPOSAL REQUIREMENTS AND CONDITIONS

20-01 ADVERTISEMENT (Notice to Bidders). This project has been advertised on the following dates:

Jviation, Inc. website: May 5, 2020
MoDOT LPA website: May 13, 2020
Memphis Democrat: May 13, 2020

20-02 QUALIFICATION OF BIDDERS. Each bidder shall submit evidence of competency and evidence of financial responsibility to perform the work to the Owner at the time of bid opening.

Evidence of competency, unless otherwise specified, shall consist of statements covering the bidder's past experience on similar work, and a list of equipment and a list of key personnel that would be available for the work.

Each bidder shall furnish the Owner satisfactory evidence of their financial responsibility. Evidence of financial responsibility, unless otherwise specified, shall consist of a confidential statement or report of the bidder's financial resources and liabilities as of the last calendar year or the bidder's last fiscal year. Such statements or reports shall be certified by a public accountant. At the time of submitting such financial statements or reports, the bidder shall further certify whether their financial responsibility is approximately the same as stated or reported by the public accountant. If the bidder's financial responsibility has changed, the bidder shall qualify the public accountant's statement or report to reflect the bidder's true financial condition at the time such qualified statement or report is submitted to the Owner.

Unless otherwise specified, a bidder may submit evidence that they are prequalified with the State Highway Division and are on the current "bidder's list" of the state in which the proposed work is located. Evidence of State Highway Division prequalification may be submitted as evidence of financial responsibility in lieu of the certified statements or reports specified above.

20-03 CONTENTS OF PROPOSAL FORMS. The Owner's proposal forms state the location and description of the proposed construction; the place, date, and time of opening of the proposals; and the estimated quantities of the various items of work to be performed and materials to be furnished for which unit bid prices are asked. The proposal form states the time in which the work must be completed, and the amount of the proposal guaranty that must accompany the proposal. The Owner will accept only those Proposals properly executed on physical forms or electronic forms provided by the Owner. Bidder actions that may cause the Owner to deem a proposal irregular are given in paragraph 20-09, *IRREGULAR PROPOSALS*.

Mobilization is limited to 10 percent of the total project cost.

A non-mandatory prebid conference on this project will discuss as a minimum, the following items: material requirements; submittals; Quality Control/Quality Assurance requirements; the construction safety and phasing plan including airport access and staging areas; and unique airfield paving construction requirements.

20-04 ISSUANCE OF PROPOSAL FORMS. The Owner reserves the right to refuse to issue a proposal form to a prospective bidder should such bidder be in default for any of the following reasons:

- a. Failure to comply with any prequalification regulations of the Owner, if such regulations are cited, or otherwise included, in the proposal as a requirement for bidding.
- b. Failure to pay, or satisfactorily settle, all bills due for labor and materials on former contracts in force with the Owner at the time the Owner issues the proposal to a prospective bidder.

c. Documented record of Contractor default under previous contracts with the Owner.

d. Documented record of unsatisfactory work on previous contracts with the Owner.

20-05 INTERPRETATION OF ESTIMATED PROPOSAL QUANTITIES. An estimate of quantities of work to be done and materials to be furnished under these specifications is given in the proposal. It is the result of careful calculations and is believed to be correct. It is given only as a basis for comparison of proposals and the award of the contract. The Owner does not expressly, or by implication, agree that the actual quantities involved will correspond exactly therewith; nor shall the bidder plead misunderstanding or deception because of such estimates of quantities, or of the character, location, or other conditions pertaining to the work. Payment to the Contractor will be made only for the actual quantities of work performed or materials furnished in accordance with the plans and specifications. It is understood that the quantities may be increased or decreased as hereinafter provided in the Section 40, paragraph 40-02, *ALTERATION OF WORK AND QUANTITIES*, without in any way invalidating the unit bid prices.

20-06 EXAMINATION OF PLANS, SPECIFICATIONS, AND SITE. The bidder is expected to carefully examine the site of the proposed work, the proposal, plans specifications, and contract forms. Bidders shall satisfy themselves as to the character, quality, and quantities of work to be performed, materials to be furnished, and as to the requirements of the proposed contract. The submission of a proposal shall be prima facie evidence that the bidder has made such examination and is satisfied as to the conditions to be encountered in performing the work and as to the requirements of the proposed contract, plans, and specifications.

Boring logs and other records of subsurface investigations and tests are available for inspection of bidders. It is understood and agreed that such subsurface information, whether included in the plans, specifications, or otherwise made available to the bidder, was obtained and is intended for the Owner's design and estimating purposes only. Such information has been made available for the convenience of all bidders. It is further understood and agreed that each bidder is solely responsible for all assumptions, deductions, or conclusions which the bidder may make or obtain from his or her examination of the boring logs and other records of subsurface investigations and tests that are furnished by the Owner.

20-07 PREPARATION OF PROPOSAL. The bidder shall submit his or her proposal on the forms furnished by the Owner. All blank spaces in the proposal forms, unless explicitly stated otherwise, must be correctly filled in where indicated for each and every item for which a quantity is given. The bidder shall state the price (written in ink or typed) both in words and numerals which they propose to do for each pay item furnished in the proposal. In case of conflict between words and numerals, the words, unless obviously incorrect, shall govern.

The bidder shall correctly sign the proposal in ink. If the proposal is made by an individual, their name and post office address must be shown. If made by a partnership, the name and post office address of each member of the partnership must be shown. If made by a corporation, the person signing the proposal shall give the name of the state where the corporation was chartered and the name, titles, and business address of the president, secretary, and the treasurer. Anyone signing a proposal as an agent shall file evidence of their authority to do so and that the signature is binding upon the firm or corporation.

20-08 RESPONSIVE AND RESPONSIBLE BIDDER. A responsive bid conforms to all significant terms and conditions contained in the Owner's invitation for bid. It is the Owner's responsibility to decide if the exceptions taken by a bidder to the solicitation are material or not and the extent of deviation it is willing to accept.

A responsible bidder has the ability to perform successfully under the terms and conditions of a proposed procurement, as defined in 2 CFR § 200.318(h). This includes such matters as Contractor integrity, compliance with public policy, record of past performance, and financial and technical resources.

0-09 IRREGULAR PROPOSALS. Proposals shall be considered irregular for the following reasons:

- a. If the proposal is on a form other than that furnished by the Owner, or if the Owner's form is altered, or if any part of the proposal form is detached.
- b. If there are unauthorized additions, conditional or alternate pay items, or irregularities of any kind that make the proposal incomplete, indefinite, or otherwise ambiguous.
- c. If the proposal does not contain a unit price for each pay item listed in the proposal, except in the case of authorized alternate pay items, for which the bidder is not required to furnish a unit price.
- d. If the proposal contains unit prices that are obviously unbalanced.
- e. If the proposal is not accompanied by the proposal guaranty specified by the Owner.
- f. If the applicable Disadvantaged Business Enterprise information is incomplete.

The Owner reserves the right to reject any irregular proposal and the right to waive technicalities if such waiver is in the best interest of the Owner and conforms to local laws and ordinances pertaining to the letting of construction contracts.

20-10 BID GUARANTEE. Each separate proposal shall be accompanied by a bid bond, certified check, or other specified acceptable collateral, in the amount specified in the proposal form. Such bond, check, or collateral shall be made payable to the Owner.

20-11 DELIVERY OF PROPOSAL. Each proposal submitted shall be placed in a sealed envelope plainly marked with the project number, location of airport, and name and business address of the bidder on the outside. When sent by mail, preferably registered, the sealed proposal, marked as indicated above, should be enclosed in an additional envelope. No proposal will be considered unless received at the place specified in the advertisement or as modified by Addendum before the time specified for opening all bids. Proposals received after the bid opening time shall be returned to the bidder unopened.

20-12 WITHDRAWAL OR REVISION OF PROPOSALS. A bidder may withdraw or revise (by withdrawal of one proposal and submission of another) a proposal provided that the bidder's request for withdrawal is received by the Owner in writing before the time specified for opening bids. Revised proposals must be received at the place specified in the advertisement before the time specified for opening all bids.

20-13 PUBLIC OPENING OF PROPOSALS. Proposals shall be opened, and read, publicly at the time and place specified in the advertisement. Bidders, their authorized agents, and other interested persons are invited to attend. Proposals that have been withdrawn (by written or telegraphic request) or received after the time specified for opening bids shall be returned to the bidder unopened.

20-14 DISQUALIFICATION OF BIDDERS. A bidder shall be considered disqualified for any of the following reasons:

- a. Submitting more than one proposal from the same partnership, firm, or corporation under the same or different name.
- b. Evidence of collusion among bidders. Bidders participating in such collusion shall be disqualified as bidders for any future work of the Owner until any such participating bidder has been reinstated by the Owner as a qualified bidder.
- c. If the bidder is considered to be in "default" for any reason specified in the paragraph 20-04, *ISSUANCE OF PROPOSAL FORMS*, of this section.

20-15 Discrepancies and Omissions. A Bidder who discovers discrepancies or omissions with the project bid documents shall immediately notify the Owner's Engineer of the matter. A bidder that has doubt as to the true meaning of a project requirement may submit to the Owner's Engineer a written request for interpretation no later than **4 business** days prior to bid opening.

Any interpretation of the project bid documents by the Owner's Engineer will be by written addendum issued by the Owner. The Owner will not consider any instructions, clarifications or interpretations of the bidding documents in any manner other than written addendum.

END OF SECTION 20

SECTION 30 AWARD AND EXECUTION OF CONTRACT

30-01 CONSIDERATION OF PROPOSALS. After the proposals are publicly opened and read, they will be compared on the basis of the summation of the products obtained by multiplying the estimated quantities shown in the proposal by the unit bid prices. If a bidder's proposal contains a discrepancy between unit bid prices written in words and unit bid prices written in numbers, the unit price written in words shall govern.

Until the award of a contract is made, the Owner reserves the right to reject a bidder's proposal for any of the following reasons:

- a. If the proposal is irregular as specified in the Section 20, paragraph 20-09, *IRREGULAR PROPOSALS*.
- b. If the bidder is disqualified for any of the reasons specified in the section 20, paragraph 20-14, *DISQUALIFICATION OF BIDDERS*.

In addition, until the award of a contract is made, the Owner reserves the right to reject any or all proposals, waive technicalities, if such waiver is in the best interest of the Owner and is in conformance with applicable state and local laws or regulations pertaining to the letting of construction contracts; advertise for new proposals; or proceed with the work otherwise. All such actions shall promote the Owner's best interests.

30-02 AWARD OF CONTRACT. The award of a contract, if it is to be awarded, shall be made within 90 calendar days of the date specified for publicly opening proposals, unless otherwise specified herein.

If the Owner elects to proceed with an award of contract, the Owner will make award to the responsible bidder whose bid, conforming with all the material terms and conditions of the bid documents, is the lowest in price.

30-03 CANCELLATION OF AWARD. The Owner reserves the right to cancel the award without liability to the bidder, except return of proposal guaranty, at any time before a contract has been fully executed by all parties and is approved by the Owner in accordance with the paragraph 30-07, *APPROVAL OF CONTRACT*.

30-04 RETURN OF PROPOSAL GUARANTY. All proposal guaranties, except those of the two lowest bidders, will be returned immediately after the Owner has made a comparison of bids as specified in the paragraph 30-01, *CONSIDERATION OF PROPOSALS*. Proposal guaranties of the two lowest bidders will be retained by the Owner until such time as an award is made, at which time, the unsuccessful bidder's proposal guaranty will be returned. The successful bidder's proposal guaranty will be returned as soon as the Owner receives the contract bonds as specified in the paragraph 30-05, *REQUIREMENTS OF CONTRACT BONDS*.

30-05 REQUIREMENTS OF CONTRACT BONDS. At the time of the execution of the contract, the successful bidder shall furnish the Owner a surety bond or bonds that have been fully executed by the bidder and the surety guaranteeing the performance of the work and the payment of all legal debts that may be incurred by reason of the Contractor's performance of the work. The surety and the form of the bond or bonds shall be acceptable to the Owner. Unless otherwise specified in this subsection, the surety bond or bonds shall be in a sum equal to the full amount of the contract.

30-06 EXECUTION OF CONTRACT. The successful bidder shall sign (execute) the necessary agreements for entering into the contract and return the signed contract to the Owner, along with the fully executed surety bond or bonds specified in the paragraph 30-05, *REQUIREMENTS OF CONTRACT BONDS* of this section, within 30 calendar days from the date mailed or otherwise delivered to the successful bidder.

30-07 APPROVAL OF CONTRACT. Upon receipt of the contract and contract bond or bonds that have been executed by the successful bidder, the Owner shall complete the execution of the contract in accordance with local laws or ordinances, and return the fully executed contract to the Contractor. Delivery of the fully

executed contract to the Contractor shall constitute the Owner's approval to be bound by the successful bidder's proposal and the terms of the contract.

30-08 FAILURE TO EXECUTE CONTRACT. Failure of the successful bidder to execute the contract and furnish an acceptable surety bond or bonds within the period specified in paragraph 30-06, *EXECUTION OF CONTRACT*, of this section shall be just cause for cancellation of the award and forfeiture of the proposal guaranty, not as a penalty, but as liquidation of damages to the Owner.

END OF SECTION 30

SECTION 40

SCOPE OF WORK

40-01 INTENT OF CONTRACT. The intent of the contract is to provide for construction and completion, in every detail, of the work described. It is further intended that the Contractor shall furnish all labor, materials, equipment, tools, transportation, and supplies required to complete the work in accordance with the plans, specifications, and terms of the contract.

40-02 ALTERATION OF WORK AND QUANTITIES. The Owner reserves the right to make such changes in quantities and work as may be necessary or desirable to complete, in a satisfactory manner, the original intended work. Unless otherwise specified in the Contract, the Owner's Engineer or RPR shall be and is hereby authorized to make, in writing, such in-scope alterations in the work and variation of quantities as may be necessary to complete the work, provided such action does not represent a significant change in the character of the work.

For purpose of this section, a significant change in character of work means: any change that is outside the current contract scope of work; any change (increase or decrease) in the total contract cost by more than 25%; or any change in the total cost of a major contract item by more than 25%.

Work alterations and quantity variances that do not meet the definition of significant change in character of work shall not invalidate the contract nor release the surety. Contractor agrees to accept payment for such work alterations and quantity variances in accordance with Section 90, paragraph 90-03, *COMPENSATION FOR ALTERED QUANTITIES*.

Should the value of altered work or quantity variance meet the criteria for significant change in character of work, such altered work and quantity variance shall be covered by a supplemental agreement. Supplemental agreements shall also require consent of the Contractor's surety and separate performance and payment bonds. If the Owner and the Contractor are unable to agree on a unit adjustment for any contract item that requires a supplemental agreement, the Owner reserves the right to terminate the contract with respect to the item and make other arrangements for its completion.

40-03 OMITTED ITEMS. The Owner, the Owner's Engineer or the RPR may provide written notice to the Contractor to omit from the work any contract item that does not meet the definition of major contract item. Major contract items may be omitted by a supplemental agreement. Such omission of contract items shall not invalidate any other contract provision or requirement.

Should a contract item be omitted or otherwise ordered to be non-performed, the Contractor shall be paid for all work performed toward completion of such item prior to the date of the order to omit such item. Payment for work performed shall be in accordance with Section 90, paragraph 90-04, *PAYMENT FOR OMITTED ITEMS*.

40-04 EXTRA WORK. Should acceptable completion of the contract require the Contractor to perform an item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, Owner may issue a Change Order to cover the necessary extra work. Change orders for extra work shall contain agreed unit prices for performing the change order work in accordance with the requirements specified in the order, and shall contain any adjustment to the contract time that, in the RPR's opinion, is necessary for completion of the extra work.

When determined by the RPR to be in the Owner's best interest, the RPR may order the Contractor to proceed with extra work as provided in Section 90, paragraph 90-05, *PAYMENT FOR EXTRA WORK*. Extra work that is necessary for acceptable completion of the project, but is not within the general scope of the work covered by the original contract shall be covered by a supplemental agreement as defined in Section 10, paragraph 10-59, *SUPPLEMENTAL AGREEMENT*.

If extra work is essential to maintaining the project critical path, RPR may order the Contractor to commence the extra work under a Time and Material contract method. Once sufficient detail is available to establish the level of effort necessary for the extra work, the Owner shall initiate a change order or supplemental agreement to cover the extra work.

Any claim for payment of extra work that is not covered by written agreement (change order or supplemental agreement) shall be rejected by the Owner.

40-05 MAINTENANCE OF TRAFFIC. It is the explicit intention of the contract that the safety of aircraft, as well as the Contractor's equipment and personnel, is the most important consideration. The Contractor shall maintain traffic in the manner detailed in the Construction Safety and Phasing Plan (CSPP).

a. It is understood and agreed that the Contractor shall provide for the free and unobstructed movement of aircraft in the air operations areas (AOAs) of the airport with respect to their own operations and the operations of all subcontractors as specified in the Section 80, paragraph 80-04, *LIMITATION OF OPERATIONS*. It is further understood and agreed that the Contractor shall provide for the uninterrupted operation of visual and electronic signals (including power supplies thereto) used in the guidance of aircraft while operating to, from, and upon the airport as specified in the Section 70, paragraph 70-15, *CONTRACTOR'S RESPONSIBILITY FOR UTILITY SERVICE AND FACILITIES OF OTHERS*.

b. With respect to their own operations and the operations of all subcontractors, the Contractor shall provide marking, lighting, and other acceptable means of identifying personnel, equipment, vehicles, storage areas, and any work area or condition that may be hazardous to the operation of aircraft, fire- rescue equipment, or maintenance vehicles at the airport in accordance with the construction safety and phasing plan (CSPP) and the safety plan compliance document (SPCD).

c. When the contract requires the maintenance of an existing road, street, or highway during the Contractor's performance of work that is otherwise provided for in the contract, plans, and specifications, the Contractor shall keep such road, street, or highway open to all traffic and shall provide maintenance as may be required to accommodate traffic. The Contractor, at their expense, shall be responsible for the repair to equal or better than preconstruction conditions of any damage caused by the Contractor's equipment and personnel. The Contractor shall furnish, erect, and maintain barricades, warning signs, flag person, and other traffic control devices in reasonable conformity with the Manual on Uniform Traffic Control Devices (MUTCD) (<http://mutcd.fhwa.dot.gov/>), unless otherwise specified. The Contractor shall also construct and maintain in a safe condition any temporary connections necessary for ingress to and egress from abutting property or intersecting roads, streets or highways.

40-06 REMOVAL OF EXISTING STRUCTURES.

All existing structures encountered within the established lines, grades, or grading sections shall be removed by the Contractor, unless such existing structures are otherwise specified to be relocated, adjusted up or down, salvaged, abandoned in place, reused in the work or to remain in place. The cost of removing such existing structures shall not be measured or paid for directly, but shall be included in the various contract items.

Should the Contractor encounter an existing structure (above or below ground) in the work for which the disposition is not indicated on the plans, the Resident Project Representative (RPR) shall be notified prior to disturbing such structure. The disposition of existing structures so encountered shall be immediately determined by the RPR in accordance with the provisions of the contract.

Except as provided in Section 40, paragraph 40-07, *RIGHTS IN AND USE OF MATERIALS FOUND IN THE WORK*, it is intended that all existing materials or structures that may be encountered (within the lines, grades, or grading sections established for completion of the work) shall

be used in the work as otherwise provided for in the contract and shall remain the property of the Owner when so used in the work.

40-07 RIGHTS IN AND USE OF MATERIALS FOUND IN THE WORK. Should the Contractor encounter any material such as (but not restricted to) sand, stone, gravel, slag, or concrete slabs within the established lines, grades, or grading sections, the use of which is intended by the terms of the contract to be embankment, the Contractor may at their own option either:

- a. Use such material in another contract item, providing such use is approved by the RPR and is in conformance with the contract specifications applicable to such use; or,
- b. Remove such material from the site, upon written approval of the RPR; or
- c. Use such material for the Contractor's own temporary construction on site; or,
- d. Use such material as intended by the terms of the contract.

Should the Contractor wish to exercise option a., b., or c., the Contractor shall request the RPR's approval in advance of such use.

Should the RPR approve the Contractor's request to exercise option a., b., or c., the Contractor shall be paid for the excavation or removal of such material at the applicable contract price. The Contractor shall replace, at their expense, such removed or excavated material with an agreed equal volume of material that is acceptable for use in constructing embankment, backfills, or otherwise to the extent that such replacement material is needed to complete the contract work. The Contractor shall not be charged for use of such material used in the work or removed from the site.

Should the RPR approve the Contractor's exercise of option a., the Contractor shall be paid, at the applicable contract price, for furnishing and installing such material in accordance with requirements of the contract item in which the material is used.

It is understood and agreed that the Contractor shall make no claim for delays by reason of their own exercise of option a., b., or c.

The Contractor shall not excavate, remove, or otherwise disturb any material, structure, or part of a structure which is located outside the lines, grades, or grading sections established for the work, except where such excavation or removal is provided for in the contract, plans, or specifications.

40-08 FINAL CLEANING UP. Upon completion of the work and before acceptance and final payment will be made, the Contractor shall remove from the site all machinery, equipment, surplus and discarded materials, rubbish, temporary structures, and stumps or portions of trees. The Contractor shall cut all brush and woods within the limits indicated and shall leave the site in a neat and presentable condition. Material cleared from the site and deposited on adjacent property will not be considered as having been disposed of satisfactorily, unless the Contractor has obtained the written permission of such property owner.

END OF SECTION 40

SECTION 50 CONTROL OF WORK

50-01 AUTHORITY OF THE RESIDENT PROJECT REPRESENTATIVE (RPR). The RPR has final authority regarding the interpretation of project specification requirements. The RPR shall determine acceptability of the quality of materials furnished, method of performance of work performed, and the manner and rate of performance of the work. The RPR does not have the authority to accept work that does not conform to specification requirements.

50-02 CONFORMITY WITH PLANS AND SPECIFICATIONS. All work and all materials furnished shall be in reasonably close conformity with the lines, grades, grading sections, cross-sections, dimensions, material requirements, and testing requirements that are specified (including specified tolerances) in the contract, plans or specifications.

If the RPR finds the materials furnished, work performed, or the finished product not within reasonably close conformity with the plans and specifications but that the portion of the work affected will, in their opinion, result in a finished product having a level of safety, economy, durability, and workmanship acceptable to the Owner, the RPR will advise the Owner of his or her determination that the affected work be accepted and remain in place. The RPR will document the determination and recommend to the Owner a basis of acceptance that will provide for an adjustment in the contract price for the affected portion of the work. Changes in the contract price must be covered by contract change order or supplemental agreement as applicable.

If the RPR finds the materials furnished, work performed, or the finished product are not in reasonably close conformity with the plans and specifications and have resulted in an unacceptable finished product, the affected work or materials shall be removed and replaced or otherwise corrected by and at the expense of the Contractor in accordance with the RPR's written orders.

The term "reasonably close conformity" shall not be construed as waiving the Contractor's responsibility to complete the work in accordance with the contract, plans, and specifications. The term shall not be construed as waiving the RPR's responsibility to insist on strict compliance with the requirements of the contract, plans, and specifications during the Contractor's execution of the work, when, in the RPR's opinion, such compliance is essential to provide an acceptable finished portion of the work.

The term "reasonably close conformity" is also intended to provide the RPR with the authority, after consultation with the FAA/MoDOT, to use sound engineering judgment in his or her determinations as to acceptance of work that is not in strict conformity, but will provide a finished product equal to or better than that intended by the requirements of the contract, plans and specifications.

The RPR will not be responsible for the Contractor's means, methods, techniques, sequences, or procedures of construction or the safety precautions incident thereto.

50-03 COORDINATION OF CONTRACT, PLANS, AND SPECIFICATIONS. The contract, plans, specifications, and all referenced standards cited are essential parts of the contract requirements. If electronic files are provided and used on the project and there is a conflict between the electronic files and hard copy plans, the hard copy plans shall govern. A requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete work. In case of discrepancy, calculated dimensions will govern over scaled dimensions; contract technical specifications shall govern over contract general provisions, plans, cited standards for materials or testing, and cited advisory circulars (ACs); contract general provisions shall govern over plans, cited standards for materials or testing, and cited ACs; plans shall govern over cited standards for materials or testing and cited ACs. If any paragraphs contained in the Special Provisions conflict with General Provisions or Technical Specifications, the Special Provisions shall govern.

From time to time, discrepancies within cited testing standards occur due to the timing of the change, edits, and/or replacement of the standards. If the Contractor discovers any apparent discrepancy within standard test methods, the Contractor shall immediately ask the RPR for an interpretation and decision, and such decision shall be final.

The Contractor shall not take advantage of any apparent error or omission on the plans or specifications. In the event the Contractor discovers any apparent error or discrepancy, Contractor shall immediately notify the Owner or the designated representative in writing requesting their written interpretation and decision.

50-04 LIST OF SPECIAL PROVISIONS. See Section 4 for the Project Special Provisions.

50-05 COOPERATION OF CONTRACTOR. The Contractor will be supplied with five hard copies or an electronic PDF of the plans and specifications. The Contractor shall have available on the construction site at all times one hard copy each of the plans and specifications. Additional hard copies of plans and specifications may be obtained by the Contractor for the cost of reproduction.

The Contractor shall give constant attention to the work to facilitate the progress thereof, and shall cooperate with the RPR and their inspectors and with other Contractors in every way possible. The Contractor shall have a competent superintendent on the work at all times who is fully authorized as their agent on the work. The superintendent shall be capable of reading and thoroughly understanding the plans and specifications and shall receive and fulfill instructions from the RPR or their authorized representative.

50-06 COOPERATION BETWEEN CONTRACTORS. The Owner reserves the right to contract for and perform other or additional work on or near the work covered by this contract.

When separate contracts are let within the limits of any one project, each Contractor shall conduct the work not to interfere with or hinder the progress of completion of the work being performed by other Contractors. Contractors working on the same project shall cooperate with each other as directed.

Each Contractor involved shall assume all liability, financial or otherwise, in connection with their own contract and shall protect and save harmless the Owner from any and all damages or claims that may arise because of inconvenience, delays, or loss experienced because of the presence and operations of other Contractors working within the limits of the same project.

The Contractor shall arrange his or her work and shall place and dispose of the materials being used to not interfere with the operations of the other Contractors within the limits of the same project. The Contractor shall join their work with that of the others in an acceptable manner and shall perform it in proper sequence to that of the others.

50-06 CONSTRUCTION LAYOUT AND STAKES. The Engineer/RPR shall establish necessary horizontal and vertical control. The establishment of Survey Control and/or reestablishment of survey control shall be by a State Licensed Land Surveyor. Contractor is responsible for preserving integrity of horizontal and vertical controls established by Engineer/RPR. In case of negligence on the part of the Contractor or their employees, resulting in the destruction of any horizontal and vertical control, the resulting costs will be deducted as a liquidated damage against the Contractor.

Prior to the start of construction, the Contractor will check all control points for horizontal and vertical accuracy and certify in writing to the RPR that the Contractor concurs with survey control established for the project. All lines, grades and measurements from control points necessary for the proper execution and control of the work on this project will be provided to the RPR. The Contractor is responsible to establish all layout required for the construction of the project.

Copies of survey notes will be provided to the RPR for each area of construction and for each placement of material as specified to allow the RPR to make periodic checks for conformance with plan grades, alignments

and grade tolerances required by the applicable material specifications. Surveys will be provided to the RPR prior to commencing work items that cover or disturb the survey staking. Survey(s) and notes shall be provided in the following format(s): **Electronic format that includes Point Number, Northing, Easting, Elevation, and Description (PNEZD, comma delimited format).**

Laser, GPS, String line, or other automatic control shall be checked with temporary control as necessary. In the case of error, on the part of the Contractor, their surveyor, employees or subcontractors, resulting in established grades, alignment or grade tolerances that do not concur with those specified or shown on the plans, the Contractor is solely responsible for correction, removal, replacement and all associated costs at no additional cost to the Owner.

No direct payment will be made, unless otherwise specified in contract documents, for this labor, materials, or other expenses. The cost shall be included in the price of the bid for the various items of the Contract.

50-08 AUTHORITY AND DUTIES OF QUALITY ASSURANCE (QA) INSPECTORS. QA inspectors shall be authorized to inspect all work done and all material furnished. Such QA inspection may extend to all or any part of the work and to the preparation, fabrication, or manufacture of the materials to be used. QA inspectors are not authorized to revoke, alter, or waive any provision of the contract. QA inspectors are not authorized to issue instructions contrary to the plans and specifications or to act as foreman for the Contractor.

QA Inspectors are authorized to notify the Contractor or their representatives of any failure of the work or materials to conform to the requirements of the contract, plans, or specifications and to reject such nonconforming materials in question until such issues can be referred to the RPR for a decision.

50-09 INSPECTION OF THE WORK. All materials and each part or detail of the work shall be subject to inspection. The RPR shall be allowed access to all parts of the work and shall be furnished with such information and assistance by the Contractor as is required to make a complete and detailed inspection.

If the RPR requests it, the Contractor, at any time before acceptance of the work, shall remove or uncover such portions of the finished work as may be directed. After examination, the Contractor shall restore said portions of the work to the standard required by the specifications. Should the work thus exposed or examined prove acceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be paid for as extra work; but should the work so exposed or examined prove unacceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be at the Contractor's expense.

Provide advance written notice to the RPR of work the Contractor plans to perform each week and each day. Any work done or materials used without written notice and allowing opportunity for inspection by the RPR may be ordered removed and replaced at the Contractor's expense.

Should the contract work include relocation, adjustment, or any other modification to existing facilities, not the property of the (contract) Owner, authorized representatives of the Owners of such facilities shall have the right to inspect such work. Such inspection shall in no sense make any facility owner a party to the contract, and shall in no way interfere with the rights of the parties to this contract.

50-10 REMOVAL OF UNACCEPTABLE AND UNAUTHORIZED WORK. All work that does not conform to the requirements of the contract, plans, and specifications will be considered unacceptable, unless otherwise determined acceptable by the RPR as provided in paragraph 50-02, *CONFORMITY WITH PLANS AND SPECIFICATIONS*.

Unacceptable work, whether the result of poor workmanship, use of defective materials, damage through carelessness, or any other cause found to exist prior to the final acceptance of the work, shall be removed

immediately and replaced in an acceptable manner in accordance with the provisions of Section 70, paragraph 70-14, *CONTRACTOR'S RESPONSIBILITY FOR WORK*.

No removal work made under provision of this paragraph shall be done without lines and grades having been established by the RPR. Work done contrary to the instructions of the RPR, work done beyond the lines shown on the plans or as established by the RPR, except as herein specified, or any extra work done without authority, will be considered as unauthorized and will not be paid for under the provisions of the contract. Work so done may be ordered removed or replaced at the Contractor's expense.

Upon failure on the part of the Contractor to comply with any order of the RPR made under the provisions of this subsection, the RPR will have authority to cause unacceptable work to be remedied or removed and replaced; and unauthorized work to be removed and recover the resulting costs as a liquidated damage against the Contractor.

50-11 LOAD RESTRICTIONS The Contractor shall comply with all legal load restrictions in the hauling of materials on public roads beyond the limits of the work. A special permit will not relieve the Contractor of liability for damage that may result from the moving of material or equipment.

The operation of equipment of such weight or so loaded as to cause damage to structures or to any other type of construction will not be permitted. Hauling of materials over the base course or surface course under construction shall be limited as directed. No loads will be permitted on a concrete pavement, base, or structure before the expiration of the curing period. The Contractor, at their own expense, shall be responsible for the repair to equal or better than preconstruction conditions of any damage caused by the Contractor's equipment and personnel.

50-12 MAINTENANCE DURING CONSTRUCTION. The Contractor shall maintain the work during construction and until the work is accepted. Maintenance shall constitute continuous and effective work prosecuted day by day, with adequate equipment and forces so that the work is maintained in satisfactory condition at all times.

In the case of a contract for the placing of a course upon a course or subgrade previously constructed, the Contractor shall maintain the previous course or subgrade during all construction operations.

All costs of maintenance work during construction and before the project is accepted shall be included in the unit prices bid on the various contract items, and the Contractor will not be paid an additional amount for such work.

50-13 FAILURE TO MAINTAIN THE WORK. Should the Contractor at any time fail to maintain the work as provided in paragraph 50-12, *MAINTENANCE DURING CONSTRUCTION*, the RPR shall immediately notify the Contractor of such noncompliance. Such notification shall specify a reasonable time within which the Contractor shall be required to remedy such unsatisfactory maintenance condition. The time specified will give due consideration to the exigency that exists.

Should the Contractor fail to respond to the RPR's notification, the Owner may suspend any work necessary for the Owner to correct such unsatisfactory maintenance condition, depending on the exigency that exists. Any maintenance cost incurred by the Owner, shall be recovered as a liquidated damage against the Contractor.

50-14 PARTIAL ACCEPTANCE. If at any time during the execution of the project the Contractor substantially completes a usable unit or portion of the work, the occupancy of which will benefit the Owner, the Contractor may request the RPR to make final inspection of that unit. If the RPR finds upon inspection that the unit has been satisfactorily completed in compliance with the contract, the RPR may accept it as being complete, and the Contractor may be relieved of further responsibility for that unit. Such partial acceptance and beneficial occupancy by the Owner shall not void or alter any provision of the contract.

50-15 FINAL ACCEPTANCE. Upon due notice from the Contractor of presumptive completion of the entire project, the RPR and Owner will make an inspection. If all construction provided for and contemplated by the contract is found to be complete in accordance with the contract, plans, and specifications, such inspection shall constitute the final inspection. The RPR shall notify the Contractor in writing of final acceptance as of the date of the final inspection.

If, however, the inspection discloses any work, in whole or in part, as being unsatisfactory, the RPR will notify the Contractor and the Contractor shall correct the unsatisfactory work. Upon correction of the work, another inspection will be made which shall constitute the final inspection, provided the work has been satisfactorily completed. In such event, the RPR will make the final acceptance and notify the Contractor in writing of this acceptance as of the date of final inspection.

50-16 CLAIMS FOR ADJUSTMENT AND DISPUTES. If for any reason the Contractor deems that additional compensation is due for work or materials not clearly provided for in the contract, plans, or specifications or previously authorized as extra work, the Contractor shall notify the RPR in writing of their intention to claim such additional compensation before the Contractor begins the work on which the Contractor bases the claim. If such notification is not given or the RPR is not afforded proper opportunity by the Contractor for keeping strict account of actual cost as required, then the Contractor hereby agrees to waive any claim for such additional compensation. Such notice by the Contractor and the fact that the RPR has kept account of the cost of the work shall not in any way be construed as proving or substantiating the validity of the claim. When the work on which the claim for additional compensation is based has been completed, the Contractor shall, within 10 calendar days, submit a written claim to the RPR who will present it to the Owner for consideration in accordance with local laws or ordinances.

Nothing in this subsection shall be construed as a waiver of the Contractor's right to dispute final payment based on differences in measurements or computations.

END OF SECTION 50

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SECTION 60 CONTROL OF MATERIALS

60-01 SOURCE OF SUPPLY AND QUALITY REQUIREMENTS. The materials used in the work shall conform to the requirements of the contract, plans, and specifications. Unless otherwise specified, such materials that are manufactured or processed shall be new (as compared to used or reprocessed).

In order to expedite the inspection and testing of materials, the Contractor shall furnish documentation to the RPR as to the origin, composition, and manufacture of all materials to be used in the work. Documentation shall be furnished promptly after execution of the contract but, in all cases, prior to delivery of such materials.

At the RPR's option, materials may be approved at the source of supply before delivery. If it is found after trial that sources of supply for previously approved materials do not produce specified products, the Contractor shall furnish materials from other sources.

The Contractor shall furnish airport lighting equipment that meets the requirements of the specifications; and is listed in AC 150/5345-53, *Airport Lighting Equipment Certification Program, and Addendum* that is in effect on the date of advertisement

60-02 SAMPLES, TESTS, AND CITED SPECIFICATIONS. All materials used in the work shall be inspected, tested, and approved by the RPR before incorporation in the work unless otherwise designated. Any work in which untested materials are used without approval or written permission of the RPR shall be performed at the Contractor's risk. Materials found to be unacceptable and unauthorized will not be paid for and, if directed by the RPR, shall be removed at the Contractor's expense.

Unless otherwise designated, quality assurance tests will be made by and at the expense of the Owner in accordance with the cited standard methods of ASTM, American Association of State Highway and Transportation Officials (AASHTO), federal specifications, Commercial Item Descriptions, and all other cited methods, which are current on the date of advertisement for bids.

The testing organizations performing on-site quality assurance field tests shall have copies of all referenced standards on the construction site for use by all technicians and other personnel. Unless otherwise designated, samples for quality assurance will be taken by a qualified representative of the RPR. All materials being used are subject to inspection, test, or rejection at any time prior to or during incorporation into the work. Copies of all tests will be furnished to the Contractor's representative at their request after review and approval of the RPR.

A **legible, hand written** copy of all Contractor QC test data shall be provided to the RPR daily, along with printed reports, in an **electronic spreadsheet file**, on a weekly basis. After completion of the project, and prior to final payment, the Contractor shall submit a final report to the RPR showing all test data reports, plus an analysis of all results showing ranges, averages, and corrective action taken on all failing tests.

The Contractor shall employ a Quality Control (QC) testing organization to perform all Contractor required QC tests in accordance with Item C-100 Contractor Quality Control Program (CQCP).

60-03 CERTIFICATION OF COMPLIANCE/ANALYSIS (COC/COA). The RPR may permit the use, prior to sampling and testing, of certain materials or assemblies when accompanied by manufacturer's COC stating that such materials or assemblies fully comply with the requirements of the contract. The certificate shall be signed by the manufacturer. Each lot of such materials or assemblies delivered to the work must be accompanied by a certificate of compliance in which the lot is clearly identified. The COA is the manufacturer's COC and includes all applicable test results.

Materials or assemblies used on the basis of certificates of compliance may be sampled and tested at any time and if found not to be in conformity with contract requirements will be subject to rejection whether in place or not.

The form and distribution of certificates of compliance shall be as approved by the RPR.

When a material or assembly is specified by "brand name or equal" and the Contractor elects to furnish the specified "or equal," the Contractor shall be required to furnish the manufacturer's certificate of compliance for each lot of such material or assembly delivered to the work. Such certificate of compliance shall clearly identify each lot delivered and shall certify as to:

- a. Conformance to the specified performance, testing, quality or dimensional requirements; and,
- b. Suitability of the material or assembly for the use intended in the contract work.

The RPR shall be the sole judge as to whether the proposed "or equal" is suitable for use in the work.

The RPR reserves the right to refuse permission for use of materials or assemblies on the basis of certificates of compliance.

60-04 PLANT INSPECTION. The RPR or their authorized representative may inspect, at its source, any specified material or assembly to be used in the work. Manufacturing plants may be inspected from time to time for the purpose of determining compliance with specified manufacturing methods or materials to be used in the work and to obtain samples required for acceptance of the material or assembly.

Should the RPR conduct plant inspections, the following conditions shall exist:

- a. The RPR shall have the cooperation and assistance of the Contractor and the producer with whom the Contractor has contracted for materials.
- b. The RPR shall have full entry at all reasonable times to such parts of the plant that concern the manufacture or production of the materials being furnished.
- c. If required by the RPR, the Contractor shall arrange for adequate office or working space that may be reasonably needed for conducting plant inspections. Place office or working space in a convenient location with respect to the plant.

It is understood and agreed that the Owner shall have the right to retest any material that has been tested and approved at the source of supply after it has been delivered to the site. The RPR shall have the right to reject only material which, when retested, does not meet the requirements of the contract, plans, or specifications

60-05 ENGINEER/RESIDENT PROJECT REPRESENTATIVE (RPR) FIELD OFFICE.

The Contractor shall provide dedicated space for the use of the engineer, RPR, and inspectors, as a field office for the duration of the project. This space shall be located conveniently near the construction and shall be separate from any space used by the Contractor. The Contractor shall furnish water, sanitary facilities, heat, air conditioning, and electricity. This facility shall be an approved weatherproof building meeting the current State Highway Specifications for a Class II Field Office. A land line telephone and answering machine shall be provided. The Contractor shall be responsible for payment of the basic monthly charge, long distance and local calls. The Contractor shall furnish a FAX machine, network capable color photocopier/printer (capabilities for up to 11" x 17" media for copying, scanning directly to email, and printing via Windows XP 32-bit, Windows 7 64-bit and Windows 10 64-bit computers), office chairs, water, sanitary facilities, heat, air conditioning, and electricity. The Contractor shall provide and be responsible for payment of Internet access for computers and equipment at the jobsite office location, with consistent minimum performance of 15 Mbps download, 5 Mbps upload and ping latency under 100ms, as tested from computers and equipment behind the

firewall to <https://www.speedtest.net/>. Internet protection shall be provided with a current production, supported, and updated firewall configured with all outbound ports available. The Contractor shall provide and maintain all wired and wireless connectivity to the Internet and between devices. The Contractor and the Contractor's superintendent shall provide all reasonable facilities to enable the Engineer to inspect the workmanship and materials used in the work.

Failure by the Contractor to provide these amenities to the Engineer's onsite personnel will result in the delay of payment to the Contractor.

60-06 STORAGE OF MATERIALS. Materials shall be stored to assure the preservation of their quality and fitness for the work. Stored materials, even though approved before storage, may again be inspected prior to their use in the work. Stored materials shall be located to facilitate their prompt inspection. The Contractor shall coordinate the storage of all materials with the RPR. Materials to be stored on airport property shall not create an obstruction to air navigation nor shall they interfere with the free and unobstructed movement of aircraft. Unless otherwise shown on the plans and/or CSPP, the storage of materials and the location of the Contractor's plant and parked equipment or vehicles shall be as directed by the RPR. Private property shall not be used for storage purposes without written permission of the Owner or lessee of such property. The Contractor shall make all arrangements and bear all expenses for the storage of materials on private property. Upon request, the Contractor shall furnish the RPR a copy of the property Owner's permission.

All storage sites on private or airport property shall be restored to their original condition by the Contractor at their expense, except as otherwise agreed to (in writing) by the Owner or lessee of the property.

60-07 UNACCEPTABLE MATERIALS. Any material or assembly that does not conform to the requirements of the contract, plans, or specifications shall be considered unacceptable and shall be rejected. The Contractor shall remove any rejected material or assembly from the site of the work, unless otherwise instructed by the RPR.

Rejected material or assembly, the defects of which have been corrected by the Contractor, shall not be returned to the site of the work until such time as the RPR has approved its use in the work.

60-08 OWNER FURNISHED MATERIALS. The Contractor shall furnish all materials required to complete the work, except those specified, if any, to be furnished by the Owner. Owner-furnished materials shall be made available to the Contractor at the location specified.

All costs of handling, transportation from the specified location to the site of work, storage, and installing Owner-furnished materials shall be included in the unit price bid for the contract item in which such Owner-furnished material is used.

After any Owner-furnished material has been delivered to the location specified, the Contractor shall be responsible for any demurrage, damage, loss, or other deficiencies that may occur during the Contractor's handling, storage, or use of such Owner-furnished material. The Owner will deduct from any monies due or to become due the Contractor any cost incurred by the Owner in making good such loss due to the Contractor's handling, storage, or use of Owner-furnished materials.

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SECTION 70 LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC

70-01 LAWS TO BE OBSERVED. The Contractor shall keep fully informed of all federal and state laws, all local laws, ordinances, and regulations and all orders and decrees of bodies or tribunals having any jurisdiction or authority, which in any manner affect those engaged or employed on the work, or which in any way affect the conduct of the work. The Contractor shall at all times observe and comply with all such laws, ordinances, regulations, orders, and decrees; and shall protect and indemnify the Owner and all their officers, agents, or servants against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order, or decree, whether by the Contractor or the Contractor's employees.

70-02 PERMITS, LICENSES, AND TAXES. The Contractor shall procure all permits and licenses, pay all charges, fees, and taxes, and give all notices necessary and incidental to the due and lawful execution of the work.

70-03 PATENTED DEVICES, MATERIALS, AND PROCESSES. If the Contractor is required or desires to use any design, device, material, or process covered by letters of patent or copyright, the Contractor shall provide for such use by suitable legal agreement with the Patentee or Owner. The Contractor and the surety shall indemnify and hold harmless the Owner, any third party, or political subdivision from any and all claims for infringement by reason of the use of any such patented design, device, material or process, or any trademark or copyright, and shall indemnify the Owner for any costs, expenses, and damages which it may be obliged to pay by reason of an infringement, at any time during the execution or after the completion of the work.

70-04 RESTORATION OF SURFACES DISTURBED BY OTHERS. The Owner reserves the right to authorize the construction, reconstruction, or maintenance of any public or private utility service, FAA or National Oceanic and Atmospheric Administration (NOAA) facility, or a utility service of another government agency at any time during the progress of the work. To the extent that such construction, reconstruction, or maintenance has been coordinated with the Owner, such authorized work (by others) must be shown on the plans and is indicated as follows:

Owner (Utility or Other Facility)	Location (See Plan Sheet No.)	Person to Contact (Name, Title, Address and Phone)

Except as listed above, the Contractor shall not permit any individual, firm, or corporation to excavate or otherwise disturb such utility services or facilities located within the limits of the work without the written permission of the RPR.

Should the Owner of public or private utility service, FAA, or NOAA facility, or a utility service of another government agency be authorized to construct, reconstruct, or maintain such utility service or facility during the progress of the work, the Contractor shall cooperate with such Owners by arranging and performing the work in this contract to facilitate such construction, reconstruction or maintenance by others whether or not such work by others is listed above. When ordered as extra work by the RPR, the Contractor shall make all necessary repairs to the work which are due to such authorized work by others, unless otherwise provided for in the contract, plans, or specifications. It is understood and agreed that the Contractor shall not be entitled to make any claim for damages due to such authorized work by others or for any delay to the work resulting from such authorized work.

70-05 Federal aid participation. The United States Government has agreed to reimburse the Owner for some portion of the contract costs. The contract work is subject to the inspection and approval of duly authorized representatives of the FAA Administrator. No requirement of this contract shall be construed as making the United States a party to the contract nor will any such requirement interfere, in any way, with the rights of either party to the contract.

70-06 SANITARY, HEALTH, AND SAFETY PROVISIONS. The Contractor shall provide and maintain in a neat, sanitary condition such accommodations for the use of his/her employees as may be necessary to comply with the requirements of the state and local Board of Health, or of other bodies or tribunals having jurisdiction.

Attention is directed to Federal, state, and local laws, rules and regulations concerning construction safety and health standards. The Contractor shall not require any worker to work in surroundings or under conditions that are unsanitary, hazardous, or dangerous to his/her health or safety.

The contractor shall be aware of all COVID-19 guidance from the Center for Disease Control (CDC) and other government health mandates and conduct all operations in conformance with these safety directives. The guidance may change during the project construction and the contractor shall change and adapt their operation and safety protocols accordingly.

The contractor shall include these procedures in the project safety plan as called for in the contract documents and revise the safety plan as needed.

The contractor shall be aware of the Missouri Standard Specifications for Highway Construction Section 107.1 "Laws to be Observed".

70-07 PUBLIC CONVENIENCE AND SAFETY. The Contractor shall control their operations and those of their subcontractors and all suppliers, to assure the least inconvenience to the traveling public. Under all circumstances, safety shall be the most important consideration.

The Contractor shall maintain the free and unobstructed movement of aircraft and vehicular traffic with respect to their own operations and those of their own subcontractors and all suppliers in accordance with Section 40, paragraph 40-05, *MAINTENANCE OF TRAFFIC*, and shall limit such operations for the convenience and safety of the traveling public as specified in Section 80, paragraph 80-04, *LIMITATION OF OPERATIONS*.

The Contractor shall remove or control debris and rubbish resulting from its work operations at frequent intervals, and upon the order of the RPR. If the RPR determines the existence of Contractor debris in the work site represents a hazard to airport operations and the Contractor is unable to respond in a prompt and reasonable manner, the RPR reserves the right to assign the task of debris removal to a third party and recover the resulting costs as a liquidated damage against the Contractor.

70-08 CONSTRUCTION SAFETY AND PHASING PLAN (CSPP). The Contractor shall complete the work in accordance with the approved Construction Safety and Phasing Plan (CSPP) developed in accordance with AC 150/5370-2, Operational Safety on Airports During Construction. The CSPP is on sheet(s) **G050-G052** of the project plans.

70-09 USE OF EXPLOSIVES. The use of explosives is not permitted on this project.

70-10 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE. The Contractor shall be responsible for the preservation of all public and private property, and shall protect carefully from disturbance or damage all land monuments and property markers until the Engineer/RPR has witnessed or otherwise referenced their location and shall not move them until directed.

The Contractor shall be responsible for all damage or injury to property of any character, during the execution of the work, resulting from any act, omission, neglect, or misconduct in manner or method of executing the work, or at any time due to defective work or materials, and said responsibility shall not be released until the project has been completed and accepted.

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1343 When or where any direct or indirect damage or injury is done to public or private property by or on account
1344 of any act, omission, neglect, or misconduct in the execution of the work, or in consequence of the non-
1345 execution thereof by the Contractor, the Contractor shall restore, at their own expense, such property to a
1346 condition similar or equal to that existing before such damage or injury was done, by repairing, or otherwise
1347 restoring as may be directed, or the Contractor shall make good such damage or injury in an acceptable manner.

70-11 RESPONSIBILITY FOR DAMAGE CLAIMS. The Contractor shall indemnify and hold harmless the Engineer/RPR and the Owner and their officers, agents, and employees from all suits, actions, or claims, of any character, brought because of any injuries or damage received or sustained by any person, persons, or property on account of the operations of the Contractor; or on account of or in consequence of any neglect in safeguarding the work; or through use of unacceptable materials in constructing the work; or because of any act or omission, neglect, or misconduct of said Contractor; or because of any claims or amounts recovered from any infringements of patent, trademark, or copyright; or from any claims or amounts arising or recovered under the "Workmen's Compensation Act," or any other law, ordinance, order, or decree. Money due the Contractor under and by virtue of their own contract considered necessary by the Owner for such purpose may be retained for the use of the Owner or, in case no money is due, their own surety may be held until such suits, actions, or claims for injuries or damages shall have been settled and suitable evidence to that effect furnished to the Owner, except that money due the Contractor will not be withheld when the Contractor produces satisfactory evidence that he or she is adequately protected by public liability and property damage insurance.

70-12 THIRD PARTY BENEFICIARY CLAUSE. It is specifically agreed between the parties executing the contract that it is not intended by any of the provisions of any part of the contract to create for the public or any member thereof, a third-party beneficiary or to authorize anyone not a party to the contract to maintain a suit for personal injuries or property damage pursuant to the terms or provisions of the contract.

70-13 OPENING SECTIONS OF THE WORK TO TRAFFIC. If it is necessary for the Contractor to complete portions of the contract work for the beneficial occupancy of the Owner prior to completion of the entire contract, such "phasing" of the work must be specified below and indicated on the approved Construction Safety and Phasing Plan (CSPP) and the project plans. When so specified, the Contractor shall complete such portions of the work on or before the date specified or as otherwise specified.

Phase or Description	Required Date or Sequence of Owner's Beneficial Occupancy	Work Shown on Plan Sheet
Refer to the Phasing Plans of the Construction Drawings.		

Upon completion of any portion of work listed above, such portion shall be accepted by the Owner in accordance with Section 50, paragraph 50-14, *PARTIAL ACCEPTANCE*.

No portion of the work may be opened by the Contractor until directed by the Owner in writing. Should it become necessary to open a portion of the work to traffic on a temporary or intermittent basis, such openings shall be made when, in the opinion of the RPR, such portion of the work is in an acceptable condition to support the intended traffic. Temporary or intermittent openings are considered to be inherent in the work and shall not constitute either acceptance of the portion of the work so opened or a waiver of any provision of the contract. Any damage to the portion of the work so opened that is not attributable to traffic which is permitted by the Owner shall be repaired by the Contractor at their expense.

The Contractor shall make their own estimate of the inherent difficulties involved in completing the work under the conditions herein described and shall not claim any added compensation by reason of delay or increased cost due to opening a portion of the contract work.

The Contractor must conform to safety standards contained AC 150/5370-2 and the approved CSPP.

Contractor shall refer to the plans, specifications, and the approved CSPP to identify barricade requirements, temporary and/or permanent markings, airfield lighting, guidance signs and other safety requirements prior to opening up sections of work to traffic.

70-14 CONTRACTOR'S RESPONSIBILITY FOR WORK. Until the RPR's final written acceptance of the entire completed work, excepting only those portions of the work accepted in accordance with Section 50, paragraph 50-14, *PARTIAL ACCEPTANCE*, the Contractor shall have the charge and care thereof and shall take every precaution against injury or damage to any part due to the action of the elements or from any other

cause, whether arising from the execution or from the non-execution of the work. The Contractor shall rebuild, repair, restore, and make good all injuries or damages to any portion of the work occasioned by any of the above causes before final acceptance and shall bear the expense thereof except damage to the work due to unforeseeable causes beyond the control of and without the fault or negligence of the Contractor, including but not restricted to acts of God such as earthquake, tidal wave, tornado, hurricane or other cataclysmic phenomenon of nature, or acts of the public enemy or of government authorities.

If the work is suspended for any cause whatever, the Contractor shall be responsible for the work and shall take such precautions necessary to prevent damage to the work. The Contractor shall provide for normal drainage and shall erect necessary temporary structures, signs, or other facilities at their own expense. During such period of suspension of work, the Contractor shall properly and continuously maintain in an acceptable growing condition all living material in newly established planting, seeding, and sodding furnished under the contract, and shall take adequate precautions to protect new tree growth and other important vegetative growth against injury.

70-15 CONTRACTOR'S RESPONSIBILITY FOR UTILITY SERVICE AND FACILITIES OF OTHERS. As provided in paragraph 70-04, *RESTORATION OF SURFACES DISTURBED BY OTHERS*, the Contractor shall cooperate with the owner of any public or private utility service, FAA or NOAA, or a utility service of another government agency that may be authorized by the Owner to construct, reconstruct or maintain such utility services or facilities during the progress of the work. In addition, the Contractor shall control their operations to prevent the unscheduled interruption of such utility services and facilities.

To the extent that such public or private utility services, FAA, or NOAA facilities, or utility services of another governmental agency are known to exist within the limits of the contract work, the approximate locations have been indicated on the plans and/or in the contract documents.

Utility Service or Facility	Person to Contact (Name, Title, Address, & Phone)	Owner's Emergency Contact (Phone)

It is understood and agreed that the Owner does not guarantee the accuracy or the completeness of the location information relating to existing utility services, facilities, or structures that may be shown on the plans or encountered in the work. Any inaccuracy or omission in such information shall not relieve the Contractor of the responsibility to protect such existing features from damage or unscheduled interruption of service.

It is further understood and agreed that the Contractor shall, upon execution of the contract, notify the Owners of all utility services or other facilities of their plan of operations. Such notification shall be in writing addressed to "The Person to Contact" as provided in this paragraph and paragraph 70-04, *RESTORATION OF SURFACES DISTURBED BY OTHERS*. A copy of each notification shall be given to the RPR.

In addition to the general written notification provided, it shall be the responsibility of the Contractor to keep such individual Owners advised of changes in their plan of operations that would affect such Owners.

Prior to beginning the work in the general vicinity of an existing utility service or facility, the Contractor shall again notify each such Owner of their plan of operation. If, in the Contractor's opinion, the Owner's assistance is needed to locate the utility service or facility or the presence of a representative of the Owner is desirable to observe the work, such advice should be included in the notification. Such notification shall be given by the most expeditious means to reach the utility owner's "Person to Contact" no later than two normal business days prior to the Contractor's commencement of operations in such general vicinity. The Contractor shall furnish a written summary of the notification to the RPR.

The Contractor's failure to give the two days' notice shall be cause for the Owner to suspend the Contractor's operations in the general vicinity of a utility service or facility.

Where the outside limits of an underground utility service have been located and staked on the ground, the Contractor shall be required to use hand excavation methods within 3 feet (1 m) of such outside limits at such points as may be required to ensure protection from damage due to the Contractor's operations.

Should the Contractor damage or interrupt the operation of a utility service or facility by accident or otherwise, the Contractor shall immediately notify the proper authority and the RPR and shall take all reasonable measures to prevent further damage or interruption of service. The Contractor, in such events, shall cooperate with the utility service or facility owner and the RPR continuously until such damage has been repaired and service restored to the satisfaction of the utility or facility owner.

The Contractor shall bear all costs of damage and restoration of service to any utility service or facility due to their operations whether due to negligence or accident. The Owner reserves the right to deduct such costs from any monies due or which may become due the Contractor, or their surety.

70-16 FURNISHING RIGHTS-OF-WAY. The Owner will be responsible for furnishing all rights-of-way upon which the work is to be constructed in advance of the Contractor's operations.

70-17 PERSONAL LIABILITY OF PUBLIC OFFICIALS. In carrying out any of the contract provisions or in exercising any power or authority granted by this contract, there shall be no liability upon the Engineer, RPR, their authorized representatives, or any officials of the Owner either personally or as an official of the Owner. It is understood that in such matters they act solely as agents and representatives of the Owner.

70-18 NO WAIVER OF LEGAL RIGHTS. Upon completion of the work, the Owner will expeditiously make final inspection and notify the Contractor of final acceptance. Such final acceptance, however, shall not preclude or stop the Owner from correcting any measurement, estimate, or certificate made before or after completion of the work, nor shall the Owner be precluded or stopped from recovering from the Contractor or his or her surety, or both, such overpayment as may be sustained, or by failure on the part of the Contractor to fulfill his or her obligations under the contract. A waiver on the part of the Owner of any breach of any part of the contract shall not be held to be a waiver of any other or subsequent breach.

The Contractor, without prejudice to the terms of the contract, shall be liable to the Owner for latent defects, fraud, or such gross mistakes as may amount to fraud, or as regards the Owner's rights under any warranty or guaranty.

70-19 ENVIRONMENTAL PROTECTION. The Contractor shall comply with all federal, state, and local laws and regulations controlling pollution of the environment. The Contractor shall take necessary precautions to prevent pollution of streams, lakes, ponds, and reservoirs with fuels, oils, asphalts, chemicals, or other harmful materials and to prevent pollution of the atmosphere from particulate and gaseous matter.

70-20 ARCHAEOLOGICAL AND HISTORICAL FINDINGS. Unless otherwise specified in this subsection, the Contractor is advised that the site of the work is not within any property, district, or site, and does not contain any building, structure, or object listed in the current National Register of Historic Places published by the United States Department of Interior.

Should the Contractor encounter, during his or her operations, any building, part of a building, structure, or object that is incongruous with its surroundings, the Contractor shall immediately cease operations in that location and notify the Engineer. The Engineer will immediately investigate the Contractor's finding and the Owner will direct the Contractor to either resume operations or to suspend operations as directed.

Should the Owner order suspension of the Contractor's operations in order to protect an archaeological or historical finding, or order the Contractor to perform extra work, such shall be covered by an appropriate contract change order or supplemental agreement as provided in Section 40, paragraph 40-04, *EXTRA WORK*, and Section 90, paragraph 90-05, *PAYMENT FOR EXTRA WORK*. If appropriate, the contract change order

or supplemental agreement shall include an extension of contract time in accordance with the Section 80, paragraph 80-07, *DETERMINATION AND EXTENSION OF CONTRACT TIME*.

70-21 INSURANCE REQUIREMENTS. The Contractor shall pay for and maintain during the life of this contract adequate Workmen's Compensation, Public Liability and Property Damage Insurance. The Contractor is charged with the responsibility for adequate and proper coverage for all his subcontract operations. Contractor shall furnish to the Sponsor satisfactory proof of carriage of the insurance required. Public Liability Insurance shall be in the amount of not less than \$1,000,000.00 for injuries, including accidental death, to any one person, nor less than \$1,000,000.00 on account of any one accident. Property Damage Insurance shall be carried in an amount not less than \$1,000,000.00. Such Liability Insurance shall include completed operation coverage.

The contractor shall provide property insurance for the building work under construction, a.k.a. Builders Risk Insurance, for the duration of the contract. This shall equal an amount sufficient to cover the replacement cost of the property during the course of construction at the estimated value of the total project. This policy shall remain in place until the date indicated for the owners occupancy on the certificate of substantial completion.

END OF SECTION 70

SECTION 80 EXECUTION AND PROGRESS

80-01 SUBLETTING OF CONTRACT. The Owner will not recognize any subcontractor on the work. The Contractor shall at all times when work is in progress be represented either in person, by a qualified superintendent, or by other designated, qualified representative who is duly authorized to receive and execute orders of the Resident Project Representative (RPR).

The Contractor shall perform, with his organization, an amount of work equal to at least 50 percent of the total contract cost.

Should the Contractor elect to assign their contract, said assignment shall be concurred in by the surety, shall be presented for the consideration and approval of the Owner, and shall be consummated only on the written approval of the Owner.

The Contractor shall provide copies of all subcontracts to the RPR 14 days prior to being utilized on the project. As a minimum, the information shall include the following:

- Subcontractor's legal company name.
- Subcontractor's legal company address, including County name.
- Principal contact person's name, telephone and fax number.
- Complete narrative description, and dollar value of the work to be performed by the subcontractor.
- Copies of required insurance certificates in accordance with the specifications.
- Minority/ non-minority status.

80-02 NOTICE TO PROCEED. The Owners notice to proceed will state the date on which contract time commences. The Contractor is expected to commence project operations within **10** days of the NTP date. The Contractor shall notify the RPR at least 24 hours in advance of the time contract operations begins. The Contractor shall not commence any actual operations prior to the date on which the notice to proceed is issued by the Owner.

80-03 EXECUTION AND PROGRESS. Unless otherwise specified, the Contractor shall submit their coordinated construction schedule showing all work activities for the RPR's review and acceptance at least 10 days prior to the start of work. The Contractor's progress schedule, once accepted by the RPR, will represent the Contractor's baseline plan to accomplish the project in accordance with the terms and conditions of the Contract. The RPR will compare actual Contractor progress against the baseline schedule to determine that status of the Contractor's performance. The Contractor shall provide sufficient materials, equipment, and labor to guarantee the completion of the project in accordance with the plans and specifications within the time set forth in the proposal.

If the Contractor falls significantly behind the submitted schedule, the Contractor shall, upon the RPR's request, submit a revised schedule for completion of the work within the contract time and modify their operations to provide such additional materials, equipment, and labor necessary to meet the revised schedule. Should the execution of the work be discontinued for any reason, the Contractor shall notify the RPR at least 24 hours in advance of resuming operations.

The Contractor shall not commence any actual construction prior to the date on which the NTP is issued by the Owner.

The project schedule shall be prepared as a network diagram in Critical Path Method (CPM), Program Evaluation and Review Technique (PERT), or other format, or as otherwise specified. It shall include information on the sequence of work activities, milestone dates, and activity duration. The schedule shall show

all work items identified in the project proposal for each work area and shall include the project start date and end date.

The Contractor shall maintain the work schedule and provide an update and analysis of the progress schedule on a twice monthly basis, or as otherwise specified in the contract. Submission of the work schedule shall not relieve the Contractor of overall responsibility for scheduling, sequencing, and coordinating all work to comply with the requirements of the contract.

80-04 LIMITATION OF OPERATIONS. The Contractor shall control their operations and the operations of their subcontractors and all suppliers to provide for the free and unobstructed movement of aircraft in the air operations areas (AOA) of the airport.

When the work requires the Contractor to conduct their operations within an AOA of the airport, the work shall be coordinated with airport operations (through the RPR) at least 48 hours prior to commencement of such work. The Contractor shall not close an AOA until so authorized by the RPR and until the necessary temporary marking and associated lighting is in place as provided in the Section 70, paragraph 70-08, CONSTRUCTION SAFETY AND PHASING PLAN (CSPP).

When the contract work requires the Contractor to work within an AOA of the airport on an intermittent basis (intermittent opening and closing of the AOA), the Contractor shall maintain constant communications as specified; immediately obey all instructions to vacate the AOA; and immediately obey all instructions to resume work in such AOA. Failure to maintain the specified communications or to obey instructions shall be cause for suspension of the Contractor's operations in the AOA until satisfactory conditions are provided. The areas of the AOA identified in the Construction Safety Phasing Plan (CSPP) and as listed below, cannot be closed to operating aircraft to permit the Contractor's operations on a continuous basis and will therefore be closed to aircraft operations intermittently as follows:

AOA	Time Periods for Closure	Type of Communications Required	Control Authority
Refer to the Safety Plan of the Construction Drawings			Airport Supervisor

Contractor shall be required to conform to safety standards contained in AC 150/5370-2G, Operational Safety on Airports During Construction (see Special Provisions).

80-04.1 OPERATIONAL SAFETY ON AIRPORT DURING CONSTRUCTION. All Contractors' operations shall be conducted in accordance with the approved project Construction Safety and Phasing Plan (CSPP) and the Safety Plan Compliance Document (SPCD) and the provisions set forth within the current version of AC 150/5370-2, Operational Safety on Airports During Construction. The CSPP included within the contract documents conveys minimum requirements for operational safety on the airport during construction activities. The Contractor shall prepare and submit a SPCD that details how it proposes to comply with the requirements presented within the CSPP.

The Contractor shall implement all necessary safety plan measures prior to commencement of any work activity. The Contractor shall conduct routine checks to assure compliance with the safety plan measures.

The Contractor is responsible to the Owner for the conduct of all subcontractors it employs on the project. The Contractor shall assure that all subcontractors are made aware of the requirements of the CSPP and that they implement and maintain all necessary measures.

No deviation or modifications may be made to the approved CSPP unless approved in writing by the Owner or Engineer. The necessary coordination actions to review Contractor proposed modifications to an approved CSPP or approved SPCD can require a significant amount of time.

80-05 CHARACTER OF WORKERS, METHODS, AND EQUIPMENT. The Contractor shall, at all times, employ sufficient labor and equipment for prosecuting the work to full completion in the manner and time required by the contract, plans, and specifications.

All workers shall have sufficient skill and experience to perform properly the work assigned to them. Workers engaged in special work or skilled work shall have sufficient experience in such work and in the operation of the equipment required to perform the work satisfactorily.

Any person employed by the Contractor or by any subcontractor who violates any operational regulations or operational safety requirements and, in the opinion of the RPR, does not perform his work in a proper and skillful manner or is intemperate or disorderly shall, at the written request of the RPR, be removed immediately by the Contractor or subcontractor employing such person, and shall not be employed again in any portion of the work without approval of the RPR.

Should the Contractor fail to remove such person or persons, or fail to furnish suitable and sufficient personnel for the proper execution of the work, the RPR may suspend the work by written notice until compliance with such orders.

All equipment that is proposed to be used on the work shall be of sufficient size and in such mechanical condition as to meet requirements of the work and to produce a satisfactory quality of work. Equipment used on any portion of the work shall not cause injury to previously completed work, adjacent property, or existing airport facilities due to its use.

When the methods and equipment to be used by the Contractor in accomplishing the work are not prescribed in the contract, the Contractor is free to use any methods or equipment that will accomplish the work in conformity with the requirements of the contract, plans, and specifications.

When the contract specifies the use of certain methods and equipment, such methods and equipment shall be used unless otherwise authorized by the RPR. If the Contractor desires to use a method or type of equipment other than specified in the contract, the Contractor may request authority from the RPR to do so. The request shall be in writing and shall include a full description of the methods and equipment proposed and of the reasons for desiring to make the change. If approval is given, it will be on the condition that the Contractor will be fully responsible for producing work in conformity with contract requirements. If, after trial use of the substituted methods or equipment, the RPR determines that the work produced does not meet contract requirements, the Contractor shall discontinue the use of the substitute method or equipment and shall complete the remaining work with the specified methods and equipment. The Contractor shall remove any deficient work and replace it with work of specified quality, or take such other corrective action as the RPR may direct. No change will be made in basis of payment for the contract items involved nor in contract time as a result of authorizing a change in methods or equipment under this paragraph.

80-06 TEMPORARY SUSPENSION OF THE WORK. The Owner shall have the authority to suspend the work wholly, or in part, for such period or periods the Owner may deem necessary, due to unsuitable weather, or other conditions considered unfavorable for the execution of the work, or for such time necessary due to the failure on the part of the Contractor to carry out orders given or perform any or all provisions of the contract.

In the event that the Contractor is ordered by the Owner, in writing, to suspend work for some unforeseen cause not otherwise provided for in the contract and over which the Contractor has no control, the Contractor may be reimbursed for actual money expended on the work during the period of shutdown. No allowance will be made for anticipated profits. The period of shutdown shall be computed from the effective date of the written order to suspend work to the effective date of the written order to resume the work. Claims for such compensation shall be filed with the RPR within the time period stated in the RPR's order to resume work. The Contractor shall submit with their own claim information substantiating the amount shown on the claim. The RPR will forward the Contractor's claim to the Owner for consideration in accordance with local laws or

ordinances. No provision of this article shall be construed as entitling the Contractor to compensation for delays due to inclement weather or for any other delay provided for in the contract, plans, or specifications.

If it becomes necessary to suspend work for an indefinite period, the Contractor shall store all materials in such manner that they will not become an obstruction nor become damaged in any way. The Contractor shall take every precaution to prevent damage or deterioration of the work performed and provide for normal drainage of the work. The Contractor shall erect temporary structures where necessary to provide for traffic on, to, or from the airport.

80-07 DETERMINATION AND EXTENSION OF CONTRACT TIME. The number of calendar days shall be stated in the proposal and contract and shall be known as the Contract Time.

If the contract time requires extension for reasons beyond the Contractor's control, it shall be adjusted as follows:

80-07.CONTRACT TIME BASED ON CALENDAR DAYS. Contract Time based on calendar days shall consist of the number of calendar days stated in the contract counting from the effective date of the Notice to Proceed and including all Saturdays, Sundays, holidays, and non-work days. All calendar days elapsing between the effective dates of the Owner's orders to suspend and resume all work, due to causes not the fault of the Contractor, shall be excluded.

At the time of final payment, the contract time shall be increased in the same proportion as the cost of the actually completed quantities bears to the cost of the originally estimated quantities in the proposal. Such increase in the contract time shall not consider either cost of work or the extension of contract time that has been covered by a change order or supplemental agreement. Charges against the contract time will cease as of the date of final acceptance.

80-08 FAILURE TO COMPLETE ON TIME. For each calendar day or working day, as specified in the contract, that any work remains uncompleted after the contract time (including all extensions and adjustments as provided in the paragraph 80-07, *DETERMINATION AND EXTENSION OF CONTRACT TIME*, the sum specified in the contract and proposal as liquidated damages will be deducted from any money due or to become due the Contractor or his or her surety. Such deducted sums shall not be deducted as a penalty but shall be considered as liquidation of a reasonable portion of damages including but not limited to additional engineering services that will be incurred by the Owner should the Contractor fail to complete the work in the time provided in their contract.

Schedule	Liquidated Damages Cost	Allowed Construction Time
Schedule I	\$750/calendar day(s)	35 Calendar Days
Schedule II	\$750/calendar day(s)	150 Calendar Days
Schedule III	\$750/calendar day(s)	30 Calendar Days
Schedule IV	\$750/calendar day(s)	30 Calendar Days

The maximum construction time allowed for Schedules **IIIV** will be the sum of the time allowed for individual schedules but not more than **210** days. Permitting the Contractor to continue and finish the work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, will in no way operate as a wavier on the part of the Owner of any of its rights under the contract.

80-09 DEFAULT AND TERMINATION OF CONTRACT. The Contractor shall be considered in default of their contract and such default will be considered as cause for the Owner to terminate the contract for any of the following reasons if the Contractor:

- a. Fails to begin the work under the contract within the time specified in the Notice to Proceed, or

- b. Fails to perform the work or fails to provide sufficient workers, equipment and/or materials to assure completion of work in accordance with the terms of the contract, or
- c. Performs the work unsuitably or neglects or refuses to remove materials or to perform anew such work as may be rejected as unacceptable and unsuitable, or
- d. Discontinues the execution of the work, or
- e. Fails to resume work which has been discontinued within a reasonable time after notice to do so, or
- f. Becomes insolvent or is declared bankrupt, or commits any act of bankruptcy or insolvency, or
- g. Allows any final judgment to stand against the Contractor unsatisfied for a period of 10 days, or
- h. Makes an assignment for the benefit of creditors, or
- i. For any other cause whatsoever, fails to carry on the work in an acceptable manner.

Should the Owner consider the Contractor in default of the contract for any reason above, the Owner shall immediately give written notice to the Contractor and the Contractor's surety as to the reasons for considering the Contractor in default and the Owner's intentions to terminate the contract.

If the Contractor or surety, within a period of 10 days after such notice, does not proceed in accordance therewith, then the Owner will, upon written notification from the RPR of the facts of such delay, neglect, or default and the Contractor's failure to comply with such notice, have full power and authority without violating the contract, to take the execution of the work out of the hands of the Contractor. The Owner may appropriate or use any or all materials and equipment that have been mobilized for use in the work and are acceptable and may enter into an agreement for the completion of said contract according to the terms and provisions thereof, or use such other methods as in the opinion of the RPR will be required for the completion of said contract in an acceptable manner.

All costs and charges incurred by the Owner, together with the cost of completing the work under contract, will be deducted from any monies due or which may become due the Contractor. If such expense exceeds the sum which would have been payable under the contract, then the Contractor and the surety shall be liable and shall pay to the Owner the amount of such excess.

80-10 TERMINATION FOR NATIONAL EMERGENCIES. The Owner shall terminate the contract or portion thereof by written notice when the Contractor is prevented from proceeding with the construction contract as a direct result of an Executive Order of the President with respect to the execution of war or in the interest of national defense.

When the contract, or any portion thereof, is terminated before completion of all items of work in the contract, payment will be made for the actual number of units or items of work completed at the contract price or as mutually agreed for items of work partially completed or not started. No claims or loss of anticipated profits shall be considered.

Reimbursement for organization of the work, and other overhead expenses, (when not otherwise included in the contract) and moving equipment and materials to and from the job will be considered, the intent being that an equitable settlement will be made with the Contractor.

Acceptable materials, obtained or ordered by the Contractor for the work and that are not incorporated in the work shall, at the option of the Contractor, be purchased from the Contractor at actual cost as shown by receipted bills and actual cost records at such points of delivery as may be designated by the Engineer.

Termination of the contract or a portion thereof shall neither relieve the Contractor of his or her responsibilities for the completed work nor shall it relieve his or her surety of its obligation for and concerning any just claim arising out of the work performed.

80-11 WORK AREA, STORAGE AREA AND SEQUENCE OF OPERATIONS. The Contractor shall obtain approval from the RPR prior to beginning any work in all areas of the airport. No operating runway, taxiway, or air operations area (AOA) shall be crossed, entered, or obstructed while it is operational. The Contractor shall plan and coordinate work in accordance with the approved CSPP and SPCD.

END OF SECTION 80

SECTION 90 MEASUREMENT AND PAYMENT

90-01 MEASUREMENT OF QUANTITIES. All work completed under the contract will be measured by the RPR, or their authorized representatives, using United States Customary Units of Measurement.

The method of measurement and computations to be used in determination of quantities of material furnished and of work performed under the contract will be those methods generally recognized as conforming to good engineering practice.

Unless otherwise specified, longitudinal measurements for area computations will be made horizontally, and no deductions will be made for individual fixtures (or leave-outs) having an area of 9 square feet (0.8 square meters) or less. Unless otherwise specified, transverse measurements for area computations will be the neat dimensions shown on the plans or ordered in writing by the RPR.

Unless otherwise specified, all contract items which are measured by the linear foot such as electrical ducts, conduits, pipe culverts, underdrains, and similar items shall be measured parallel to the base or foundation upon which such items are placed.

The term "lump sum" when used as an item of payment will mean complete payment for the work described in the contract. When a complete structure or structural unit (in effect, "lump sum" work) is specified as the unit of measurement, the unit will be construed to include all necessary fittings and accessories.

When requested by the Contractor and approved by the RPR in writing, material specified to be measured by the cubic yard (cubic meter) may be weighed, and such weights will be converted to cubic yards (cubic meters) for payment purposes. Factors for conversion from weight measurement to volume measurement will be determined by the RPR and shall be agreed to by the Contractor before such method of measurement of pay quantities is used.

Measurement and Payment Terms

Term	Description
Excavation and Embankment Volume	In computing volumes of excavation, the average end area method will be used unless otherwise specified.
Measurement and Proportion by Weight	The term "ton" will mean the short ton consisting of 2,000 pounds (907 kg) avoirdupois. All materials that are measured or proportioned by weights shall be weighed on accurate, independently certified scales by competent, qualified personnel at locations designated by the RPR. If material is shipped by rail, the car weight may be accepted provided that only the actual weight of material is paid for. However, car weights will not be acceptable for material to be passed through mixing plants. Trucks used to haul material being paid for by weight shall be weighed empty daily at such times as the RPR directs, and each truck shall bear a plainly legible identification mark.
Measurement by Volume	Materials to be measured by volume in the hauling vehicle shall be hauled in approved vehicles and measured therein at the point of delivery. Vehicles for this purpose may be of any size or type acceptable for the materials hauled, provided that the body is of such shape that the actual contents may be readily and accurately determined. All vehicles shall be loaded to at least their water level capacity, and all loads shall be leveled when the vehicles arrive at the point of delivery.

Term	Description
Asphalt Material	Asphalt materials will be measured by the gallon (liter) or ton (kg). When measured by volume, such volumes will be measured at 60°F (16°C) or will be corrected to the volume at 60°F (16°C) using ASTM D1250 for asphalts. Net certified scale weights or weights based on certified volumes in the case of rail shipments will be used as a basis of measurement, subject to correction when asphalt material has been lost from the car or the distributor, wasted, or otherwise not incorporated in the work. When asphalt materials are shipped by truck or transport, net certified weights by volume, subject to correction for loss or foaming, will be used for computing quantities.
Cement	Cement will be measured by the ton (kg) or hundredweight (km).
Structure	Structures will be measured according to neat lines shown on the plans or as altered to fit field conditions.
Timber	Timber will be measured by the thousand feet board measure (MFBM) actually incorporated in the structure. Measurement will be based on nominal widths and thicknesses and the extreme length of each piece.
Plates and Sheets	The thickness of plates and galvanized sheet used in the manufacture of corrugated metal pipe, metal plate pipe culverts and arches, and metal cribbing will be specified and measured in decimal fraction of inch.
Miscellaneous Items	When standard manufactured items are specified such as fence, wire, plates, rolled shapes, pipe conduit, etc., and these items are identified by gauge, unit weight, section dimensions, etc., such identification will be considered to be nominal weights or dimensions. Unless more stringently controlled by tolerances in cited specifications, manufacturing tolerances established by the industries involved will be accepted.
Scales	<p>Scales must be tested for accuracy and serviced before use. Scales for weighing materials which are required to be proportioned or measured and paid for by weight shall be furnished, erected, and maintained by the Contractor, or be certified permanently installed commercial scales. Platform scales shall be installed and maintained with the platform level and rigid bulkheads at each end.</p> <p>Scales shall be accurate within 0.5% of the correct weight throughout the range of use. The Contractor shall have the scales checked under the observation of the RPR before beginning work and at such other times as requested. The intervals shall be uniform in spacing throughout the graduated or marked length of the beam or dial and shall not exceed 0.1% of the nominal rated capacity of the scale, but not less than one pound (454 grams). The use of spring balances will not be permitted.</p> <p>In the event inspection reveals the scales have been “overweighing” (indicating more than correct weight) they will be immediately adjusted. All materials received subsequent to the last previous correct weighting-accuracy test will be reduced by the percentage of error in excess of 0.5%.</p> <p>In the event inspection reveals the scales have been under-weighing (indicating less than correct weight), they shall be immediately adjusted. No additional payment to the Contractor will be allowed for materials previously weighed and recorded.</p> <p>Beams, dials, platforms, and other scale equipment shall be so arranged that the operator and the RPR can safely and conveniently view them.</p> <p>Scale installations shall have available ten standard 50-pound (2.3 km) weights for testing the weighing equipment or suitable weights and devices for other approved equipment.</p>

Term	Description
	All costs in connection with furnishing, installing, certifying, testing, and maintaining scales; for furnishing check weights and scale house; and for all other items specified in this subsection, for the weighing of materials for proportioning or payment, shall be included in the unit contract prices for the various items of the project.
Rental Equipment	Rental of equipment will be measured by time in hours of actual working time and necessary traveling time of the equipment within the limits of the work. Special equipment ordered in connection with extra work will be measured as agreed in the change order or supplemental agreement authorizing such work as provided in paragraph 90-05 <i>Payment for Extra Work</i> .
Pay Quantities	When the estimated quantities for a specific portion of the work are designated as the pay quantities in the contract, they shall be the final quantities for which payment for such specific portion of the work will be made, unless the dimensions of said portions of the work shown on the plans are revised by the RPR. If revised dimensions result in an increase or decrease in the quantities of such work, the final quantities for payment will be revised in the amount represented by the authorized changes in the dimensions.

90-02 SCOPE OF PAYMENT. The Contractor shall receive and accept compensation provided for in the contract as full payment for furnishing all materials, for performing all work under the contract in a complete and acceptable manner, and for all risk, loss, damage, or expense of whatever character arising out of the nature of the work or the execution thereof, subject to the provisions of the Section 70, paragraph 70-18, *NO WAIVER OF LEGAL RIGHTS*.

When the “basis of payment” subsection of a technical specification requires that the contract price (price bid) include compensation for certain work or material essential to the item, this same work or material will not also be measured for payment under any other contract item which may appear elsewhere in the contract, plans, or specifications.

90-03 COMPENSATION FOR ALTERED QUANTITIES. When the accepted quantities of work vary from the quantities in the proposal, the Contractor shall accept as payment in full, so far as contract items are concerned, payment at the original contract price for the accepted quantities of work actually completed and accepted. No allowance, except as provided for in the Section 40, paragraph 40-02, *ALTERATION OF WORK AND QUANTITIES*, will be made for any increased expense, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor which results directly from such alterations or indirectly from their unbalanced allocation of overhead and profit among the contract items, or from any other cause.

90-04 PAYMENT FOR OMITTED ITEMS. As specified in the Section 40, paragraph 40-03, *OMITTED ITEMS*, the RPR shall have the right to omit from the work (order nonperformance) any contract item, except major contract items, in the best interest of the Owner.

Should the RPR omit or order nonperformance of a contract item or portion of such item from the work, the Contractor shall accept payment in full at the contract prices for any work actually completed and acceptable prior to the RPR’s order to omit or non-perform such contract item.

Acceptable materials ordered by the Contractor or delivered on the work prior to the date of the RPR’s order will be paid for at the actual cost to the Contractor and shall thereupon become the property of the Owner.

In addition to the reimbursement hereinbefore provided, the Contractor shall be reimbursed for all actual costs incurred for the purpose of performing the omitted contract item prior to the date of the RPR’s order. Such

additional costs incurred by the Contractor must be directly related to the deleted contract item and shall be supported by certified statements by the Contractor as to the nature the amount of such costs.

90-05 PAYMENT FOR EXTRA WORK. Extra work, performed in accordance with the Section 40, paragraph 40-04, *EXTRA WORK*, will be paid for at the contract prices or agreed prices specified in the change order or supplemental agreement authorizing the extra work.

90-06 PARTIAL PAYMENTS. Partial payments will be made to the Contractor at least once each month as the work progresses. Said payments will be based upon estimates, prepared by the RPR, of the value of the work performed and materials complete and in place, in accordance with the contract, plans, and specifications. Such partial payments may also include the delivered actual cost of those materials stockpiled and stored in accordance with paragraph 90-07, *PAYMENT FOR MATERIALS ON HAND*. No partial payment will be made when the amount due to the Contractor since the last estimate amounts to less than five hundred dollars.

- a. From the total of the amount determined to be payable on a partial payment, ten (10) percent of such total amount will be deducted and retained by the Owner for protection of the Owner's interests. Unless otherwise instructed by the Owner, the amount retained by the Owner will be in effect until the final payment is made except as follows:
 - (1) Contractor may request release of retainage on work that has been partially accepted by the Owner in accordance with Section 50-14. Contractor must provide a certified invoice to the RPR that supports the value of retainage held by the Owner for partially accepted work.
 - (2) In lieu of retainage, the Contractor may exercise at its option the establishment of an escrow account per paragraph 90-08.
- b. The Contractor is required to pay all subcontractors for satisfactory performance of their contracts no later than 30 days after the Contractor has received a partial payment. Contractor must provide the Owner evidence of prompt and full payment of retainage held by the prime Contractor to the subcontractor within 30 days after the subcontractor's work is satisfactorily completed. A subcontractor's work is satisfactorily completed when all the tasks called for in the subcontract have been accomplished and documented as required by the Owner. When the Owner has made an incremental acceptance of a portion of a prime contract, the work of a subcontractor covered by that acceptance is deemed to be satisfactorily completed.
- c. When at least 95% of the work has been completed to the satisfaction of the RPR, the RPR shall, at the Owner's discretion and with the consent of the surety, prepare estimates of both the contract value and the cost of the remaining work to be done. The Owner may retain an amount not less than twice the contract value or estimated cost, whichever is greater, of the work remaining to be done. The remainder, less all previous payments and deductions, will then be certified for payment to the Contractor.

It is understood and agreed that the Contractor shall not be entitled to demand or receive partial payment based on quantities of work in excess of those provided in the proposal or covered by approved change orders or supplemental agreements, except when such excess quantities have been determined by the RPR to be a part of the final quantity for the item of work in question.

No partial payment shall bind the Owner to the acceptance of any materials or work in place as to quality or quantity. All partial payments are subject to correction at the time of final payment as provided in paragraph 90-09, *ACCEPTANCE AND FINAL PAYMENT*.

The Contractor shall deliver to the Owner a complete release of all claims for labor and material arising out of this contract before the final payment is made. If any subcontractor or supplier fails to furnish such a release in full, the Contractor may furnish a bond or other collateral satisfactory to the Owner to indemnify the Owner

against any potential lien or other such claim. The bond or collateral shall include all costs, expenses, and attorney fees the Owner may be compelled to pay in discharging any such lien or claim.

90-07 PAYMENT FOR MATERIALS ON HAND. Partial payments may be made to the extent of the delivered cost of materials to be incorporated in the work, provided that such materials meet the requirements of the contract, plans, and specifications and are delivered to acceptable sites on the airport property or at other sites in the vicinity that are acceptable to the Owner. Such delivered costs of stored or stockpiled materials may be included in the next partial payment after the following conditions are met:

- a. The material has been stored or stockpiled in a manner acceptable to the RPR at or on an approved site.
- b. The Contractor has furnished the RPR with acceptable evidence of the quantity and quality of such stored or stockpiled materials.
- c. The Contractor has furnished the RPR with satisfactory evidence that the material and transportation costs have been paid.
- d. The Contractor has furnished the Owner legal title (free of liens or encumbrances of any kind) to the material so stored or stockpiled.
- e. The Contractor has furnished the Owner evidence that the material so stored or stockpiled is insured against loss by damage to or disappearance of such materials at any time prior to use in the work.

It is understood and agreed that the transfer of title and the Owner's payment for such stored or stockpiled materials shall in no way relieve the Contractor of his or her responsibility for furnishing and placing such materials in accordance with the requirements of the contract, plans, and specifications.

In no case will the amount of partial payments for materials on hand exceed the contract price for such materials or the contract price for the contract item in which the material is intended to be used.

No partial payment will be made for stored or stockpiled living or perishable plant materials.

The Contractor shall bear all costs associated with the partial payment of stored or stockpiled materials in accordance with the provisions of this paragraph.

90-08 PAYMENT OF WITHHELD FUNDS. At the Contractor's option, if an Owner withholds retainage in accordance with the methods described in paragraph 90-06, *PARTIAL PAYMENTS*, the Contractor may request that the Owner deposit the retainage into an escrow account. The Owner's deposit of retainage into an escrow account is subject to the following conditions:

- a. The Contractor shall bear all expenses of establishing and maintaining an escrow account and escrow agreement acceptable to the Owner.
- b. The Contractor shall deposit to and maintain in such escrow only those securities or bank certificates of deposit as are acceptable to the Owner and having a value not less than the retainage that would otherwise be withheld from partial payment.
- c. The Contractor shall enter into an escrow agreement satisfactory to the Owner.
- d. The Contractor shall obtain the written consent of the surety to such agreement.

90-09 ACCEPTANCE AND FINAL PAYMENT. When the contract work has been accepted in accordance with the requirements of the Section 50, paragraph 50-15, *FINAL ACCEPTANCE*, the RPR will prepare the

final estimate of the items of work actually performed. The Contractor shall approve the RPR's final estimate or advise the RPR of the Contractor's objections to the final estimate which are based on disputes in measurements or computations of the final quantities to be paid under the contract as amended by change order or supplemental agreement. The Contractor and the RPR shall resolve all disputes (if any) in the measurement and computation of final quantities to be paid within 30 calendar days of the Contractor's receipt of the RPR's final estimate. If, after such 30-day period, a dispute still exists, the Contractor may approve the RPR's estimate under protest of the quantities in dispute, and such disputed quantities shall be considered by the Owner as a claim in accordance with the Section 50, paragraph 50-16, *CLAIMS FOR ADJUSTMENT AND DISPUTES*.

After the Contractor has approved, or approved under protest, the RPR's final estimate, and after the RPR's receipt of the project closeout documentation required in paragraph 90-11, *CONTRACTOR FINAL PROJECT DOCUMENTATION*, final payment will be processed based on the entire sum, or the undisputed sum in case of approval under protest, determined to be due the Contractor less all previous payments and all amounts to be deducted under the provisions of the contract. All prior partial estimates and payments shall be subject to correction in the final estimate and payment.

If the Contractor has filed a claim for additional compensation under the provisions of the Section 50, paragraph 50- 16, *CLAIMS FOR ADJUSTMENTS AND DISPUTES*, or under the provisions of this subsection, such claims will be considered by the Owner in accordance with local laws or ordinances. Upon final adjudication of such claims, any additional payment determined to be due the Contractor will be paid pursuant to a supplemental final estimate.

90-10 CONSTRUCTION WARRANTY.

- b. In addition to any other warranties in this contract, the Contractor warrants that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, workmanship, or design furnished, or performed by the Contractor or any subcontractor or supplier at any tier.
- b. This warranty shall continue for a period of one year from the date of final acceptance of the work, except as noted. If the Owner takes possession of any part of the work before final acceptance, this warranty shall continue for a period of one year from the date the Owner takes possession. **However, this will not relieve the Contractor from corrective items required by the final acceptance of the project work. Light Emitting Diode emitting diode (LED) light fixtures with the exception of obstruction lighting, must be warranted by the manufacturer for a minimum of four (4) years after date of installation inclusive of all electronics.**
- c. The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to Owner real or personal property, when that damage is the result of the Contractor's failure to conform to contract requirements; or any defect of equipment, material, workmanship, or design furnished by the Contractor.
- d. The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for one year from the date of repair or replacement.
- e. The Owner will notify the Contractor, in writing, within seven (7) days after the discovery of any failure, defect, or damage.
- f. If the Contractor fails to remedy any failure, defect, or damage within 14 days after receipt of notice, the Owner shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.

- 2019 g. With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for
2020 work performed and materials furnished under this contract, the Contractor shall: (1) Obtain all
2021 warranties that would be given in normal commercial practice; (2) Require all warranties to be executed,
2022 in writing, for the benefit of the Owner, as directed by the Owner, and (3) Enforce all warranties for
2023 the benefit of the Owner.

- 2024
2025 h. This warranty shall not limit the Owner's rights with respect to latent defects, gross mistakes, or fraud.
2026

2027 **90-11 CONTRACTOR FINAL PROJECT DOCUMENTATION.** Approval of final payment to the
2028 Contractor is contingent upon completion and submittal of the items listed below. The final payment will not
2029 be approved until the RPR approves the Contractor's final submittal. The Contractor shall:
2030

- 2031 a. Provide two (2) copies of all manufacturer's warranties specified for materials, equipment, and
2032 installations.
- 2033 b. Provide weekly payroll records (not previously received) from the general Contractor and all
2034 subcontractors.
- 2035 c. Complete final cleanup in accordance with Section 40, paragraph 40-08, *FINAL CLEANUP*.
- 2036 d. Complete all punch list items identified during the Final Inspection.
- 2037 e. Provide complete release of all claims for labor and material arising out of the Contract.
- 2038 f. Provide a certification statement signed by the subcontractors, indicating actual amounts paid to the
2039 Disadvantaged Business Enterprise (DBE) subcontractors and/or suppliers associated with the
2040 project. A sample certification letter is available on the MoDOT Aviation website.
- 2041 g. When applicable per state requirements, return copies of sales tax completion forms.
- 2042 h. Manufacturer's certifications for all items incorporated in the work.
- 2043 i. All required record drawings, as-built drawings or as-constructed drawings.
- 2044 j. Project Operation and Maintenance (O&M) Manual.
- 2045 k. Security for Construction Warranty.
- 2046 l. Equipment commissioning documentation submitted, if required.
- 2047 m. After the final inspection has been completed, a Notice of Contractor's Final Settlement will
2048 be issued for publication in accordance with applicable state, local, and federal requirements.
- 2049 n. Contractor is required to submit on company letterhead that all wages, material purchases, and
2050 subcontractors have been paid in full.
- 2051 o. Provide an Affidavit of Compliance (PW-4) from the general Contractor and all subcontractors that
2052 affirms under oath that the party has fully complied with Missouri Prevailing Wage Law.
- 2053 p. List of all subcontractors used on the project with final dollar value of subcontracts and DBE
2054 subcontractors identified.
- 2055 q. All test results in format required by the FAA. All tests results must be approved and accepted by the
2056 FAA before the RPR is authorized to release any retainage amounts.
2057

2058 Final payment will not be authorized until these items have been completed.
2059
2060
2061

END OF SECTION 90

GENERAL CONSTRUCTION ITEMS

ITEM C-100 CONTRACTOR QUALITY CONTROL PROGRAM (CQCP)

100-01 GENERAL. Quality is more than test results. Quality is the combination of proper materials, testing, workmanship, equipment, inspection, and documentation of the project. Establishing and maintaining a culture of quality is key to achieving a quality project. The Contractor shall establish, provide, and maintain an effective Contractor Quality Control Program (CQCP) that details the methods and procedures that will be taken to assure that all materials and completed construction required by this contract conform to contract plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors. Although guidelines are established and certain minimum requirements are specified here and elsewhere in the contract technical specifications, the Contractor shall assume full responsibility for accomplishing the stated purpose.

The Contractor shall establish a CQCP that will:

- a. Provide qualified personnel to develop and implement the CQCP.
- b. Provide for the production of acceptable quality materials.
- c. Provide sufficient information to assure that the specification requirements can be met.
- d. Document the CQCP process.

The Contractor shall not begin any construction or production of materials to be incorporated into the completed work until the CQCP has been reviewed and approved by the Resident Project Representative (RPR). No partial payment will be made for materials subject to specific quality control (QC) requirements until the CQCP has been reviewed and approved.

The QC requirements contained in this section and elsewhere in the contract technical specifications are in addition to and separate from the quality assurance (QA) testing requirements. QA testing requirements are the responsibility of the RPR or Contractor as specified in the specifications.

A Quality Control (QC)/Quality Assurance (QA) workshop with the Engineer, Resident Project Representative (RPR), Contractor, subcontractors, testing laboratories, and Owner's representative must be held prior to start of construction. The QC/QA workshop will be facilitated by the Contractor. The Contractor shall coordinate with the Airport and the RPR on time and location of the QC/QA workshop. Items to be addressed, at a minimum, will include:

- a. Review of the CQCP including submittals, QC Testing, Action & Suspension Limits for Production, Corrective Action Plans, Distribution of QC reports, and Control Charts.
- b. Discussion of the QA program.
- c. Discussion of the QC and QA Organization and authority including coordination and information exchange between QC and QA.
- d. Establish regular meetings to discuss control of materials, methods and testing.
- e. Establishment of the overall QC culture.

100-02 DESCRIPTION OF PROGRAM.

- a. **General description.** The Contractor shall establish a CQCP to perform QC inspection and testing of all items of work required by the technical specifications, including those performed by subcontractors. The CQCP shall ensure conformance to applicable specifications and plans with respect to materials, off-site fabrication, workmanship, construction, finish, and functional performance. The CQCP shall be effective for control of all construction work performed under this Contract and shall specifically include surveillance and tests required by the technical specifications, in

addition to other requirements of this section and any other activities deemed necessary by the Contractor to establish an effective level of QC.

- b. Contractor Quality Control Program (CQCP).** The Contractor shall describe the CQCP in a written document that shall be reviewed and approved by the RPR prior to the start of any production, construction, or off-site fabrication. The written CQCP shall be submitted to the RPR for review and approval at least ten calendar days before the CQCP Workshop. The Contractor's CQCP and QC testing laboratory must be approved in writing by the RPR prior to the Notice to Proceed (NTP).

The CQCP shall be organized to address, as a minimum, the following items:

1. QC organization and resumes of key staff
2. Project progress schedule
3. Submittals schedule
4. Inspection requirements
5. QC testing plan
6. Documentation of QC activities and distribution of QC reports
7. Requirements for corrective action when QC and/or QA acceptance criteria are not met
8. Material quality and construction means and methods. Address all elements applicable to the project that affect the quality of the pavement structure including subgrade, subbase, base, and surface course. Some elements that must be addressed include, but is not limited to mix design, aggregate grading, stockpile management, mixing and transporting, placing and finishing, quality control testing and inspection, smoothness, laydown plan, equipment, and temperature management plan.

The Contractor must add any additional elements to the CQCP that is necessary to adequately control all production and/or construction processes required by this contract.

100-03 CQCP ORGANIZATION. The CQCP shall be implemented by the establishment of a QC organization. An organizational chart shall be developed to show all QC personnel, their authority, and how these personnel integrate with other management/production and construction functions and personnel.

The organizational chart shall identify all QC staff by name and function, and shall indicate the total staff required to implement all elements of the CQCP, including inspection and testing for each item of work. If necessary, different technicians can be used for specific inspection and testing functions for different items of work. If an outside organization or independent testing laboratory is used for implementation of all or part of the CQCP, the personnel assigned shall be subject to the qualification requirements of paragraph 100-03a and 100-03b. The organizational chart shall indicate which personnel are Contractor employees and which are provided by an outside organization.

The QC organization shall, as a minimum, consist of the following personnel:

- a. Program Administrator.** The Contractor Quality Control Program Administrator (CQCPA) must be a full-time on-site employee of the Contractor, or a consultant engaged by the Contractor. The CQCPA must have a minimum of five (5) years of experience in QC construction with prior QC experience on a project of comparable size and scope as the contract.

Included in the five (5) years of paving experience, the CQCPA must meet at least one of the following requirements:

- (1) Professional Engineer with one (1) year of airport paving experience.
- (2) Engineer-in-training with two (2) years of airport paving experience.
- (3) National Institute for Certification in Engineering Technologies (NICET) Civil Engineering Technology Level IV with three (3) years of highway and/or airport paving experience.

- (4) An individual with four (4) years of highway and/or airport paving experience, with a Bachelor of Science Degree in Civil Engineering, Civil Engineering Technology or Construction.

CQCPA must have full authority to institute any and all actions necessary for the successful implementation of the CQCP to ensure compliance with the contract plans and technical specifications. The CQCPA authority must include the ability to immediately stop production until materials and/or processes are in compliance with contract specifications. The CQCPA must report directly to a principal officer of the construction firm. The CQCPA may supervise the Quality Control Program on more than one project provided that person can be at the job site within two (2) hours after being notified of a problem.

- b. **QC technicians.** A sufficient number of QC technicians necessary to adequately implement the CQCP shall be provided. These personnel shall be either Engineers, engineering technicians, or experienced craftsman with qualifications in the appropriate field equivalent to NICET Level II in Civil Engineering Technology or higher, and shall have a minimum of two (2) years of experience in their area of expertise.

The QC technicians must report directly to the CQPA and shall perform the following functions:

- (1) Inspection of all materials, construction, plant, and equipment for conformance to the technical specifications, and as required by subsection 100-06.
- (2) Performance of all QC tests as required by the technical specifications and subsection 100-07.
- (3) Performance of tests for the RPR when required by the technical specifications.

Certification at an equivalent level of qualification and experience by a state or nationally recognized organization will be acceptable in lieu of NICET certification.

- c. **Staffing levels.** The Contractor shall provide sufficient qualified QC personnel to monitor each work activity at all times. Where material is being produced in a plant for incorporation into the work, separate plant and field technicians shall be provided at each plant and field placement location. The scheduling and coordinating of all inspection and testing must match the type and pace of work activity. The CQCP shall state where different technicians will be required for different work elements.

100-04 PROJECT PROGRESS SCHEDULE. Critical QC activities must be shown on the project schedule as required by Section 80, paragraph 80-03, *EXECUTION AND PROGRESS*.

100-05 SUBMITTALS SCHEDULE. The Contractor shall submit a detailed listing of all submittals (for example, mix designs, material certifications) and shop drawings required by the technical specifications. The listing can be developed in a spreadsheet format and shall include as a minimum:

- a. Specification item number
- b. Item description
- c. Description of submittal
- d. Specification paragraph requiring submittal
- e. Scheduled date of submittal

100-06 INSPECTION REQUIREMENTS. QC inspection functions shall be organized to provide inspections for all definable features of work, as detailed below. All inspections shall be documented by the Contractor as specified by paragraph 100-09.

Inspections shall be performed daily as needed to ensure continuing compliance with contract requirements until completion of the particular feature of work. These shall include the following minimum requirements:

- a. During plant operation for material production, QC test results and periodic inspections shall be used to ensure the quality of aggregates and other mix components, and to adjust and control mix proportioning to meet the approved mix design and other requirements of the technical specifications.

All equipment used in proportioning and mixing shall be inspected to ensure its proper operating condition. The CQCP shall detail how these and other functions will be accomplished and used.

- b. During field operations, QC test results and periodic inspections shall be used to ensure the quality of all materials and workmanship. All equipment used in placing, finishing, and compacting shall be inspected to ensure its proper operating condition and to ensure that all such operations are in conformance to the technical specifications and are within the plan dimensions, lines, grades, and tolerances specified. The CQCP shall document how these and other functions will be accomplished and used.

100-07 CONTRACTOR QC TESTING FACILITY.

- a. For projects that include Item P-401, Item P-403, and Item P-404, the Contractor shall ensure facilities, including all necessary equipment, materials, and current reference standards, are provided that meet requirements in the following paragraphs of ASTM D3666, *Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials*:

- 8.1.3 Equipment Calibration and Checks;
- 8.1.9 Equipment Calibration, Standardization, and Check Records;
- 8.1.12 Test Methods and Procedures

- b. For projects that include P-501, the Contractor shall ensure facilities, including all necessary equipment, materials, and current reference standards, are provided that meet requirements in the following paragraphs of ASTM C1077, *Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation*:

- 7 Test Methods and Procedures
- 8 Facilities, Equipment, and Supplemental Procedures

100-08 QC TESTING PLAN. As a part of the overall CQCP, the Contractor shall implement a QC testing plan, as required by the technical specifications. The testing plan shall include the minimum tests and test frequencies required by each technical specification Item, as well as any additional QC tests that the Contractor deems necessary to adequately control production and/or construction processes.

The QC testing plan can be developed in a spreadsheet fashion and shall, as a minimum, include the following:

- a. Specification item number (e.g., P-401)
- b. Item description (e.g., Hot Mix Asphalt Pavements)
- c. Test type (e.g., gradation, grade, asphalt content)
- d. Test standard (e.g., ASTM or American Association of State Highway and Transportation Officials (AASHTO) test number, as applicable)
- e. Test frequency (e.g., as required by technical specifications or minimum frequency when requirements are not stated)
- f. Responsibility (e.g., plant technician)
- g. Control requirements (e.g., target, permissible deviations)

The QC testing plan shall contain a statistically-based procedure of random sampling for acquiring test samples in accordance with ASTM D3665. The RPR shall be provided the opportunity to witness QC sampling and testing.

All QC test results shall be documented by the Contractor as required by subsection 100-09.

100-09 DOCUMENTATION. The Contractor shall maintain current QC records of all inspections and tests performed. These records shall include factual evidence that the required QC inspections or tests have been

performed, including type and number of inspections or tests involved; results of inspections or tests; nature of defects, deviations, causes for rejection, etc.; proposed remedial action; and corrective actions taken.

These records must cover both conforming and defective or deficient features, and must include a statement that all supplies and materials incorporated in the work are in full compliance with the terms of the contract. Legible copies of these records shall be furnished to the RPR daily. The records shall cover all work placed subsequent to the previously furnished records and shall be verified and signed by the CQCPA.

Contractor QC records required for the contract shall include, but are not necessarily limited to, the following records:

- a. **Daily inspection reports.** Each Contractor QC technician shall maintain a daily log of all inspections performed for both Contractor and subcontractor operations. These technician's daily reports shall provide factual evidence that continuous QC inspections have been performed and shall, as a minimum, include the following:

- (1) Technical specification item number and description
- (2) Compliance with approved submittals
- (3) Proper storage of materials and equipment
- (4) Proper operation of all equipment
- (5) Adherence to plans and technical specifications
- (6) Summary of any necessary corrective actions
- (7) Safety inspection.
- (8) Photographs and/or video

The daily inspection reports shall identify all QC inspections and QC tests conducted, results of inspections, location and nature of defects found, causes for rejection, and remedial or corrective actions taken or proposed.

The daily inspection reports shall be signed by the responsible QC technician and the CQCPA. The RPR shall be provided at least one copy of each daily inspection report on the work day following the day of record. When QC inspection and test results are recorded and transmitted electronically, the results must be archived.

- b. **Daily test reports.** The Contractor shall be responsible for establishing a system that will record all QC test results. Daily test reports shall document the following information:

- (1) Technical specification item number and description
- (2) Test designation
- (3) Location
- (4) Date of test
- (5) Control requirements
- (6) Test results
- (7) Causes for rejection
- (8) Recommended remedial actions
- (9) Retests

Test results from each day's work period shall be submitted to the RPR prior to the start of the next day's work period. When required by the technical specifications, the Contractor shall maintain statistical QC charts. When QC daily test

100-10 CORRECTIVE ACTION REQUIREMENTS. The CQCP shall indicate the appropriate action to be taken when a process is deemed, or believed, to be out of control (out of tolerance) and detail what action will be taken to bring the process into control. The requirements for corrective action shall include both general

requirements for operation of the CQCP as a whole, and for individual items of work contained in the technical specifications.

The CQCP shall detail how the results of QC inspections and tests will be used for determining the need for corrective action and shall contain clear sets of rules to gauge when a process is out of control and the type of correction to be taken to regain process control.

When applicable or required by the technical specifications, the Contractor shall establish and use statistical QC charts for individual QC tests. The requirements for corrective action shall be linked to the control charts.

100-11 INSPECTION AND/OR OBSERVATIONS BY RPR. All items of material and equipment are subject to inspection and/or observation by the RPR at the point of production, manufacture or shipment to determine if the Contractor, producer, manufacturer or shipper maintains an adequate QC system in conformance with the requirements detailed here and the applicable technical specifications and plans. In addition, all items of materials, equipment and work in place shall be subject to inspection and/or observation by the RPR at the site for the same purpose.

Inspection and/or observations by the RPR does not relieve the Contractor of performing QC inspections of either on-site or off-site Contractor's or subcontractor's work.

100-12 NONCOMPLIANCE.

- a. The Resident Project Representative (RPR) will provide written notice to the Contractor of any noncompliance with their CQCP. After receipt of such notice, the Contractor must take corrective action.
- b. When QC activities do not comply with either the CQCP or the contract provisions, or when the Contractor fails to properly operate and maintain an effective CQCP, and no effective corrective actions have been taken after notification of noncompliance, the RPR will recommend the Owner take the following actions:
 - (1) Order the Contractor to replace ineffective or unqualified QC personnel or subcontractors and/or.
 - (2) Order the Contractor to stop operations until appropriate corrective actions are taken.

METHOD OF MEASUREMENT

100-13 BASIS OF MEASUREMENT AND PAYMENT. Contractor Quality Control Program (CQCP) is for the personnel, tests, facilities and documentation required to implement the CQCP. The CQCP will be paid as a lump sum with the following schedule of partial payments:

- a. With first pay request, 25% with approval of CQCP and completion of the Quality Control (QC)/Quality Assurance (QA) workshop.
- b. When 25% or more of the original contract is earned, an additional 25%.
- c. When 50% or more of the original contract is earned, an additional 20%.
- d. When 75% or more of the original contract is earned, an additional 20%.
- e. After final inspection and acceptance of project, the final 10%.

BASIS OF PAYMENT

100-14 Payment will be made under:

Item C-100a	Contractor Quality Control Program (CQCP) – per Lump Sum
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REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

National Institute for Certification in Engineering Technologies (NICET)

ASTM International (ASTM)

ASTM C1077 Standard Practice for Agencies Testing Concrete and Concrete Aggregates
for Use in Construction and Criteria for Testing Agency Evaluation

ASTM D3665 Standard Practice for Random Sampling of Construction Materials

ASTM D3666 Standard Specification for Minimum Requirements for Agencies Testing
and Inspecting Road and Paving Materials

END OF ITEM C-100

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Item C-102

TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SILTATION CONTROL

102-1. Description. This item shall consist of temporary control measures as shown on the plans or as ordered by the Resident Project Representative (RPR) during the life of a contract to control pollution of air and water, soil erosion, and siltation through the use of silt fences, berms, dikes, dams, sediment basins, fiber mats, gravel, mulches, grasses, slope drains, and other erosion control devices or methods.

Temporary erosion control shall be in accordance with the approved erosion control plan; the approved Construction Safety and Phasing Plan (CSPP) and AC 150/5370-2, *Operational Safety on Airports During Construction*. The temporary erosion control measures contained herein shall be coordinated with the permanent erosion control measures specified as part of this contract to the extent practical to assure economical, effective, and continuous erosion control throughout the construction period.

Temporary control may include work outside the construction limits such as borrow pit operations, equipment and material storage sites, waste areas, and temporary plant sites.

Temporary control measures shall be designed, installed and maintained to minimize the creation of wildlife attractants that have the potential to attract hazardous wildlife on or near public-use airports.

MATERIALS

102-2.1 Grass. Grass that will not compete with the grasses sown later for permanent cover per Item T-901 shall be a quick-growing species (such as ryegrass, Italian ryegrass, or cereal grasses) suitable to the area providing a temporary cover. Selected grass species shall not create a wildlife attractant.

102-2.2 Mulches. Mulches may be hay, straw, fiber mats, netting, bark, wood chips, or other suitable material reasonably clean and free of noxious weeds and deleterious materials per Item T-908. Mulches shall not create a wildlife attractant.

102-2.3 Fertilizer. Fertilizer shall be a standard commercial grade and shall conform to all federal and state regulations and to the standards of the Association of Official Agricultural Chemists.

102-2.4 Slope drains. Slope drains may be constructed of pipe, fiber mats, rubble, concrete, asphalt, or other materials that will adequately control erosion.

102-2.5 Silt fence. Silt fence shall consist of polymeric filaments which are formed into a stable network such that filaments retain their relative positions. Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life. Silt fence shall meet the requirements of ASTM D6461.

102-2.6 Other. All other materials shall meet commercial grade standards and shall be approved by the RPR before being incorporated into the project.

CONSTRUCTION REQUIREMENTS

102-3.1 General. In the event of conflict between these requirements and pollution control laws, rules, or regulations of other federal, state, or local agencies, the more restrictive laws, rules, or regulations shall apply. The RPR shall be responsible for assuring compliance to the extent that construction practices, construction operations, and construction work are involved.

102-3.2 Schedule. Prior to the start of construction, the Contractor shall submit schedules in accordance with the approved Construction Safety and Phasing Plan (CSPP) and the plans for accomplishment of temporary and permanent erosion control work for clearing and grubbing; grading; construction; paving; and structures at watercourses. The Contractor shall also submit a proposed method of erosion and dust control on haul roads and borrow pits and a plan for disposal of waste materials. Work shall not be started until the erosion control schedules and methods of operation for the applicable construction have been accepted by the RPR.

102-3.3 Construction details. The Contractor will be required to incorporate all permanent erosion control features into the project at the earliest practicable time as outlined in the plans and approved CSPP. Except where future construction operations will damage slopes, the Contractor shall perform the permanent seeding and mulching and other specified slope protection work in stages, as soon as substantial areas of exposed slopes can be made available. Temporary erosion and pollution control measures will be used to correct conditions that develop during construction that were not foreseen during the design stage; that are needed prior to installation of permanent control features; or that are needed temporarily to control erosion that develops during normal construction practices, but are not associated with permanent control features on the project.

Where erosion may be a problem, schedule and perform clearing and grubbing operations so that grading operations and permanent erosion control features can follow immediately if project conditions permit. Temporary erosion control measures are required if permanent measures cannot immediately follow grading operations. The RPR shall limit the area of clearing and grubbing, excavation, borrow, and embankment operations in progress, commensurate with the Contractor's capability and progress in keeping the finish grading, mulching, seeding, and other such permanent control measures current with the accepted schedule. If seasonal limitations make such coordination unrealistic, temporary erosion control measures shall be taken immediately to the extent feasible and justified as directed by the RPR.

The Contractor shall provide immediate permanent or temporary pollution control measures to minimize contamination of adjacent streams or other watercourses, lakes, ponds, or other areas of water impoundment as directed by the RPR. If temporary erosion and pollution control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of the work as scheduled or directed by the RPR, the work shall be performed by the Contractor and the cost shall be incidental to this item.

The RPR may increase or decrease the area of erodible earth material that can be exposed at any time based on an analysis of project conditions.

The erosion control features installed by the Contractor shall be maintained by the Contractor during the construction period.

Provide temporary structures whenever construction equipment must cross watercourses at frequent intervals. Pollutants such as fuels, lubricants, bitumen, raw sewage, wash water from concrete mixing operations, and other harmful materials shall not be discharged into any waterways, impoundments or into natural or manmade channels.

102-3.4 Installation, maintenance and removal of silt fence. Silt fences shall extend a minimum of 16 inches (41 cm) and a maximum of 34 inches (86 cm) above the ground surface. Posts shall be set no more than 10 feet (3 m) on center. Filter fabric shall be cut from a continuous roll to the length required minimizing joints where possible. When joints are necessary, the fabric shall be spliced at a support post with a minimum 12-inch (300-mm) overlap and securely sealed. A trench shall be excavated approximately 4 inches (100 mm) deep by 4 inches (100 mm) wide on the upslope side of the silt fence. The trench shall be backfilled and the soil compacted over the silt fence fabric. The Contractor shall remove and dispose of silt that accumulates during construction and prior to establishment of permanent erosion control. The fence shall be maintained in good working condition until permanent erosion control is established. Silt fence shall be removed upon approval of the RPR.

METHOD OF MEASUREMENT

102-4.1 Temporary erosion and pollution control work required will be performed as scheduled or directed by the RPR. Completed and accepted work will be measured as follows:

- a. Temporary seeding and mulching will be measured by the square yard (square meter).
- b. Temporary slope drains will be measured by the linear foot (meter).
- c. Temporary benches, dikes, dams, and sediment basins will be measured by the cubic yard (cubic meter) of excavation performed, including necessary cleaning of sediment basins, and the cubic yard (cubic meter) of embankment placed as directed by the RPR.
- d. All fertilizing will be measured by the ton (kg).
- e. Installation and removal of silt fence will be measured by the Lump sum.

102-4.2 Control work performed for protection of construction areas outside the construction limits, such as borrow and waste areas, haul roads, equipment and material storage sites, and temporary plant sites, will not be measured and paid for directly but shall be considered as a subsidiary obligation of the Contractor.

BASIS OF PAYMENT

102-5.1 Accepted quantities of temporary water pollution, soil erosion, and siltation control work ordered by the RPR and measured as provided in paragraph 102-4.1 will be paid for under:

Item C-102-5.1a Temporary Erosion Control – per lump sum

Where other directed work falls within the specifications for a work item that has a contract price, the units of work shall be measured and paid for at the contract unit price bid for the various items.

Temporary control features not covered by contract items that are ordered by the RPR will be paid for in accordance with Section 90, paragraph 90-05 *PAYMENT FOR EXTRA WORK*.

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5200-33	<i>Hazardous Wildlife Attractants on or Near Airports</i>
AC 150/5370-2	<i>Operational Safety on Airports During Construction</i>

ASTM International (ASTM)

ASTM D6461	<i>Standard Specification for Silt Fence Materials</i>
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United States Department of Agriculture (USDA)

FAA/USDA Wildlife Hazard Management at Airports, A Manual for Airport Personnel

END OF ITEM C-102

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ITEM C-105 MOBILIZATION

105-1 DESCRIPTION. This item shall consist of, but is not limited to, work and operations necessary for the movement of personnel, equipment, facilities, material and supplies to and from the project site for work on the project except as provided in the contract as separate pay items.

105-2 Mobilization limit. Mobilization shall be limited to 10 percent of the total project cost.

105-3 POSTED NOTICES. Prior to commencement of construction activities, the Contractor must post the following documents in a prominent and accessible place where they may be easily viewed by all employees of the prime Contractor and by all employees of subcontractors engaged by the prime Contractor: Equal Employment Opportunity (EEO) Poster "Equal Employment Opportunity is the Law" in accordance with the Office of Federal Contract Compliance Programs Executive Order 11246, as amended; Davis Bacon Wage Poster (WH 1321) - DOL "Notice to All Employees" Poster; and State Wage Rates from the Project Manual and Applicable Davis-Bacon Wage Rate Determination. These notices must remain posted until final acceptance of the work by the Owner.

105-4 ENGINEER/RPR FIELD OFFICE. The Contractor shall provide dedicated space for the use of the field RPR and inspectors, as a field office for the duration of the project. This space shall be located conveniently near the construction and shall be separate from any space used by the Contractor. The Contractor shall furnish water, sanitary facilities, heat, air conditioning, and electricity in accordance with local building codes.

105-5 METHOD OF MEASUREMENT. Partial payments for mobilization will be made once each month as the work progresses. Provided all requirements of applicable General and Special Provisions have been accomplished to the satisfaction of the Engineer, partial payments will be made as follows:

- a. When 5% of the original contract amount is earned, 20% of the amount bid for this item will be paid, not to exceed 2% of the original contract amount.
- b. When 20% of the original contract amount is earned, 50% of the amount bid for this item, less all previous payments, will be paid, not to exceed 5% of the original contract amount.
- c. When 35% of the original contract amount is earned, 60% of the amount bid for this item, less all previous payments, will be paid, not to exceed 6% of the original contract amount.
- d. When 75% of the original contract amount is earned, the amount bid for this item, less all previous payments, will be paid, not to exceed 10% of the original contract amount.
- e. When 90% of the original contract amount is earned, the amount in excess of 10% of the original contract amount, less all previous payments, will be paid.

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

2612 Office of Federal Contract Compliance Programs (OFCCP)

2613

2614 Executive Order 11246, as amended

2615

2616 EEOC-P/E-1 – Equal Employment Opportunity is the Law Poster

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2618

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END OF ITEM C-105

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ITEM C-110

METHOD OF ESTIMATING PERCENTAGE OF MATERIAL WITHIN SPECIFICATION LIMITS (PWL)

110-01 GENERAL. When the specifications provide for acceptance of material based on the method of estimating percentage of material within specification limits (PWL), the PWL will be determined in accordance with this section. All test results for a lot will be analyzed statistically to determine the total estimated percent of the lot that is within specification limits. The PWL is computed using the sample average (\bar{X}) and sample standard deviation (S_n) of the specified number (n) of sublots for the lot and the specification tolerance limits, L for lower and U for upper, for the particular acceptance parameter. From these values, the respective Quality index, Q_L for Lower Quality Index and/or Q_U for Upper Quality Index, is computed and the PWL for the lot for the specified n is determined from Table 1. All specification limits specified in the technical sections shall be absolute values. Test results used in the calculations shall be to the significant figure given in the test procedure.

There is some degree of uncertainty (risk) in the measurement for acceptance because only a small fraction of production material (the population) is sampled and tested. This uncertainty exists because all portions of the production material have the same probability to be randomly sampled. The Contractor's risk is the probability that material produced at the acceptable quality level is rejected or subjected to a pay adjustment. The Owner's risk is the probability that material produced at the rejectable quality level is accepted.

It is the intent of this section to inform the Contractor that, in order to consistently offset the Contractor's risk for material evaluated, production quality (using population average and population standard deviation) must be maintained at the acceptable quality specified or higher. In all cases, it is the responsibility of the Contractor to produce at quality levels that will meet the specified acceptance criteria when sampled and tested at the frequencies specified.

110-02 METHOD FOR COMPUTING PWL. The computational sequence for computing PWL is as follows:

- a. Divide the lot into n sublots in accordance with the acceptance requirements of the specification.
- b. Locate the random sampling position within the subplot in accordance with the requirements of the specification.
- c. Make a measurement at each location, or take a test portion and make the measurement on the test portion in accordance with the testing requirements of the specification.
- d. Find the sample average (\bar{X}) for all subplot values within the lot by using the following formula:

$$\bar{X} = (x_1 + x_2 + x_3 + \dots + x_n) / n$$

Where: \bar{X} = Sample average of all subplot values within a lot

x_1, x_2, \dots, x_n = Individual subplot values

n = Number of subplot test values

- e. Find the sample standard deviation (S_n) by use of the following formula:

$$S_n = [(d_1^2 + d_2^2 + d_3^2 + \dots + d_n^2) / (n-1)]^{1/2}$$

Where: S_n = Sample standard deviation of the number of subplot test values in the set

d_1, d_2, \dots, d_n = Deviations of the individual subplot test values x_1, x_2, \dots from the average value \bar{X} that is: $d_1 = (x_1 - \bar{X})$, $d_2 = (x_2 - \bar{X})$... $d_n = (x_n - \bar{X})$

n = Number of sublots test values

f. For single sided specification limits (that is, L only), compute the Lower Quality Index Q_L by use of the following formula:

$$Q_L = (X - L) / S_n$$

Where: L = specification lower tolerance limit

Estimate the percentage of material within limits (PWL) by entering Table 1 with Q_L , using the column appropriate to the total number (n) of measurements. If the value of Q_L falls between values shown on the table, use the next higher value of PWL.

g. For double-sided specification limits (that is, L and U), compute the Quality Indexes Q_L and Q_U by use of the following formulas:

$$Q_L = (X - L) / S_n$$

and

$$Q_U = (U - X) / S_n$$

Where: L and U = specification lower and upper tolerance limits

Estimate the percentage of material between the lower (L) and upper (U) tolerance limits (PWL) by entering Table 1 separately with Q_L and Q_U , using the column appropriate to the total number (n) of measurements, and determining the percent of material above P_L and percent of material below P_U for each tolerance limit. If the values of Q_L fall between values shown on the table, use the next higher value of P_L or P_U . Determine the PWL by use of the following formula:

$$PWL = (P_U + P_L) - 100$$

Where: P_L = percent within lower specification limit

P_U = percent within upper specification limit

EXAMPLE OF PWL CALCULATION

Project: Example Project

Test Item: Item P-401, Lot A.

A. PWL Determination for Mat Density.

1. Density of four random cores taken from Lot A.

$$A-1 = 96.60$$

$$A-2 = 97.55$$

$$A-3 = 99.30$$

$$A-4 = 98.35$$

$$n = 4$$

2. Calculate average density for the lot.

$$X = (x_1 + x_2 + x_3 + \dots x_n) / n$$

$$X = (96.60 + 97.55 + 99.30 + 98.35) / 4$$

$$X = 97.95\% \text{ density}$$

3. Calculate the standard deviation for the lot.

$$S_n = [((96.60 - 97.95)^2 + (97.55 - 97.95)^2 + (99.30 - 97.95)^2 + (98.35 - 97.95)^2) / (4 - 1)]^{1/2}$$

$$S_n = [(1.82 + 0.16 + 1.82 + 0.16) / 3]^{1/2}$$

$$S_n = 1.15$$

4. Calculate the Lower Quality Index Q_L for the lot. ($L=96.3$)

$$Q_L = (X - L) / S_n$$

$$Q_L = (97.95 - 96.30) / 1.15$$

$$Q_L = 1.4348$$

5. Determine PWL by entering Table 1 with $Q_L = 1.44$ and $n = 4$.

$$PWL = 98$$

B. PWL Determination for Air Voids.

1. Air Voids of four random samples taken from Lot A.

$$A-1 = 5.00$$

$$A-2 = 3.74$$

$$A-3 = 2.30$$

$$A-4 = 3.25$$

2. Calculate the average air voids for the lot.

$$X = (x_1 + x_2 + x_3 + \dots x_n) / n$$

$$X = (5.00 + 3.74 + 2.30 + 3.25) / 4$$

$$X = 3.57\%$$

3. Calculate the standard deviation S_n for the lot.

$$S_n = [((3.57 - 5.00)^2 + (3.57 - 3.74)^2 + (3.57 - 2.30)^2 + (3.57 - 3.25)^2) / (4 - 1)]^{1/2}$$

$$S_n = [(2.04 + 0.03 + 1.62 + 0.10) / 3]^{1/2}$$

$$S_n = 1.12$$

4. Calculate the Lower Quality Index Q_L for the lot. ($L = 2.0$)

$$Q_L = (X - L) / S_n$$

$$Q_L = (3.57 - 2.00) / 1.12$$

$$Q_L = 1.3992$$

5. Determine P_L by entering Table 1 with $Q_L = 1.41$ and $n = 4$.

$$P_L = 97$$

6. Calculate the Upper Quality Index Q_U for the lot. ($U = 5.0$)

$$Q_U = (U - X) / S_n$$

$$Q_U = (5.00 - 3.57) / 1.12$$

$$Q_U = 1.2702$$

7. Determine P_U by entering Table 1 with $Q_U = 1.29$ and $n = 4$.

$$P_U = 93$$

8. Calculate Air Voids PWL

$$PWL = (P_L + P_U) - 100$$

$$PWL = (97 + 93) - 100 = 90$$

EXAMPLE OF OUTLIER CALCULATION (REFERENCE ASTM E178)

Project: Example Project

Test Item: Item P-401, Lot A.

A. Outlier Determination for Mat Density.

1. Density of four random cores taken from Lot A arranged in descending order.

$$A-3 = 99.30$$

$$A-4 = 98.35$$

$$A-2 = 97.55$$

$$A-1 = 96.60$$

2. From ASTM E178, Table 1, for $n=4$ an upper 5% significance level, the critical value for test criterion = 1.463.

3. Use average density, standard deviation, and test criterion value to evaluate density measurements.

- a. For measurements greater than the average:

If (measurement - average)/(standard deviation) is less than test criterion, then the measurement is not considered an outlier

For A-3, check if $(99.30 - 97.95) / 1.15$ is greater than 1.463.

Since 1.174 is less than 1.463, the value is not an outlier.

- b. For measurements less than the average:

If (average - measurement)/(standard deviation) is less than test criterion, then the measurement is not considered an outlier.

For A-1, check if $(97.95 - 96.60) / 1.15$ is greater than 1.463.

Since 1.174 is less than 1.463, the value is not an outlier.

2809 **Note:** In this example, a measurement would be considered an outlier if the density were:
2810 Greater than $(97.95 + 1.463 \times 1.15) = 99.63\%$
2811 OR
2812 less than $(97.95 - 1.463 \times 1.15) = 96.27\%$.
2813
2814
2815

Table 1. Table for Estimating Percent of Lot Within Limits (PWL)

Percent Within Limits (P_L and P_U)	Positive Values of Q (Q_L and Q_U)							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
99	1.1541	1.4700	1.6714	1.8008	1.8888	1.9520	1.9994	2.0362
98	1.1524	1.4400	1.6016	1.6982	1.7612	1.8053	1.8379	1.8630
97	1.1496	1.4100	1.5427	1.6181	1.6661	1.6993	1.7235	1.7420
96	1.1456	1.3800	1.4897	1.5497	1.5871	1.6127	1.6313	1.6454
95	1.1405	1.3500	1.4407	1.4887	1.5181	1.5381	1.5525	1.5635
94	1.1342	1.3200	1.3946	1.4329	1.4561	1.4717	1.4829	1.4914
93	1.1269	1.2900	1.3508	1.3810	1.3991	1.4112	1.4199	1.4265
92	1.1184	1.2600	1.3088	1.3323	1.3461	1.3554	1.3620	1.3670
91	1.1089	1.2300	1.2683	1.2860	1.2964	1.3032	1.3081	1.3118
90	1.0982	1.2000	1.2290	1.2419	1.2492	1.2541	1.2576	1.2602
89	1.0864	1.1700	1.1909	1.1995	1.2043	1.2075	1.2098	1.2115
88	1.0736	1.1400	1.1537	1.1587	1.1613	1.1630	1.1643	1.1653
87	1.0597	1.1100	1.1173	1.1192	1.1199	1.1204	1.1208	1.1212
86	1.0448	1.0800	1.0817	1.0808	1.0800	1.0794	1.0791	1.0789
85	1.0288	1.0500	1.0467	1.0435	1.0413	1.0399	1.0389	1.0382
84	1.0119	1.0200	1.0124	1.0071	1.0037	1.0015	1.0000	0.9990
83	0.9939	0.9900	0.9785	0.9715	0.9671	0.9643	0.9624	0.9610
82	0.9749	0.9600	0.9452	0.9367	0.9315	0.9281	0.9258	0.9241
81	0.9550	0.9300	0.9123	0.9025	0.8966	0.8928	0.8901	0.8882
80	0.9342	0.9000	0.8799	0.8690	0.8625	0.8583	0.8554	0.8533
79	0.9124	0.8700	0.8478	0.8360	0.8291	0.8245	0.8214	0.8192
78	0.8897	0.8400	0.8160	0.8036	0.7962	0.7915	0.7882	0.7858
77	0.8662	0.8100	0.7846	0.7716	0.7640	0.7590	0.7556	0.7531
76	0.8417	0.7800	0.7535	0.7401	0.7322	0.7271	0.7236	0.7211
75	0.8165	0.7500	0.7226	0.7089	0.7009	0.6958	0.6922	0.6896
74	0.7904	0.7200	0.6921	0.6781	0.6701	0.6649	0.6613	0.6587
73	0.7636	0.6900	0.6617	0.6477	0.6396	0.6344	0.6308	0.6282
72	0.7360	0.6600	0.6316	0.6176	0.6095	0.6044	0.6008	0.5982
71	0.7077	0.6300	0.6016	0.5878	0.5798	0.5747	0.5712	0.5686
70	0.6787	0.6000	0.5719	0.5582	0.5504	0.5454	0.5419	0.5394
69	0.6490	0.5700	0.5423	0.5290	0.5213	0.5164	0.5130	0.5105
68	0.6187	0.5400	0.5129	0.4999	0.4924	0.4877	0.4844	0.4820
67	0.5878	0.5100	0.4836	0.4710	0.4638	0.4592	0.4560	0.4537
66	0.5563	0.4800	0.4545	0.4424	0.4355	0.4310	0.4280	0.4257
65	0.5242	0.4500	0.4255	0.4139	0.4073	0.4030	0.4001	0.3980
64	0.4916	0.4200	0.3967	0.3856	0.3793	0.3753	0.3725	0.3705
63	0.4586	0.3900	0.3679	0.3575	0.3515	0.3477	0.3451	0.3432
62	0.4251	0.3600	0.3392	0.3295	0.3239	0.3203	0.3179	0.3161
61	0.3911	0.3300	0.3107	0.3016	0.2964	0.2931	0.2908	0.2892
60	0.3568	0.3000	0.2822	0.2738	0.2691	0.2660	0.2639	0.2624
59	0.3222	0.2700	0.2537	0.2461	0.2418	0.2391	0.2372	0.2358
58	0.2872	0.2400	0.2254	0.2186	0.2147	0.2122	0.2105	0.2093
57	0.2519	0.2100	0.1971	0.1911	0.1877	0.1855	0.1840	0.1829
56	0.2164	0.1800	0.1688	0.1636	0.1607	0.1588	0.1575	0.1566
55	0.1806	0.1500	0.1406	0.1363	0.1338	0.1322	0.1312	0.1304
54	0.1447	0.1200	0.1125	0.1090	0.1070	0.1057	0.1049	0.1042
53	0.1087	0.0900	0.0843	0.0817	0.0802	0.0793	0.0786	0.0781
52	0.0725	0.0600	0.0562	0.0544	0.0534	0.0528	0.0524	0.0521
51	0.0363	0.0300	0.0281	0.0272	0.0267	0.0264	0.0262	0.0260
50	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

2820

Percent Within Limits (P _L and P _U)	Negative Values of Q (Q _L and Q _U)							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
49	-0.0363	-0.0300	-0.0281	-0.0272	-0.0267	-0.0264	-0.0262	-0.0260
48	-0.0725	-0.0600	-0.0562	-0.0544	-0.0534	-0.0528	-0.0524	-0.0521
47	-0.1087	-0.0900	-0.0843	-0.0817	-0.0802	-0.0793	-0.0786	-0.0781
46	-0.1447	-0.1200	-0.1125	-0.1090	-0.1070	-0.1057	-0.1049	-0.1042
45	-0.1806	-0.1500	-0.1406	-0.1363	-0.1338	-0.1322	-0.1312	-0.1304
44	-0.2164	-0.1800	-0.1688	-0.1636	-0.1607	-0.1588	-0.1575	-0.1566
43	-0.2519	-0.2100	-0.1971	-0.1911	-0.1877	-0.1855	-0.1840	-0.1829
42	-0.2872	-0.2400	-0.2254	-0.2186	-0.2147	-0.2122	-0.2105	-0.2093
41	-0.3222	-0.2700	-0.2537	-0.2461	-0.2418	-0.2391	-0.2372	-0.2358
40	-0.3568	-0.3000	-0.2822	-0.2738	-0.2691	-0.2660	-0.2639	-0.2624
39	-0.3911	-0.3300	-0.3107	-0.3016	-0.2964	-0.2931	-0.2908	-0.2892
38	-0.4251	-0.3600	-0.3392	-0.3295	-0.3239	-0.3203	-0.3179	-0.3161
37	-0.4586	-0.3900	-0.3679	-0.3575	-0.3515	-0.3477	-0.3451	-0.3432
36	-0.4916	-0.4200	-0.3967	-0.3856	-0.3793	-0.3753	-0.3725	-0.3705
35	-0.5242	-0.4500	-0.4255	-0.4139	-0.4073	-0.4030	-0.4001	-0.3980
34	-0.5563	-0.4800	-0.4545	-0.4424	-0.4355	-0.4310	-0.4280	-0.4257
33	-0.5878	-0.5100	-0.4836	-0.4710	-0.4638	-0.4592	-0.4560	-0.4537
32	-0.6187	-0.5400	-0.5129	-0.4999	-0.4924	-0.4877	-0.4844	-0.4820
31	-0.6490	-0.5700	-0.5423	-0.5290	-0.5213	-0.5164	-0.5130	-0.5105
30	-0.6787	-0.6000	-0.5719	-0.5582	-0.5504	-0.5454	-0.5419	-0.5394
29	-0.7077	-0.6300	-0.6016	-0.5878	-0.5798	-0.5747	-0.5712	-0.5686
28	-0.7360	-0.6600	-0.6316	-0.6176	-0.6095	-0.6044	-0.6008	-0.5982
27	-0.7636	-0.6900	-0.6617	-0.6477	-0.6396	-0.6344	-0.6308	-0.6282
26	-0.7904	-0.7200	-0.6921	-0.6781	-0.6701	-0.6649	-0.6613	-0.6587
25	-0.8165	-0.7500	-0.7226	-0.7089	-0.7009	-0.6958	-0.6922	-0.6896
24	-0.8417	-0.7800	-0.7535	-0.7401	-0.7322	-0.7271	-0.7236	-0.7211
23	-0.8662	-0.8100	-0.7846	-0.7716	-0.7640	-0.7590	-0.7556	-0.7531
22	-0.8897	-0.8400	-0.8160	-0.8036	-0.7962	-0.7915	-0.7882	-0.7858
21	-0.9124	-0.8700	-0.8478	-0.8360	-0.8291	-0.8245	-0.8214	-0.8192
20	-0.9342	-0.9000	-0.8799	-0.8690	-0.8625	-0.8583	-0.8554	-0.8533
19	-0.9550	-0.9300	-0.9123	-0.9025	-0.8966	-0.8928	-0.8901	-0.8882
18	-0.9749	-0.9600	-0.9452	-0.9367	-0.9315	-0.9281	-0.9258	-0.9241
17	-0.9939	-0.9900	-0.9785	-0.9715	-0.9671	-0.9643	-0.9624	-0.9610
16	-1.0119	-1.0200	-1.0124	-1.0071	-1.0037	-1.0015	-1.0000	-0.9990
15	-1.0288	-1.0500	-1.0467	-1.0435	-1.0413	-1.0399	-1.0389	-1.0382
14	-1.0448	-1.0800	-1.0817	-1.0808	-1.0800	-1.0794	-1.0791	-1.0789
13	-1.0597	-1.1100	-1.1173	-1.1192	-1.1199	-1.1204	-1.1208	-1.1212
12	-1.0736	-1.1400	-1.1537	-1.1587	-1.1613	-1.1630	-1.1643	-1.1653
11	-1.0864	-1.1700	-1.1909	-1.1995	-1.2043	-1.2075	-1.2098	-1.2115
10	-1.0982	-1.2000	-1.2290	-1.2419	-1.2492	-1.2541	-1.2576	-1.2602
9	-1.1089	-1.2300	-1.2683	-1.2860	-1.2964	-1.3032	-1.3081	-1.3118
8	-1.1184	-1.2600	-1.3088	-1.3323	-1.3461	-1.3554	-1.3620	-1.3670
7	-1.1269	-1.2900	-1.3508	-1.3810	-1.3991	-1.4112	-1.4199	-1.4265
6	-1.1342	-1.3200	-1.3946	-1.4329	-1.4561	-1.4717	-1.4829	-1.4914
5	-1.1405	-1.3500	-1.4407	-1.4887	-1.5181	-1.5381	-1.5525	-1.5635
4	-1.1456	-1.3800	-1.4897	-1.5497	-1.5871	-1.6127	-1.6313	-1.6454
3	-1.1496	-1.4100	-1.5427	-1.6181	-1.6661	-1.6993	-1.7235	-1.7420
2	-1.1524	-1.4400	-1.6016	-1.6982	-1.7612	-1.8053	-1.8379	-1.8630
1	-1.1541	-1.4700	-1.6714	-1.8008	-1.8888	-1.9520	-1.9994	-2.0362

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM E178

Standard Practice for Dealing with Outlying Observations

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SECTION 4

SUPPLEMENTARY PROVISIONS

PART A FEDERAL AND STATE PROVISIONS

1. CIVIL RIGHTS ACT OF 1964, TITLE VI ASSURANCES (Reference: 49 USC § 47123, FAA Order 1400.11)
2. CIVIL RIGHTS – GENERAL (Reference: 49 USC § 47123)
3. ACCESS TO RECORDS AND REPORTS (Reference: 2 CFR § 200.333, 2 CFR § 200.336, FAA Order 5100.38)
4. DISADVANTAGED BUSINESS ENTERPRISE (Reference: 49 CFR Part 26)
5. ENERGY CONSERVATION REQUIREMENTS (Reference: 2 CFR § 200 Appendix II(H))
6. BREACH OF CONTRACT TERMS (Reference: 2 CFR § 200 Appendix II(A))
7. VETERAN’S PREFERENCE (Reference: 49 USC § 47112(c))
8. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION CONSTRUCTION SAFETY TRAINING
9. DAVIS-BACON REQUIREMENTS (Reference: 2 CFR § 200 Appendix II(D), 29 CFR Part 5)
10. EQUAL OPPORTUNITY CLAUSE AND SPECIFICATIONS (Reference: 2 CFR 200, Appendix II(C), 41 CFR § 60-1.4, CFR § 60-4.3, Executive Order 11246)
11. PROHIBITION OF SEGREGATED FACILITIES (Reference: 41 CFR § 60)
12. AFFIRMATIVE ACTION REQUIREMENT (Reference: 41 CFR Part 60-4, Executive Order 11246)
13. TERMINATION OF CONTRACT (Reference: 2 CFR § 200 Appendix II(B), FAA Advisory Circular 150/5370-10, Section 80-09)
14. CONTRACT WORKHOURS AND SAFETY STANDARDS ACT REQUIREMENTS (Reference: 2 CFR § 200 Appendix II(E))
15. CLEAN AIR AND WATER POLLUTION CONTROL (Reference: 2 CFR § 200 Appendix II(G))
16. BUY AMERICAN PREFERENCE (Reference: 49 USC § 50101)
17. COPELAND “ANTI-KICKBACK” ACT (Reference: 2 CFR § 200 Appendix II(D), 29 CFR Parts 3 & 5)
18. FEDERAL FAIR LABOR STANDARDS ACT (FEDERAL MINIMUM WAGE) (Reference: 29 USC § 201, et seq.)
19. OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970 (Reference 20 CFR Part 1910)

- 2886 20. DISTRACTED DRIVING (Executive Order 13513, DOT Order 3902.10)
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2888 21. PROCUREMENT OF RECOVERED MATERIALS (Reference 2 CFR § 200.322, 40 CFR Part 247)
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2890 22. RIGHT TO INVENTIONS (Reference: 2 CFR § 200 Appendix II(F), 37 CFR § 401)
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2892 23. SEISMIC SAFETY (49 CFR Part 41)
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2894 24. CERTIFICATION OF BIDDER REGARDING TAX DELINQUENCY AND FELONY
2895 CONVICTIONS (Sections 415 and 416 of Title IV, Division L of the Consolidated Appropriations
2896 Act, 2014, DOT Order 4200.6)
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2899 **1. CIVIL RIGHTS ACT OF 1964, TITLE VI ASSURANCES**

2900
2901 During the performance of this contract, the contractor, for itself, its assignees and successors in interest
2902 (hereinafter referred to as the "contractor") agrees as follows:

- 2903
2904 **1.1(a) Compliance with Regulations.** The contractor (hereinafter includes consultants) will comply
2905 with the **Title VI List of Pertinent Nondiscrimination Acts and Authorities**, as they may be
2906 amended from time to time, which are herein incorporated by reference and made a part of this
2907 contract.
- 2908
2909 **1.1(b) Non-discrimination.** The contractor, with regard to the work performed by it during the
2910 contract, will not discriminate on the grounds of race, color, or national origin in the selection
2911 and retention of subcontractors, including procurements of materials and leases of equipment.
2912 The contractor will not participate directly or indirectly in the 7discrimination prohibited by the
2913 Acts and the Regulations, including employment practices when the contract covers any activity,
2914 project, or program set forth in Appendix B of 49 CFR part 21.
- 2915
2916 **1.1(c) Solicitations for Subcontracts, Including Procurements of Materials and Equipment.** In
2917 all solicitations, either by competitive bidding, or negotiation made by the contractor for work to
2918 be performed under a subcontract, including procurements of materials, or leases of equipment,
2919 each potential subcontractor or supplier will be notified by the contractor of the contractor's
2920 obligations under this contract and the Acts and the Regulations relative to Non-discrimination
2921 on the grounds of race, color, or national origin.
- 2922
2923 **1.1(d) Information and Reports.** The contractor will provide all information and reports required by
2924 the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its
2925 books, records, accounts, other sources of information, and its facilities as may be determined by
2926 the sponsor or the Federal Aviation Administration to be pertinent to ascertain compliance with
2927 such Nondiscrimination Acts and Authorities and instructions. Where any information required
2928 of a contractor is in the exclusive possession of another who fails or refuses to furnish the
2929 information, the contractor will so certify to the sponsor or the Federal Aviation Administration,
2930 as appropriate, and will set forth what efforts it has made to obtain the information.
- 2931
2932 **1.1(e) Sanctions for Noncompliance.** In the event of a contractor's noncompliance with the Non-
2933 discrimination provisions of this contract, the sponsor will impose such contract sanctions as it
2934 or the Federal Aviation Administration may determine to be appropriate, including, but not
2935 limited:
- 2936
2937 **a.** Withholding of payments to the contractor under the contract until the contractor complies,
2938 and/or
- 2939
2940 **b.** Cancellation, termination, or suspension of the contract, in whole or in part.
- 2941
2942 **1.1(f) Incorporation of Provisions.** The contractor will include the provisions of paragraphs 1.1(a)
2943 through 1.1(f) in every subcontract, including procurements of materials and leases of equipment,
2944 unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The contractor
2945 will take action with respect to any subcontract or procurement as the sponsor or the Federal
2946 Aviation Administration may direct as a means of enforcing such provisions including sanctions
2947 for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with
2948 litigation by a subcontractor, or supplier because of such direction, the contractor may request
2949 the sponsor to enter into any litigation to protect the interests of the sponsor. In addition, the
2950 contractor may request the United States to enter into the litigation to protect the interests of the
2951 United States.
- 2952

- 2953 **1.2 Title VI List of Pertinent Nondiscrimination Authorities.** During the performance of this
2954 contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to
2955 as the “contractor”) agrees to comply with the following non-discrimination statutes and
2956 authorities; including but not limited to:
2957
- 2958 • Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d *et seq.*, 78 stat. 252), (prohibits
2959 discrimination on the basis of race, color, national origin);
 - 2960 • 49 CFR part 21 (Non-discrimination In Federally-Assisted Programs of The Department of
2961 Transportation—Effectuation of Title VI of The Civil Rights Act of 1964);
 - 2962 • The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42
2963 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been
2964 acquired because of Federal or Federal-aid programs and projects);
 - 2965 • Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 *et seq.*), as amended, (prohibits
2966 discrimination on the basis of disability); and 49 CFR part 27;
 - 2967 • The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 *et seq.*), (prohibits
2968 discrimination on the basis of age);
 - 2969 • Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended,
2970 (prohibits discrimination based on race, creed, color, national origin, or sex);
 - 2971 • The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and
2972 applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975
2973 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms
2974 “programs or activities” to include all of the programs or activities of the Federal-aid recipients,
2975 sub-recipients and contractors, whether such programs or activities are Federally funded or
2976 not);
 - 2977 • Titles II and III of the Americans with Disabilities Act of 1990, which prohibit discrimination
2978 on the basis of disability in the operation of public entities, public and private transportation
2979 systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131 –
2980 12189) as implemented by Department of Transportation regulations at 49 CFR parts 37 and
2981 38;
 - 2982 • The Federal Aviation Administration’s Non-discrimination statute (49 U.S.C. § 47123)
2983 (prohibits discrimination on the basis of race, color, national origin, and sex);
 - 2984 • Executive Order 12898, Federal Actions to Address Environmental Justice in Minority
2985 Populations and Low-Income Populations, which ensures discrimination against minority
2986 populations by discouraging programs, policies, and activities with disproportionately high and
2987 adverse human health or environmental effects on minority and low-income populations;
 - 2988 • Executive Order 13166, Improving Access to Services for Persons with Limited English
2989 Proficiency, and resulting agency guidance, national origin discrimination includes
2990 discrimination because of limited English proficiency (LEP). To ensure compliance with Title
2991 VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your
2992 programs (70 Fed. Reg. at 74087 to 74100);

- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).

References: 49 USC § 47123, FAA Order 1400.11

2. GENERAL CIVIL RIGHTS PROVISIONS

The Contractor agrees to comply with pertinent statutes, Executive Orders and such rules as are promulgated to ensure that no person shall, on the grounds of race, creed, color, national origin, sex, age, or disability be excluded from participating in any activity conducted with or benefiting from Federal assistance.

This provision binds the Contractors and subcontractors from the bid solicitation period through the completion of the contract. This provision is in addition to that required of Title VI of the Civil Rights Act of 1964.

References: 49 USC § 47123

3. ACCESS TO RECORDS AND REPORTS

The Contractor must maintain an acceptable cost accounting system. The Contractor agrees to provide the Owner, the Federal Aviation Administration and the Comptroller General of the United States or any of their duly authorized representatives access to any books, documents, papers, and records of the Contractor which are directly pertinent to the specific contract for the purpose of making audit, examination, excerpts and transcriptions. The Contractor agrees to maintain all books, records and reports required under this contract for a period of not less than three years after final payment is made and all pending matters are closed.

References: 2 CFR § 200.333, 2 CFR § 200.336, FAA Order 5100.38

4. DISADVANTAGED BUSINESS ENTERPRISES

Where used in this provision, "Department of Transportation" or "DOT" refers to the United States Department of Transportation. "MoDOT" refers to the Missouri Department of Transportation and the Missouri Highways and Transportation Commission.

Policy. It is the policy of the Department of Transportation that disadvantaged business enterprises as defined in 49 CFR Part 26 shall have the maximum opportunity to participate in the performance of contracts financed in whole or in part with Federal funds under this agreement. Consequently, the DBE requirements of 49 CFR Part 26, apply to this agreement.

Contract Assurance. MoDOT and the Sponsor will ensure that the following clause is placed in every USDOT assisted contract and subcontract.

"The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy, as the recipient deems appropriate."

(This assurance shall be included in each subcontract the prime contractor signs with a subcontractor.)

Federal Financial Assistance Agreement Assurances. MoDOT and the Sponsor agree to and incorporate the following assurance into the day to day operations and the administration of all USDOT assisted contracts; where “recipient” mean MoDOT and any MoDOT grantee receiving USDOT assistance:

“MoDOT or the Sponsor shall not discriminate on the basis of race, color, national origin, or sex in the award and performance of any USDOT assisted contract or in the administration of its DBE Program or the requirements of 49 CFR Part 26. The recipient shall take all necessary and reasonable steps under 49 CFR Part 26 to ensure nondiscrimination in the award and administration of USDOT assisted contracts. The recipient’s DBE Program, as required by 49 CFR Part 26 and as approved by USDOT, is incorporated by reference in this agreement. Implementation of this program is a legal obligation and failure to carry out its approved program, the Department may impose sanctions as provided for under Part 26 and may, in appropriate cases, refer the matter for enforcement under 18 U.S.C. 1001 and/or the Program Fraud Civil Remedies Act of 1986 (31 U.S.C. 3801 et seq.).”

MoDOT and the Sponsor ensure that all recipients of USDOT assisted contracts, funds, or grants incorporate, agree to and comply with the assurance statement.

Prompt Payment. MoDOT and the Sponsor require all contractors to pay all subcontractors and suppliers under this prime contract for satisfactory performance of its contract in compliance with the prompt payment statute, Mo. Revised Statutes, Chapter 34, Section 34.057 (included below). MoDOT and the Sponsor also requires the prompt, as defined in Section 34.057, return of all retainage held on all subcontractors after the subcontractor’s work is satisfactorily completed, as MoDOT and the Sponsor personnel may ultimately determine (if necessary). These prompt payment requirements apply to both DBE and non-DBE subcontractors.

All contractors and subcontractors must retain records of all payments, made or received, for 3 years from the date of final payment and must be available for inspection, upon request, by any authorized representative of MoDOT, the Sponsor or USDOT. MoDOT and the city will maintain records of actual payments to DBE firms for work committed to at the time of contract award.

MoDOT and the Sponsor will perform audits of contract payments to firms. The audits will review payments to subcontractors to ensure that the actual amount paid to DBE subcontractors equals or exceeds the dollar amounts stated in the schedule of DBE participation and that payment was made in compliance with Missouri Revised Statutes, Chapter 34, Section 34.057.

MISSOURI REVISED STATUTES

Chapter 34 State Purchasing and Printing Section 34.057

August 28, 2014

Public works contracts--prompt payment by public owner to contractor, engineer, architect, or surveyor--prompt payment by contractor to subcontractor-- progress payments--retainage--late payment charges-- withholding of payments.

34.057. 1. Unless contrary to any federal funding requirements or unless funds from a state grant are not timely received by the contracting public municipality but notwithstanding any other law to the contrary, all public works contracts made and awarded by the appropriate officer, board or agency of the state or of a political subdivision of the state or of any district therein, including any municipality, county and any board referred to as the public owner, for construction, reconstruction or alteration of any public works project, shall provide for prompt payment by the public owner to the contractor, and any professional engineer, architect, landscape architect, or land surveyor, as well as prompt payment by the contractor to the subcontractor and material supplier in accordance with the following:

(1) A public owner shall make progress payments to the contractor and any professional engineer, architect, landscape architect or land surveyor on at least a monthly basis as the work progresses, or, on a lump sum basis according to the terms of the lump sum contract. Except in the case of lump sum contracts, payments shall be based upon estimates prepared at least monthly of work performed and material delivered, as determined by the project architect or engineer. Retainage withheld on any construction contract or subcontract for public works projects shall not exceed five percent of the value of the contract or subcontract. If the contractor is not required to obtain a bond under section 107.170 because the cost of the public works contract is not estimated to exceed fifty thousand dollars, the public owner may withhold retainage on the public works project in an amount not to exceed ten percent of the value of the contract or subcontract. The public owner shall pay the contractor the amount due, less a retainage, within thirty days following the latter of the following:

(a) The date of delivery of materials or construction services purchased;

(b) The date, as designated by the public owner, upon which the invoice is duly delivered to the person or place designated by the public owner; or

(c) In those instances in which the contractor approves the public owner's estimate, the date upon which such notice of approval is duly delivered to the person or place designated by the public owner;

(2) Payments shall be considered received within the context of this section when they are duly posted with the United States Postal Service or other agreed upon delivery service or when they are hand-delivered to an authorized person or place as agreed to by the contracting parties;

(3) If, in the discretion of the owner and the project architect or engineer and the contractor, it is determined that a subcontractor's performance has been completed and the subcontractor can be released prior to substantial completion of the public works contract without risk to the public owner, the contractor shall request such adjustment in retainage, if any, from the public owner as necessary to enable the contractor to pay the subcontractor in full. The public owner may reduce or eliminate retainage on any contract payment if, in the public owner's opinion, the work is proceeding satisfactorily. If retainage is released and there are any remaining minor items to be completed, an amount equal to one hundred fifty percent of the value of each item as determined by the public owner's duly authorized representatives shall be withheld until such item or items are completed;

(4) The public owner shall pay at least ninety-eight percent of the retainage, less any offsets or deductions authorized in the contract or otherwise authorized by law, to the contractor. The contractor shall pay the subcontractor or supplier after substantial completion of the contract work and acceptance by the public owner's authorized contract representative, or as may otherwise be provided by the contract specifications for state highway, road or bridge projects administered by the state highways and transportation commission. Such payment shall be made within thirty days after acceptance, and the invoice and all other appropriate documentation and certifications in complete and acceptable form are provided, as may be required by the contract documents. If the public owner or the owner's representative determines the work is not substantially completed and accepted, then the owner or the owner's representative shall provide a written explanation of why the work is not considered substantially completed and accepted within fourteen calendar days to the contractor, who shall then provide such notice to the subcontractor or suppliers responsible for such work. If such written explanation is not given by the public body, the public body shall pay at least ninety-eight percent of the retainage within thirty calendar days. If at that time there are any remaining minor items to be completed, an amount equal to one hundred fifty percent of the value of each item as determined by the public owner's representative shall be withheld until such items are completed;

(5) All estimates or invoices for supplies and services purchased, approved and processed, or final payments, shall be paid promptly and shall be subject to late payment charges provided in this section. Except as provided in subsection 4 of this section, if the contractor has not been paid within thirty days as set forth in subdivision (1) of subsection 1 of this section, the contracting agency shall pay the contractor, in addition to the payment due him, interest at the rate of one and one-half percent per month calculated from the expiration of the thirty-day period until fully paid;

(6) When a contractor receives any payment, the contractor shall pay each subcontractor and material supplier in proportion to the work completed by each subcontractor and material supplier his application less any retention not to exceed five percent. If the contractor receives less than the full payment due under the public construction contract, the contractor shall be obligated to disburse on a pro rata basis those funds received, with the contractor, subcontractors and material suppliers each receiving a prorated portion based on the amount of payment. When, however, the public owner does not release the full payment due under the contract because there are specific areas of work or materials he is rejecting or because he has otherwise determined such areas are not suitable for payment then those specific subcontractors or suppliers involved shall not be paid for that portion of the work rejected or deemed not suitable for payment; provided the public owner or the owner's representative gives a written explanation to the contractor, subcontractor, or supplier involved as to why the work or supplies were rejected or deemed not suitable for payment, and all other subcontractors and suppliers shall be paid in full;

(7) If the contractor, without reasonable cause, fails to make any payment to his subcontractors and material suppliers within fifteen days after receipt of payment under the public construction contract, the contractor shall pay to his subcontractors and material suppliers, in addition to the payment due them, interest in the amount of one and one-half percent per month, calculated from the expiration of the fifteen-day period until fully paid. This subdivision shall also apply to any payments made by subcontractors and material suppliers to their subcontractors and material suppliers and to all payments made to lower tier subcontractors and material suppliers throughout the contracting chain;

(8) The public owner shall make final payment of all moneys owed to the contractor, including any retainage withheld under subdivision (4) of this subsection, less any offsets or deductions authorized in the contract or otherwise authorized by law, within thirty days of the due date. Final payment shall be considered due upon the earliest of the following events:

- (a) Completion of the project and filing with the owner of all required documentation and certifications, in complete and acceptable form, in accordance with the terms and conditions of the contract;

(b) The project is certified by the architect or engineer authorized to make such certification on behalf of the owner as having been completed, including the filing of all documentation and certifications required by the contract, in complete and acceptable form; or

(c) The project is certified by the contracting authority as having been completed, including the filing of all documentation and certifications required by the contract, in complete and acceptable form.

(9) Nothing in this section shall prevent the contractor or subcontractor, at the time of application or certification to the public owner or contractor, from withholding such applications or certifications to the owner or contractor for payment to the subcontractor or material supplier. Amounts intended to be withheld shall not be included in such applications or certifications to the public owner or contractor. Reasons for withholding such applications or certifications shall include, but not be limited to, the following: unsatisfactory job progress; defective construction work or material not remedied; disputed work; failure to comply with other material provisions of the contract; third-party claims filed or reasonable evidence that a claim will be filed; failure of the subcontractor to make timely payments for labor, equipment and materials; damage to a contractor or another subcontractor or material supplier; reasonable evidence that the contract cannot be completed for the unpaid balance of the subcontract sum or a reasonable amount for retention, not to exceed the initial percentage retained by the owner.

(10) Should the contractor determine, after application or certification has been made and after payment has been received from the public owner, or after payment has been received by a contractor based upon the public owner's estimate of materials in place and work performed as provided by contract, that all or a portion of the moneys needs to be withheld from a specific subcontractor or material supplier for any of the reasons enumerated in this section, and such moneys are withheld from such subcontractor or material supplier, then such undistributed amounts shall be specifically identified in writing and deducted from the next application or certification made to the public owner or from the next estimate by the public owner of payment due the contractor, until a resolution of the matter has been achieved. Disputes shall be resolved in accordance with the terms of the contract documents. Upon such resolution the amounts withheld by the contractor from the subcontractor or material supplier shall be included in the next application or certification made to the public owner or the next estimate by the public owner and shall be paid promptly in accordance with the provisions of this section. This subsection shall also apply to applications or certifications made by subcontractors or material suppliers to the contractor and throughout the various tiers of the contracting chain.

(11) The contracts which provide for payments to the contractor based upon the public owner's estimate of materials in place and work performed rather than applications or certifications submitted by the contractor, the public owner shall pay the contractor within thirty days following the date upon which the estimate is required by contract to be completed by the public owner, the amount due less a retainage not to exceed five percent. All such estimates by the public owner shall be paid promptly and shall be subject to late payment charges as provided in this subsection. After the thirtieth day following the date upon which the estimate is required by contract to be completed by the public owner, the contracting agency shall pay the contractor, in addition to the payment due him, interest at a rate of one and one-half percent per month calculated from the expiration of the thirty-day period until fully paid.

(12) The public owner shall pay or cause to be paid to any professional engineer, architect, landscape architect, or land surveyor the amount due within thirty days following the receipt of an invoice prepared and submitted in accordance with the contract terms. In addition to the payment due, the contracting agency shall pay interest at the rate of one and one-half percent per month calculated from the expiration of the thirty-day period until fully paid.

(13) Nothing in this section shall prevent the owner from withholding payment or final payment from the contractor, or a subcontractor or material supplier. Reasons for withholding payment or final payment shall include, but not be limited to, the following: liquidated damages; unsatisfactory job progress; defective construction work or material not remedied; disputed work; failure to comply with any material provision of the contract; third party claims filed or reasonable evidence that a claim will be filed; failure to make timely payments for labor, equipment or materials; damage to a contractor, subcontractor or material supplier; reasonable evidence that a subcontractor

or material supplier cannot be fully compensated under its contract with the contractor for the unpaid balance of the contract sum; or citation by the enforcing authority for acts of the contractor or subcontractor which do not comply with any material provision of the contract and which result in a violation of any federal, state or local law, regulation or ordinance applicable to that project causing additional costs or damages to the owner.

(14) Nothing in this section shall be construed to require direct payment by a public owner to a subcontractor or supplier, except in the case of the default, as determined by a court, of the contractor on the contract with the public owner where no performance or payment bond is required or where the surety fails to execute its duties, as determined by a court.

(15) Notwithstanding any other provisions in this section to the contrary, no late payment interest shall be due and owing for payments which are withheld in good faith for reasonable cause pursuant to subsections 2, 5 and 6 of this section. If it is determined by a court of competent jurisdiction that a payment which was withheld pursuant to subsections 2, 5 and 6 of this section was not withheld in good faith for reasonable cause, the court may impose interest at the rate of one and one-half percent per month calculated from the date of the invoice and may, in its discretion, award reasonable attorney fees to the prevailing party. In any civil action or part of a civil action brought pursuant to this section, if a court determines after a hearing for such purpose that the cause was initiated, or a defense was asserted, or a motion was filed, or any proceeding therein was done frivolously and in bad faith, the court shall require the party who initiated such cause, asserted such defense, filed such motion, or caused such proceeding to be had to pay the other party named in such action the amount of the costs attributable thereto and reasonable expenses incurred by such party, including reasonable attorney fees.

(L. 1990 S.B. 808 & 672 § 1, A.L. 2014 S.B. 529)

(2004) Act contemplates a contract between the parties to such a cause of action and provides for such action against a public owner only by the contractor, not a subcontractor or supplier. *Mays-Maune & Associates v. Werner Brothers*, 139 S.W.3d 201 (Mo.App. E.D.).

MoDOT DBE Program Regulations. The Sponsor, contractor and each subcontractor are bound by the new MoDOT DBE Program regulations at Title 7 CSR, Division 10, Chapter 8.

Reference: 49 CFR Part 26

5. ENERGY CONSERVATION REQUIREMENTS

Contractor and Subcontractor agrees to comply with mandatory standards and policies relating to energy efficiency as contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act (42 U.S.C. 6201 *et seq.*).

Reference: 2 CFR § 200 Appendix II(H)

6. BREACH OF CONTRACT TERMS

Any violation or breach of terms of this contract on the part of the Contractor or its subcontractors may result in the suspension or termination of this contract or such other action that may be necessary to enforce the rights of the parties of this agreement.

Owner will provide Contractor written notice that describes the nature of the breach and corrective actions the Contractor must undertake in order to avoid termination of the contract. The Owner reserves the right to withhold payments to the Contractor until such time the Contractor corrects the breach or the Owner elects to terminate the contract. The Owner's notice will identify a specific date by which the

Contractor must correct the breach. The Owner may proceed with termination of the contract if the Contractor fails to correct the breach by the deadline indicated in the Owner's notice.

The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder are in addition to, and not a limitation of, any duties, obligations, rights and remedies otherwise imposed or available by law.

Reference: 2 CFR § 200 Appendix II(A)

7. VETERAN'S PREFERENCE

In the employment of labor (excluding executive, administrative, and supervisory positions), the Contractor and all sub-tier contractors must give preference to covered veterans as defined within Title 49 United States Code Section 47112. Covered veterans include Vietnam-era veterans, Persian Gulf veterans, Afghanistan-Iraq war veterans, disabled veterans, and small business concerns (as defined by 15 U.S.C. 632) owned and controlled by disabled veterans. This preference only applies when there are covered veterans readily available and qualified to perform the work to which the employment relates.

References: Title 49 U.S.C. 47112(c)

8. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION CONSTRUCTION SAFETY TRAINING

The Contractor and its subcontractors (if any subcontractors are retained) shall comply with all applicable provisions of section 292.675, Revised Statutes of Missouri, which statute is incorporated herein by reference and is made a part of this contract. Section 292.675 states that any person signing a contract to work on the construction of public works for any public body shall provide a ten hour Occupational Safety and Health Administration (OSHA) construction safety program for their on-site employees, which includes a course in construction safety and health approved by OSHA or a similar program approved by the Department of Labor and Industrial Relations which is at least as stringent as an approved OSHA program, unless such employees have previously completed the required program and hold documentation of such prior completion. All employees who have not previously completed the program are required to complete the program within sixty (60) days of beginning work on such construction project. Any employee found on a worksite subject to section 292.675's requirements without documentation of the successful completion of this course shall have twenty (20) days to produce such documentation before being subject to removal from the project.

The Contractor shall forfeit as penalty to the public body on whose behalf the contract is made or awarded two thousand five hundred dollars (\$2,500) plus one hundred dollars (\$100) for each employee employed by the contractor or subcontractor, for each calendar day, or portion thereof, such employee is employed by the contractor or subcontractor without the required training. These penalties shall not begin to accrue until the sixty (60) day and twenty (20) day time periods described above have elapsed. The public body awarding the contract shall withhold and retain therefrom all sums and amounts due and owing as a result of any violation of section 292.675 when making payments to the Contractor under the contract. The Contractor may withhold from any subcontractor sufficient sums to cover any penalties the public body has withheld from the Contractor resulting from the subcontractor's failure to comply with the terms of section 292.675.

DAVIS BACON REQUIREMENTS**9.1 Minimum Wages.**

- (i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalent thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 9.1(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR Part 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: *Provided*, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 9.1(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can easily be seen by the workers.

- (ii)
- (A) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:
- (1) The work to be performed by the classification requested is not performed by a classification in the wage determinations; and
 - (2) The classification is utilized in the area by the construction industry; and
 - (3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.
- (B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

- 3397 (C) In the event the contractor, the laborers or mechanics to be employed in the classification
3398 or their representatives, and the contracting officer do not agree on the proposed
3399 classification and wage rate (including the amount designated for fringe benefits where
3400 appropriate), the contracting officer shall refer the questions, including the views of all
3401 interested parties and the recommendation of the contracting officer, to the
3402 Administrator for determination. The Administrator, or an authorized representative,
3403 will issue a determination within 30 days of receipt and so advise the contracting officer
3404 or will notify the contracting officer within the 30-day period that additional time is
3405 necessary.
3406
- 3407 (D) The wage rate (including fringe benefits where appropriate) determined pursuant to
3408 subparagraphs 9.1(ii) (B) or (C) of this paragraph, shall be paid to all workers performing
3409 work in the classification under this contract from the first day on which work is
3410 performed in the classification.
3411
- 3412 (iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or
3413 mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor
3414 shall either pay the benefit as stated in the wage determination or shall pay another bona fide
3415 fringe benefit or an hourly cash equivalent thereof.
3416
- 3417 (iv) If the contractor does not make payments to a trustee or other third person, the contractor
3418 may consider as part of the wages of any laborer or mechanic the amount of any costs
3419 reasonably anticipated in providing bona fide fringe benefits under a plan or program,
3420 *Provided*, That the Secretary of Labor has found, upon the written request of the contractor,
3421 that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor
3422 may require the contractor to set aside in a separate account assets for the meeting of
3423 obligations under the plan or program.
3424

3425 **9.2 Withholding.** The Federal Aviation Administration or the Sponsor shall upon its own action or
3426 upon written request of an authorized representative of the Department of Labor withhold or
3427 cause to be withheld from the contractor under this contract or any other Federal contract with
3428 the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon
3429 prevailing wage requirements, which is held by the same prime contractor, so much of the accrued
3430 payments or advances as may be considered necessary to pay laborers and mechanics, including
3431 apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full
3432 amount of wages required by the contract. In the event of failure to pay any laborer or mechanic,
3433 including any apprentice, trainee, or helper, employed or working on the site of work, all or part
3434 of the wages required by the contract, the Federal Aviation Administration may, after written
3435 notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to
3436 cause the suspension of any further payment, advance, or guarantee of funds until such violations
3437 have ceased.
3438

3439 **9.3 Payrolls and basic records.**
3440

- 3441 (i) Payrolls and basic records relating thereto shall be maintained by the contractor during the
3442 course of the work and preserved for a period of three years thereafter for all laborers and
3443 mechanics working at the site of the work. Such records shall contain the name, address, and
3444 social security number of each such worker, his or her correct classification, hourly rates of
3445 wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits
3446 or cash equivalents thereof of the types described in 1(b)(2)(B) of the Davis-Bacon Act), daily
3447 and weekly number of hours worked, deductions made and actual wages paid. Whenever the
3448 Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or
3449 mechanic include the amount of any costs reasonably anticipated in providing benefits under
3450 a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor

shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual costs incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)

- (A) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the (write in name of appropriate federal agency) if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant, sponsor, or owner, as the case may be, for transmission to the Federal Aviation Administration. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the (write in name of appropriate federal agency) if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit them to the applicant, sponsor, or owner, as the case may be, for transmission to the (write in name of agency), the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the sponsoring government agency (or the applicant, sponsor, or owner).
- (B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

- (1) That the payroll for the payroll period contains the information required to be provided under 29 CFR § 5.5(a)(3)(ii), the appropriate information is being maintained under 29 CFR § 5.5 (a)(3)(i) and that such information is correct and complete;
- (2) That each laborer and mechanic (including each helper, apprentice and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations 29 CFR Part 3;
- (3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

- 3505 (C) The weekly submission of a properly executed certification set forth on the reverse side
3506 of Optional Form WH-347 shall satisfy the requirement for submission of the
3507 "Statement of Compliance" required by paragraph (3)(ii)(B) of this section.
3508
- 3509 (D) The falsification of any of the above certifications may subject the contractor or
3510 subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section
3511 231 of Title 31 of the United States Code.
3512
- 3513 (iii) The contractor or subcontractor shall make the records required under paragraph 9.3(i) of
3514 this section available for inspection, copying or transcription by authorized representatives
3515 of the Sponsor, the Federal Aviation Administration or the Department of Labor, and shall
3516 permit such representatives to interview employees during working hours on the job. If the
3517 contractor or subcontractor fails to submit the required records or to make them available,
3518 the Federal agency may, after written notice to the contractor, sponsor, applicant or owner,
3519 take such action as may be necessary to cause the suspension of any further payment,
3520 advance, or guarantee of funds. Furthermore, failure to submit the required records upon
3521 request or to make such records available may be grounds for debarment action pursuant to
3522 29 CFR 5.12.
3523

3524 9.4 Apprentices and Trainees.

3525

- 3526 (i) **Apprentices.** Apprentices will be permitted to work at less than the predetermined rate for
3527 the work they performed when they are employed pursuant to and individually registered in
3528 a bona fide apprenticeship program registered with the U.S. Department of Labor,
3529 Employment and Training Administration, Bureau of Apprenticeship and Training, or with
3530 a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or
3531 her first 90 days of probationary employment as an apprentice in such an apprenticeship
3532 program, who is not individually registered in the program, but who has been certified by the
3533 Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where
3534 appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio
3535 of apprentices to journeymen on the job site in any craft classification shall not be greater
3536 than the ratio permitted to the contractor as to the entire work force under the registered
3537 program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or
3538 otherwise employed as stated above, shall be paid not less than the applicable wage rate on
3539 the wage determination for the classification of work actually performed. In addition, any
3540 apprentice performing work on the job site in excess of the ratio permitted under the
3541 registered program shall be paid not less than the applicable wage rate on the wage
3542 determination for the work actually performed. Where a contractor is performing
3543 construction on a project in a locality other than that in which its program is registered, the
3544 ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in
3545 the contractor's or subcontractor's registered program shall be observed. Every apprentice
3546 must be paid at not less than the rate specified in the registered program for the apprentice's
3547 level of progress, expressed as a percentage of the journeymen hourly rate specified in the
3548 applicable wage determination. Apprentices shall be paid fringe benefits in accordance with
3549 the provisions of the apprenticeship program. If the apprenticeship program does not specify
3550 fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage
3551 determination for the applicable classification. If the Administrator determines that a
3552 different practice prevails for the applicable apprentice classification, fringes shall be paid in
3553 accordance with that determination. In the event the Bureau of Apprenticeship and Training,
3554 or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an
3555 apprenticeship program, the contractor will no longer be permitted to utilize apprentices at
3556 less than the applicable predetermined rate for the work performed until an acceptable
3557 program is approved.
3558

(ii) **Trainees.** Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) **Equal Employment Opportunity.** The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

9.5 Compliance With Copeland Act Requirements. The contractor shall comply with the requirements of 29 CFR Part 3, which are incorporated by reference in this contract.

9.6 Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR Part 5.5(a)(1) through (10) and such other clauses as the Federal Aviation Administration may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR Part 5.5.

9.7 Contract Termination: Debarment. A breach of the contract clauses in paragraphs 9.1 through 9.10 of this section may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

9.8 Compliance With Davis-Bacon and Related Act Requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.

9.9 Disputes Concerning Labor Standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6 and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

3612 **9.10 Certification of Eligibility.**

- 3613
- 3614 (i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any
- 3615 person or firm who has an interest in the contractor's firm is a person or firm ineligible to be
- 3616 awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR
- 3617 5.12(a)(1).
- 3618
- 3619 (ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of
- 3620 a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
- 3621
- 3622 (iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C.
- 3623 1001.
- 3624

3625 *Reference: 2 CFR § 200 Appendix II(D), 29 CFR Part 5*

3626

3627

3628 **10. EQUAL EMPLOYMENT OPPORTUNITY CLAUSE AND SPECIFICATIONS**

3629 **EQUAL OPPORTUNITY CLAUSE**

3630

3631 During the performance of this contract, the contractor agrees as follows:

3632

- 3633
- 3634 **10.1** The contractor will not discriminate against any employee or applicant for employment because
- 3635 of race, color, religion, sex, or national origin. The contractor will take affirmative action to
- 3636 ensure that applicants are employed, and that employees are treated during employment without
- 3637 regard to their race, color, religion, sex, sexual orientation, gender identity or national origin. Such
- 3638 action shall include, but not be limited to the following:
- 3639
- 3640 Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or
- 3641 termination; rates of pay or other forms of compensation; and selection for training, including
- 3642 apprenticeship. The contractor agrees to post in conspicuous places, available to employees and
- 3643 applicants for employment, notices to be provided setting forth the provisions of this
- 3644 nondiscrimination clause.
- 3645
- 3646 **10.2** The contractor will, in all solicitations or advertisements for employees placed by or on behalf of
- 3647 the contractor, state that all qualified applicants will receive considerations for employment
- 3648 without regard to race, color, religion, sex, or national origin.
- 3649
- 3650 **10.3** The contractor will send to each labor union or representative of workers with which it has a
- 3651 collective bargaining agreement or other contract or understanding, a notice to be provided
- 3652 advising the said labor union or workers' representatives of the contractor's commitments under
- 3653 this section, and shall post copies of the notice in conspicuous places available to employees and
- 3654 applicants for employment.
- 3655
- 3656 **10.4** The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965,
- 3657 as amended, and of the rules, regulations, and relevant orders of the Secretary of Labor.
- 3658
- 3659 **10.5** The contractor will furnish all information and reports required by Executive Order 11246 of
- 3660 September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant
- 3661 thereto, and will permit access to his books, records, and accounts by the administering agency
- 3662 and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules,
- 3663 regulations, and orders.
- 3664

3665 **10.6** In the event of the contractor's noncompliance with the nondiscrimination clauses of this
3666 contract or with any of the said rules, regulations, or orders, this contract may be canceled,
3667 terminated, or suspended in whole or in part and the contractor may be declared ineligible for
3668 further Government contracts or federally assisted construction contracts in accordance with
3669 procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions
3670 may be imposed and remedies invoked as provided in Executive Order 11246 of September 24,
3671 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law
3672

3673 **10.7** The contractor will include the portion of the sentence immediately preceding paragraph 10.1
3674 and the provisions of paragraphs 10.1 through 10.7 in every subcontract or purchase order unless
3675 exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204
3676 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon
3677 each subcontractor or vendor. The contractor will take such action with respect to any
3678 subcontract or purchase order as the administering agency may direct as a means of enforcing
3679 such provisions, including sanctions for noncompliance: Provided, however, That in the event a
3680 contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor
3681 as a result of such direction by the administering agency the contractor may request the United
3682 States to enter into such litigation to protect the interests of the United States.
3683

3684 **STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION**
3685 **CONTRACT SPECIFICATIONS**
3686

3687 **10.8.** As used in these specifications:
3688

- 3689 a. "Covered area" means the geographical area described in the solicitation from which this
3690 contract resulted;
3691
3692 b. "Director" means Director, Office of Federal Contract Compliance Programs (OFCCP),
3693 U.S. Department of Labor, or any person to whom the Director delegates authority;
3694
3695 c. "Employer identification number" means the Federal social security number used on the
3696 Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941;
3697
3698 d. "Minority" includes:
3699
3700 (1) Black (all) persons having origins in any of the Black African racial groups not of
3701 Hispanic origin);
3702
3703 (2) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American, or
3704 other Spanish culture or origin regardless of race);
3705
3706 (3) Asian and Pacific Islander (all persons having origins in any of the original peoples of the
3707 Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
3708
3709 (4) American Indian or Alaskan native (all persons having origins in any of the original
3710 peoples of North America and maintaining identifiable tribal affiliations through
3711 membership and participation or community identification).
3712

3713 **10.9.** Whenever the contractor, or any subcontractor at any tier, subcontracts a portion of the work
3714 involving any construction trade, it shall physically include in each subcontract in excess of
3715 \$10,000 the provisions of these specifications and the Notice which contains the applicable goals
3716 for minority and female participation and which is set forth in the solicitations from which this
3717 contract resulted.
3718

- 3719 **10.10.** If the contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by
3720 the U.S. Department of Labor in the covered area either individually or through an association,
3721 its affirmative action obligations on all work in the Plan area (including goals and timetables) shall
3722 be in accordance with that Plan for those trades which have unions participating in the Plan.
3723 Contractors shall be able to demonstrate their participation in and compliance with the provisions
3724 of any such Hometown Plan. Each contractor or subcontractor participating in an approved plan
3725 is individually required to comply with its obligations under the EEO clause and to make a good
3726 faith effort to achieve each goal under the Plan in each trade in which it has employees. The
3727 overall good faith performance by other contractors or subcontractors toward a goal in an
3728 approved Plan does not excuse any covered contractor's or subcontractor's failure to take good
3729 faith efforts to achieve the Plan goals and timetables.
3730
- 3731 **10.11.** The contractor shall implement the specific affirmative action standards provided in paragraphs
3732 10.14a through 10.14p of these specifications. The goals set forth in the solicitation from which
3733 this contract resulted are expressed as percentages of the total hours of employment and training
3734 of minority and female utilization the contractor should reasonably be able to achieve in each
3735 construction trade in which it has employees in the covered area. Covered construction
3736 contractors performing construction work in a geographical area where they do not have a Federal
3737 or federally assisted construction contract shall apply the minority and female goals established
3738 for the geographical area where the work is being performed. Goals are published periodically in
3739 the Federal Register in notice form, and such notices may be obtained from any Office of Federal
3740 Contract Compliance Programs office or from Federal procurement contracting officers. The
3741 contractor is expected to make substantially uniform progress in meeting its goals in each craft
3742 during the period specified.
3743
- 3744 **10.12.** Neither the provisions of any collective bargaining agreement nor the failure by a union with
3745 whom the contractor has a collective bargaining agreement to refer either minorities or women
3746 shall excuse the contractor's obligations under these specifications, Executive Order 11246 or the
3747 regulations promulgated pursuant thereto.
3748
- 3749 **10.13.** In order for the non-working training hours of apprentices and trainees to be counted in meeting
3750 the goals, such apprentices and trainees shall be employed by the contractor during the training
3751 period and the contractor shall have made a commitment to employ the apprentices and trainees
3752 at the completion of their training, subject to the availability of employment opportunities.
3753 Trainees shall be trained pursuant to training programs approved by the U.S. Department of
3754 Labor.
3755
- 3756 **10.14.** The contractor shall take specific affirmative actions to ensure equal employment opportunity.
3757 The evaluation of the contractor's compliance with these specifications shall be based upon its
3758 effort to achieve maximum results from its actions. The contractor shall document these efforts
3759 fully and shall implement affirmative action steps at least as extensive as the following:
3760
- 3761 a. Ensure and maintain a working environment free of harassment, intimidation, and coercion
3762 at all sites, and in all facilities at which the contractor's employees are assigned to work. The
3763 contractor, where possible, will assign two or more women to each construction project. The
3764 contractor shall specifically ensure that all foremen, superintendents, and other onsite
3765 supervisory personnel are aware of and carry out the contractor's obligation to maintain such
3766 a working environment, with specific attention to minority or female individuals working at
3767 such sites or in such facilities.
3768
- 3769 b. Establish and maintain a current list of minority and female recruitment sources, provide
3770 written notification to minority and female recruitment sources and to community
3771 organizations when the contractor or its unions have employment opportunities available,
3772 and maintain a record of the organizations' responses.

- c. Maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source, or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the contractor by the union or, if referred, not employed by the contractor, this shall be documented in the file with the reason therefore along with whatever additional actions the contractor may have taken.
- d. Provide immediate written notification to the Director when the union or unions with which the contractor has a collective bargaining agreement has not referred to the contractor a minority person or female sent by the contractor, or when the contractor has other information that the union referral process has impeded the contractor's efforts to meet its obligations.
- e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the contractor's employment needs, especially those programs funded or approved by the Department of Labor. The contractor shall provide notice of these programs to the sources compiled under 10.8b above.
- f. Disseminate the contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.
- g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination, or other employment decisions including specific review of these items with onsite supervisory personnel such as superintendents, general foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
- h. Disseminate the contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the contractor's EEO policy with other contractors and subcontractors with whom the contractor does or anticipates doing business.
- i. Direct its recruitment efforts, both oral and written, to minority, female, and community organizations, to schools with minority and female students; and to minority and female recruitment and training organizations serving the contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the contractor shall send written notification to organizations, such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
- j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable provide after school, summer, and vacation employment to minority and female youth both on the site and in other areas of a contractor's workforce.

- 3826 k. Validate all tests and other selection requirements where there is an obligation to do so under
3827 41 CFR Part 60-3.
3828
3829 l. Conduct, at least annually, an inventory and evaluation at least of all minority and female
3830 personnel, for promotional opportunities and encourage these employees to seek or to
3831 prepare for, through appropriate training, etc., such opportunities.
3832
3833 m. Ensure that seniority practices, job classifications, work assignments, and other personnel
3834 practices do not have a discriminatory effect by continually monitoring all personnel and
3835 employment related activities to ensure that the EEO policy and the contractor's obligations
3836 under these specifications are being carried out.
3837
3838 n. Ensure that all facilities and company activities are non-segregated except that separate or
3839 single user toilet and necessary changing facilities shall be provided to assure privacy between
3840 the sexes.
3841
3842 o. Document and maintain a record of all solicitations of offers for subcontracts from minority
3843 and female construction contractors and suppliers, including circulation of solicitations to
3844 minority and female contractor associations and other business associations.
3845
3846 p. Conduct a review, at least annually, of all supervisors' adherence to and performance under
3847 the contractor's EEO policies and affirmative action obligations.
3848

3849 **10.15.** Contractors are encouraged to participate in voluntary associations, which assist in fulfilling one
3850 or more of their affirmative action obligations (10.14a through 10.14p). The efforts of a
3851 contractor association, joint contractor union, contractor community, or other similar groups of
3852 which the contractor is a member and participant, may be asserted as fulfilling any one or more
3853 of its obligations under 10.14a through 10.14p of these specifications provided that the contractor
3854 actively participates in the group, makes every effort to assure that the group has a positive impact
3855 on the employment of minorities and women in the industry, ensures that the concrete benefits
3856 of the program are reflected in the contractor's minority and female workforce participation,
3857 makes a good faith effort to meet its individual goals and timetables, and can provide access to
3858 documentation which demonstrates the effectiveness of actions taken on behalf of the contractor.
3859 The obligation to comply, however, is the contractor's and failure of such a group to fulfill an
3860 obligation shall not be a defense for the contractor's noncompliance.
3861

3862 **10.16.** A single goal for minorities and a separate single goal for women have been established. The
3863 contractor, however, is required to provide equal employment opportunity and to take affirmative
3864 action for all minority groups, both male and female, and all women, both minority and non-
3865 minority. Consequently, if the particular group is employed in a substantially disparate manner
3866 (for example, even though the contractor has achieved its goals for women generally,) the
3867 contractor may be in violation of the Executive Order if a specific minority group of women is
3868 underutilized.
3869

3870 **10.17.** The contractor shall not use the goals and timetables or affirmative action standards to
3871 discriminate against any person because of race, color, religion, sex, or national origin.
3872

3873 **10.18.** The contractor shall not enter into any subcontract with any person or firm debarred from
3874 Government contracts pursuant to Executive Order 11246.
3875

3876 **10.19.** The contractor shall carry out such sanctions and penalties for violation of these specifications
3877 and of the Equal Opportunity Clause, including suspension, termination, and cancellation of
3878 existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as
3879 amended, and its implementing regulations, by the Office of Federal Contract Compliance

3880 Programs. Any contractor who fails to carry out such sanctions and penalties shall be in violation
3881 of these specifications and Executive Order 11246, as amended.
3882

3883 **10.20.** The contractor, in fulfilling its obligations under these specifications, shall implement specific
3884 affirmative action steps, at least as extensive as those standards prescribed in paragraph 10.14 of
3885 these specifications, so as to achieve maximum results from its efforts to ensure equal
3886 employment opportunity. If the contractor fails to comply with the requirements of the Executive
3887 Order, the implementing regulations, or these specifications, the Director shall proceed in
3888 accordance with 41 CFR 60-4.8.
3889

3890 **10.21.** The contractor shall designate a responsible official to monitor all employment related activity to
3891 ensure that the company EEO policy is being carried out, to submit reports relating to the
3892 provisions hereof as may be required by the Government, and to keep records. Records shall at
3893 least include for each employee, the name, address, telephone number, construction trade, union
3894 affiliation if any, employee identification number when assigned, social security number, race, sex,
3895 status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours
3896 worked per week in the indicated trade, rate of pay, and locations at which the work was
3897 performed. Records shall be maintained in an easily understandable and retrievable form;
3898 however, to the degree that existing records satisfy this requirement, contractors shall not be
3899 required to maintain separate records.
3900

3901 **10.22.** Nothing herein provided shall be construed as a limitation upon the application of other laws
3902 which establish different standards of compliance or upon the application of requirements for
3903 the hiring of local or other area residents (e.g., those under the Public Works Employment Act
3904 of 1977 and the Community Development Block Grant Program.
3905

3906 *References: 2 CFR 200, Appendix II(C), 41 CFR § 60-1.4, 41 CFR § 60-4.3, Executive Order 11246*
3907

3908 **11. PROHIBITION OF SEGREGATED FACILITIES**

3909 **11.1** The contractor agrees that it does not and will not maintain or provide for its employees any
3910 segregated facilities at any of its establishments, and that it does not and will permit its employees
3911 to perform their services at any location under its control where segregated facilities are
3912 maintained. The contractor agrees that a breach of this clause is a violation of the Equal
3913 Opportunity clause in this contract.
3914

3915 **11.2** "Segregated facilities," as used in this clause, means any waiting rooms, work areas, rest rooms
3916 and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage
3917 or dressing areas, parking lots, drinking fountains, recreation or entertainment areas,
3918 transportation, and housing facilities provided for employees, that are segregated by explicit
3919 directive or are in fact segregated on the basis of race, color, religion, sex, or national origin
3920 because of written or oral policies or employees custom. The term does not include separate or
3921 single-user rest rooms or necessary dressing or sleeping areas provided to assure privacy between
3922 the sexes.
3923

3924 **11.3** The contractor shall include this clause in every subcontract and purchase order that is subject to
3925 the Equal Opportunity clause of this contract.
3926

3927 *References: 41 CFR § 60.*
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12. AFFIRMATIVE ACTION REQUIREMENT

12.1 The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.

12.2 The goals and timetables for minority and female participation, expressed in percentage terms for the contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Timetables:

-Goals for minority participation for each trade: 4.00
(Vol.45 Federal Register pg. 65984 10/3/80

[Participation Goals for Minorities and Females](#)

-Goals for female participation in each trade: 6.9% (Nationwide Percentage)

These goals are applicable to all of the contractor's construction work (whether or not it is Federal or federally-assisted) performed in the covered area. If the contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the contractor also is subject to the goals for both its federally involved and non-federally involved construction.

The contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from contractor to contractor or from project to project, for the sole purpose of meeting the contractor's goals, shall be a violation of the contract, the Executive Order, and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed

12.3 The contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs (OFCCP), within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed

12.4 As used in this notice and in the contract resulting from this solicitation, the "covered area" is Memphis, Scotland County, in the State of Missouri.

References: 41 CFR Part 60-4, Executive Order 11246

3981 **13. TERMINATION OF CONTRACT**

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13.1 Termination of Convenience (Construction and Equipment Contracts):

The Owner may terminate this contract in whole or in part at any time by providing written notice to the Contractor. Such action may be without cause and without prejudice to any other right or remedy of Owner. Upon receipt of a written notice of termination, except as explicitly directed by the Owner, the Contractor shall immediately proceed with the following obligations regardless of any delay in determining or adjusting amounts under this clause:

- a. Contractor must immediately discontinue work as specified in the written notice.
- b. Terminate all subcontracts to the extent they relate to the work terminated under the notice.
- c. Discontinue orders for materials and services except as directed by the written notice.
- d. Deliver to the Owner all fabricated and partially fabricated parts, completed and partially completed work, supplies, equipment and materials acquired prior to termination of the work and as directed in the written notice.
- e. Complete performance of the work not terminated by the notice.
- f. Take action as directed by the Owner to protect and preserve property and work related to this contract of which Owner will take possession.

Owner agrees to pay Contractor for:

- a. Completed and acceptable work executed in accordance with the contract documents prior to the effective date of termination;
- b. Documented expenses sustained prior to the effective date of termination in performing work and furnishing labor, materials, or equipment as required by the contract documents in connection with uncompleted work;
- c. Reasonable and substantiated claims, costs and damages incurred in settlement of terminated contracts with subcontractors and suppliers; and
- d. Reasonable and substantiated expenses to the contractor directly attributable to Owner's termination action.

Owner will not pay Contractor for loss of anticipated profits or revenues or other economic loss arising out of or resulting from the Owner's termination action.

The rights and remedies this clause provides are in addition to any other rights and remedies provided by law or under this contract.

13.2 Termination for Default (Construction):

Section 80-09 of FAA Advisory Circular 150/5370-10 establishes conditions, rights and remedies associated with Owner termination of this contract due to default of the Contractor.

13.3 Termination for Default (Equipment):

The Owner may, by written notice of default to the Contractor, terminate all or part of this Contract if the Contractor:

- a. Fails to commence the Work under the Contract within the time specified in the Notice to Proceed;
- b. Fails to make adequate progress as to endanger performance of this Contract in accordance with its terms;
- c. Fails to make delivery of the equipment within the time specified in the Contract, including any Owner approved extensions;
- d. Fails to comply with material provisions of the Contract;
- e. Submits certifications made under the Contract and as part of their proposal that include false or fraudulent statements;
- f. Becomes insolvent or declares bankruptcy;

If one or more of the stated events occur, the Owner will give notice in writing to the Contractor and Surety of its intent to terminate the contract for cause. At the Owner's discretion, the notice may allow the Contractor and Surety an opportunity to cure the breach or default.

If within ten days of the receipt of notice, the Contractor or Surety fails to remedy the breach or default to the satisfaction of the Owner, the Owner has authority to acquire equipment by other procurement action. The Contractor will be liable to the Owner for any excess costs the Owner incurs for acquiring such similar equipment.

Payment for completed equipment delivered to and accepted by the Owner shall be at the Contract price. The Owner may withhold from amounts otherwise due the Contractor for such completed equipment such sum as the Owner determines to be necessary to protect the Owner against loss because of Contractor default.

Owner will not terminate the Contractor's right to proceed with the Work under this clause if the delay in completing the work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor. Examples of such acceptable causes include: acts of God; acts of the Owner; acts of another Contractor in the performance of a contract with the Owner; and severe weather events that substantially exceed normal conditions for the location.

If, after termination of the Contractor's right to proceed, the Owner determines that the Contractor was not in default, or that the delay was excusable, the rights and obligations of the parties will be the same as if the Owner issued the termination for the convenience of the Owner.

The rights and remedies of the Owner in this clause are in addition to any other rights and remedies provided by law or under this contract

References: 2 CFR § 200 Appendix II(B), FAA Advisory Circular 150/5370-10, Section 80-09

4084 **14. CONTRACT WORKHOURS AND SAFETY STANDARDS ACT REQUIREMENTS**

4085
4086 **14.1 Overtime Requirements.** No contractor or subcontractor contracting for any part of the
4087 contract work which may require or involve the employment of laborers or mechanics shall
4088 require or permit any such laborer or mechanic, including watchmen and guards, in any workweek
4089 in which he or she is employed on such work to work in excess of forty hours in such workweek
4090 unless such laborer or mechanic receives compensation at a rate not less than one and one-half
4091 times the basic rate of pay for all hours worked in excess of forty hours in such work week.

4092
4093 **14.2 Violation; Liability for Unpaid Wages; Liquidated Damages.** In the event of any violation
4094 of the clause set forth in paragraph 14.1 above, the contractor or any subcontractor responsible
4095 therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall
4096 be liable to the United States (in the case of work done under contract for the District of Columbia
4097 or a territory, to such District or to such territory), for liquidated damages. Such liquidated
4098 damages shall be computed with respect to each individual laborer or mechanic, including
4099 watchmen and guards, employed in violation of the clause set forth in paragraph 14.1 above, in
4100 the sum of \$10 for each calendar day on which such individual was required or permitted to work
4101 in excess of the standard workweek of forty hours without payment of the overtime wages
4102 required by the clause set forth in paragraph 14.1 above.

4103
4104 **14.3 Withholding for Unpaid Wages and Liquidated Damages.** The Federal Aviation
4105 Administration (FAA) or the Owner shall upon its own action or upon written request of an
4106 authorized representative of the Department of Labor withhold or cause to be withheld, from
4107 any moneys payable on account of work performed by the contractor or subcontractor under any
4108 such contract or any other Federal contract with the same prime contractor, or any other
4109 Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which
4110 is held by the same prime contractor, such sums as may be determined to be necessary to satisfy
4111 any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as
4112 provided in the clause set forth in paragraph 14.2 of this clause.

4113
4114 **14.4 Subcontractors.** The contractor or subcontractor shall insert in any subcontracts the clauses set
4115 forth in paragraphs 14.1 through 14.4 and also a clause requiring the subcontractor to include
4116 these clauses in any lower tier subcontracts. The prime contractor shall be responsible for
4117 compliance by any subcontractor or lower tier subcontractor with the clauses set forth in
4118 paragraphs 14.1 through 14.4 of this clause.

4119
4120 *References: 2 CFR § 200 Appendix II (E)*

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4123 **15. CLEAN AIR AND WATER POLLUTION CONTROL**

4124
4125 Contractor agrees to comply with all applicable standards, orders, and regulations issued pursuant to the
4126 Clean Air Act (42 U.S.C. § 740-7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C.
4127 § 1251-1387). The Contractor agrees to report any violation to the Owner immediately upon discovery.
4128 The Owner assumes responsibility for notifying the Environmental Protection Agency (EPA) and the
4129 Federal Aviation Administration.

4130
4131 Contractor must include this requirement in all subcontracts that exceed \$150,000.

4132
4133 *References: 2 CFR § 200 Appendix II(G)*

4137 **16. BUY AMERICAN PREFERENCE**

4138
4139 The contractor agrees to comply with 49 USC § 50101, which provides that Federal funds may not be
4140 obligated unless all steel and manufactured goods used in AIP funded projects are produced in the United
4141 States, unless the FAA has issued a waiver for the product; the product is listed as an Excepted Article,
4142 Material Or Supply in Federal Acquisition Regulation subpart 25.108; or is included in the FAA
4143 Nationwide Buy American Waivers Issued list.

4144
4145 A bidder or offeror must complete and submit the Buy America certification included in Section B of the
4146 Contractor Documents with their bid or offer. The Owner will reject as nonresponsive any bid or offer
4147 that does not include a completed Certificate of Buy American Compliance.

4148
4149 *References: Title 49 U.S.C. § 50101*
4150

4151 **17. COPELAND “ANTI-KICKBACK” ACT**

4152 Contractor must comply with the requirements of the Copeland “Anti-Kickback” Act (18 U.S.C. 874 and
4153 40 U.S.C. 3145), as supplemented by Department of Labor regulation 29 CFR part 3. Contractor and
4154 subcontractor are prohibited from inducing, by any means, any person employed on the project to give
4155 up any part of the compensation to which the employee is entitled. The contractor and each subcontractor
4156 must submit to the Owner, a weekly statement on the wages paid to each employee performing on covered
4157 work during the prior week. Owner must report any violation of the Act to the Federal Aviation
4158 Administration.

4159
4160 *Reference: 2 CFR § 200 Appendix II(D), 29 CFR parts 3 & 5*
4161

4162 **18. FEDERAL FAIR LABOR STANDARDS ACT (FEDERAL MINIMUM WAGE)**

4163
4164 All contracts and subcontracts that result from this solicitation incorporate by reference the provisions of
4165 29 CFR par 201, the Federal Fair Labor Standards Act (FLSA), with the same force and effect as if given
4166 in full text. The FLSA sets minimum wage, overtime pay, recordkeeping, and child labor standards for
4167 full and part time workers. The contractor has full responsibility to monitor compliance to the referenced
4168 statute or regulation. The contractor must address any claims or disputes that arise from this requirement
4169 directly with the U.S. Department of Labor – Wage and Hour Division.

4170
4171 *Reference: 29 USC § 201, et seq.*
4172

4173 **19. OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970**

4174
4175 All contracts and subcontracts that result from this solicitation incorporate by reference the requirements
4176 of 29 CFR Part 1910 with the same force and effect as if given in full text. Contractor must provide a
4177 work environment that is free from recognized hazards that may cause death or serious physical harm to
4178 the employee. The contractor retains full responsibility to monitor its compliance and their subcontractor’s
4179 compliance with the applicable requirements of the Occupational Safety and Health Act of 1970 (20 CFR
4180 Part 1910). Contractor must address any claims or disputes that pertain to a referenced requirement
4181 directly with the U.S. Department of Labor – Occupational Safety and Health Administration.

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4183 *Reference: 20 CFR part 1910*
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4190 **20. DISTRACTED DRIVING**

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4192 **Texting When Driving.** In accordance with Executive Order 13513, "Federal Leadership on Reducing
4193 Text Messaging While Driving" (10/1/2009) and DOT Order 3902.10 "Text Messaging While Driving"
4194 (12/30/2009), THE FAA encourages recipients of Federal grant funds to adopt and enforce safety
4195 policies that decrease crashes by distracted drivers, including policies to ban text messaging while driving
4196 when performing work related to a grant or sub-grant.

4197 In support of this initiative, the Owner encourages the Contractor to promote policies and initiatives for
4198 its employees and other work personnel that decrease crashes by distracted drivers, including policies that
4199 ban text messaging while driving motor vehicles while performing work activities associated with the
4200 project. The Contractor must include the substance of this clause in all sub-tier contracts exceeding \$3,500
4201 and involve driving a motor vehicle in performance of work activities associated with the project.
4202

4203 *Reference: Executive Order 13513, and DOT Order 3902.10*
4204
4205

4206 **21. PROCUREMENT OF RECOVERED MATERIALS**

4207
4208 Contractor and subcontractor agree to comply with Section 6002 of the Solid Waste Disposal Act, as
4209 amended by the Resource Conservation and Recovery Act, and the regulatory provisions of 40 CFR Part
4210 247. In the performance of this contract and to the extent practicable, the Contractor and subcontractors
4211 are to use products containing the highest percentage of recovered materials for items designated by the
4212 Environmental Protection Agency (EPA) under 40 CFR Part 247 whenever:
4213

- 4214 a. The contract requires procurement of \$10,000 or more of a designated item during the fiscal year;
4215 or,
4216 b. The contractor has procured \$10,000 or more of a designated item using Federal funding during
4217 the previous fiscal year.
4218

4219 The list of EPA-designated items is available at www.epa.gov/epawaste/conserve/tools/cpg/products/.
4220

4221 Section 6002(c) establishes exceptions to the preference for recovery of EPA-designated products if the
4222 contractor can demonstrate the item is:
4223

- 4224 a. Not reasonably available within a timeframe providing for compliance with the contract
4225 performance schedule;
4226
4227 b. Fails to meet reasonable contract performance requirements; or
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4229 c. Is only available at an unreasonable price.
4230

4231 *Reference: 2 CFR § 200.322, 40 CFR Part 247*
4232
4233

4234 **22. RIGHTS TO INVENTIONS**

4235
4236 Contracts or agreements that include the performance of experimental, developmental, or research work
4237 must provide for the rights of the Federal Government and the Owner in any resulting invention as
4238 established by 37 CFR Part 401, Rights to Inventions Made by Non-Profit Organizations and Small
4239 Business Firms Under Government Grants, Contracts, and Cooperative Agreements. This contract
4240 incorporates by reference the patent and inventions rights as specified within 37 CFR §401.14. Contractor
4241 must include this requirement in all sub-tier contracts involving experimental, developmental or research
4242 work.
4243

4244 *References: 2 CFR § 200 Appendix II(F), 37 CFR § 401*

23. **SEISMIC SAFETY**

The contractor agrees to ensure that all work performed under this contract, including work performed by subcontractors, conforms to a building code standard that provides a level of seismic safety substantially equivalent to standards established by the National Earthquake Hazards Reduction Program (NEHRP). Local building codes that model their code after the current version of the International Building Code (IBC) meet the NEHRP equivalency level for seismic safety

Reference: 49 CFR Part 41

23. **CERTIFICATION OF BIDDER REGARDING TAX DELINQUENCY AND FELONY CONVICTIONS** (Sections 415 and 416 of Title IV, Division L of the Consolidated Appropriations Act, 2014, DOT Order 4200.6)

The bidder must complete the following two certification statements. The applicant must indicate its current status as it relates to tax delinquency and felony conviction by inserting a checkmark (✓) in the space following the applicable response. The bidder agrees that, if awarded a contract resulted from this solicitation, it will incorporate this provision for certification in all lower tier subcontracts.

Certifications

- (1) The bidder represents that it is () is not () a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.
- (2) The bidder represents that it is () is not () a corporation that was convicted of a criminal violation under any Federal law within the preceding 24 months.

Note: If a bidder responds in the affirmative to either of the above representations, the bidder is ineligible to receive an award unless the Sponsor has received notification from the agency suspension and debarment official (SDO) that the SDO has considered suspension or debarment and determined that further action is not required to protect the Government's interests. The bidder therefore must provide information to the Sponsor about its tax liability or conviction to the Sponsor, who will then notify MoDOT and/or the FAA, which will then notify the agency's SDO to facilitate completion of the required considerations before award decisions are made.

Term Definitions:

Felony Conviction: Felony conviction means a conviction within the preceding twenty-four (24) months of a felony criminal violation under any Federal law and includes conviction of an offense defined in a section of the U.S. code that specifically classifies the offense as a felony and conviction of an offense that is classified as a felony under 18 U.S.C. § 3559.

Tax Delinquency: A tax delinquency is any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.

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PART B
DBE ADMINISTRATION
Required If Federal Funds Exceed \$250,000

1. Eligibility of DBEs:

Only those firms currently certified as DBEs by the Missouri Department of Transportation (MoDOT), City of St. Louis, Metro, City of Kansas City, and Kansas City Area Transportation Authority are eligible to participate as DBEs on this contract. A list of these firms is available on MoDOT's Office of External Civil Rights webpage at the following address:

<http://www.modot.org/dbe-program/mrcc-directory>

2. Counting DBE Participation Towards DBE Goals:

DBE participation toward attainment of the goal will be computed on the basis of the subcontract prices agreed to between the contractor and subcontractors for the contract items or portions of items being sublet, as shown on the DBE Participation Form and attachments. Credit will only be given for use of DBEs that are certified or accepted according to this specification. DBE participation shall be counted toward meeting the DBE goal in accordance with the following:

a. Commercially Useful Function:

The Sponsor shall count toward the DBE goal only those expenditures to DBEs that perform a commercially useful function in the work of the contract. A DBE performs a commercially useful function when it is responsible for execution of a distinct element of work by actually performing, managing, and supervising that work. To determine if a DBE is performing a commercially useful function, the amount of work subcontracted, industry practices, and other relevant factors will be evaluated. If consistent with industry practices, a DBE shall enter into a subcontract or other contractual written agreement. A DBE Contractor may subcontract a portion of the work up to the amount allowed under standard subcontracting contract provisions of normal industry practices. A DBE is presumed not to be performing a commercially useful function if the DBE is performing outside these guidelines.

b. Materials and Supplies:

The Sponsor shall count toward the DBE goal the expenditures for materials and supplies obtained from DBE suppliers and manufacturers as described below. The DBEs must assume the actual and contractual responsibility for the provision of the materials and supplies:

- (1) The entire expenditure to a DBE manufacturer will be counted toward the DBE goal. A manufacturer must operate or maintain a factory or establishment that produces on the premises the materials or supplies that are obtained by the contractor.
- (2) Sixty percent of expenditures to a DBE regular dealer will be counted toward the DBE goal. A regular dealer must perform a commercially useful function in the supply process including buying the materials or supplies, maintaining an inventory and regularly selling materials to the public. Bulk items such as steel, cement, gravel, stone and petroleum products need not be kept in stock, but the dealer must own or operate distribution equipment.
- (3) No credit will be given toward the DBE goal if the prime contractor makes a direct payment to a non-DBE material supplier. However, it will be permissible for a material supplier to invoice the prime contractor and the DBE jointly and be paid by the prime contractor making remittance to the DBE firm and material supplier jointly.

(4) No credit toward the DBE goal will be given for the cost of materials or equipment used in a DBE firm's work when those costs are paid by a deduction from the prime contractor's payment(s) to the DBE firm.

c. Work Classifications: DBE credit will count toward the contractual goal only for work actually performed by the DBE firm and within the Standard Industry Classification (SIC) code approved for that firm. The credit will be counted in the following manner:

(1) Manufacturer: Credit is given for 100 percent of the value paid for materials furnished which become a permanent part of the project. A manufacturer is a firm that owns and operates the facilities to produce a product required by the project and purchased by the contractor.

(2) Supplier: Credit is given for 60 percent of the value paid for materials furnished which becomes a permanent part of the project. A supplier sells goods to the general public and maintains an inventory at an owned or leased warehouse or store. Bulk items such as steel, petroleum products, or rock do not have to be maintained in an on-site inventory. Credit will not be given for the cost of the materials and separate credit for the hauling of those same materials. Transportation of the materials is deemed part of the total cost.

(3) Broker: Credit is given for 100 percent of the **fees** or **commission** received by the DBE firm for materials purchased, services provided, or equipment secured and resold to the contractor. Fees or commissions are defined as the difference between what the DBE firm paid for the materials purchased, services provided, or equipment secured and the price paid by the contractor to the DBE firm for those items. A broker does not manufacture or supply on a regular basis.

(4) Trucker: Credit is given for 100 percent of the amount paid to the DBE trucker if that trucking is performed by the DBE, with employees of the DBE, using equipment owned or long-term leased by the DBE. However, if the DBE firm uses leased trucks, at least one truck owned by the firm **must** be used on the project.

Full credit will not be given for leased trucks unless they are leased on a long-term basis from another DBE firm, DBE owner operators, or a recognized commercial leasing operation. Firms licensed by the Missouri Public Service Commission as leasing agents qualify as a recognized leasing operation. Lease of trucks from the prime contractor will not be credited toward the DBE goal, other than possibly the portion constituting broker fees and commissions. This type of relationship will be subject to strict scrutiny.

All trucks used must be labeled clearly and visibly with a sign indicating the firm owning or leasing the vehicle. MoDOT will require submittal of a truck roster report, including ownership and vehicle identification information, on a regular basis. MoDOT project office or other designated personnel will review the rosters for verification and will monitor the trucks operating on the project. MoDOT will conduct random verification and report any irregularities to the External Civil Rights Unit for review.

In order for the use of a DBE trucker to be credited for the delivered price of materials supplies, the trucker must be certified as a supplier or manufacturer of the material, responsible for the quality standards of the material, negotiating the material price, payment, and select the source.

(a) Owner-Operator Trucking: The Sponsor shall count toward the DBE goal, the entire delivery fee paid to DBE owner-operators performing trucking for the contractor, if they appear on the contractor's payroll and separate records are furnished to the Sponsor documenting the expenditures. The records shall include for each owner-operator; their social security number; driver's license number; vehicle registration number; current vehicle license number; truck number; and a complete record of the contract fees paid to them.

If the DBE firm uses owner-operators to supplement their owned trucks, the DBE must be responsible for management and supervision of the entire trucking operation. The trucking arrangement or contract *cannot* be a contrived arrangement to meet the DBE goal. The DBE will be considered a broker, and only fees or commissions received will count toward the goal, if the DBE is not in full control, or does not have employees or trucks on the project.

- d. Joint Venture: When a joint venture contract is involved, the Sponsor shall count towards the DBE goal that portion of the contract total dollar value equal to the percentage of ownership and control of each DBE firm within the joint venture. Such crediting is subject to the sponsor's acceptance of the joint venture agreement. The Bidder must furnish the joint venture agreement with the DBE Participation Form. The joint venture agreement must include a detailed breakdown of the following:

- (1) Contract responsibility of the DBE for specific contract items of work,
- (2) Capital participation by the DBE,
- (3) Specific equipment to be provided by the DBE,
- (4) Specific responsibilities of the DBE regarding control of the joint venture,
- (5) Specific workers and skills to be provided by the DBE, and
- (6) Percentage distribution to the DBE of the projected profit or loss incurred by the joint venture.

The joint venture must be certified in writing by MoDOT.

3. Award Documentation and Procedure: All bidders shall certify in the Proposal Form their intent to meet or exceed the established goal or to demonstrate good faith efforts to meet the goal. Failure to make such certification or failure to demonstrate good faith efforts will render a bid non-responsive and will not be considered.

- a. DBE Participation Information: All bidders must complete the required DBE participation information in the Proposal Form, when a DBE goal has been established for the project. The information shall demonstrate the contractor's intended participation by certified DBEs. The information furnished shall consist of:

- (1) The names and addresses of DBE firms that will participate in the contract;
- (2) A description of the work that each DBE will perform;
- (3) The dollar amount of the participation of each DBE firm;
- (4) Written documentation (signed contract proposal) of the bidder/offeree's commitment to use a DBE subcontractor whose participation it submits to meet a contract goal;
- (5) If the contract goal is not met, evidence of good faith efforts (see paragraph c below).

(Note: After award of the contract, the MoDOT External Civil Rights Office will contact by mail each DBE firm participating in the contract, requesting written confirmation from the DBE that it is participating in the contract as provided in the Proposal Form.)

- b. Sponsor Evaluation: In selecting the lowest responsible bidder, the Sponsor and MoDOT will evaluate the DBE information provided with the bid. The Sponsor and MoDOT may request additional DBE information. Prior to awarding the contract the Sponsor will verify verbally and/or in writing that the information submitted by the apparent successful bidder is accurate and complete.

- c. Good Faith Efforts: If the bidder is unable to meet the DBE goal, the bidder must submit, as part of its bid, written documentation and evidence of good faith efforts taken to meet the goal. Good faith efforts conducted after the bid opening will not be considered adequate to fulfill these bid requirements. Good faith efforts may include but are not limited to:

- (1) Efforts to select portions of the work for performance by DBEs, in order to increase the likelihood of achieving the DBE goal. This can include, but is not limited to, breaking down contracts into

economically feasible units to facilitate DBE participation. Selection of portions of work shall be at least equal to the DBE goal.

- (2) Written notification to individual DBEs likely to participate in the contract sent at least 7 calendar days prior to the bid opening. The notification shall list specific items or types of work and shall be sent to a reasonable number of DBE's qualified to participate in the contract.
- (3) Efforts to negotiate with DBEs for specific items of work including:
 - (a) Names, addresses, and telephone numbers of DBEs who were contacted, the dates of initial contact and information on further contacts made to determine with certainty if the DBEs were interested. Personal or phone contacts are expected;
 - (b) Description of the information provided to the DBEs regarding the plans, specifications and estimated quantities for portions of the work to be performed;
 - (c) Individual statements as to why agreements with DBEs were not reached; and
 - (d) Information on each DBE contacted but rejected and the reasons for the rejection.
- (4) Efforts to assist the DBEs that need assistance in obtaining bonding, insurance, or lines of credit required by the contractor.
- (5) Documentation that qualified DBEs are not available or not interested.
- (6) Advertisements in general circulation media, trade association publications and disadvantaged-focus media concerning subcontracting opportunities.
- (7) Efforts to use the services of available disadvantaged community organizations; disadvantaged contractor's groups; local, state and federal disadvantaged business assistance offices; and other organizations that provide assistance in recruitment and placement of DBEs.

The demonstration of good faith efforts by the contractor must prove the contractor actively and aggressively sought out DBEs to participate in the project. The following actions would not be considered acceptable reasons for failure to meet the DBE goal and would not constitute a good faith effort:

- (1) The DBE was unable to provide adequate performance and/or payment bonds.
- (2) A reasonable DBE bid was rejected based on price.
- (3) The DBE would not agree to perform the subcontract work at the prime contractors unit bid price.
- (4) Union versus non-union status of the DBE firm.
- (5) The prime contractor would normally perform all work included in this contract.
- (6) The prime contractor solicited DBE participation by mail only.

Should MoDOT and the city determine that the bidder's submitted documentation on good faith efforts are inadequate, the bidder must make a written request for administrative reconsideration within 2 working days of the notification on lack of good faith efforts. That notice may be faxed or emailed to:

Missy Stuedle
External Civil Rights Director
P.O. Box 270
Jefferson City, Missouri 65102
Telephone: (573) 526-2978
Fax: (573) 526-0558
E-Mail: Missy.Stuedle@modot.mo.gov

The Administrative Reconsideration Committee will include 3 individuals MoDOT deems appropriate and the members will be familiar with the DBE program, bidding, construction, and/or contracting

4538 matters. The External Civil Rights Unit will process the request, including providing documentation of
4539 the determination, and notify the Administrative Reconsideration Committee of the request for review,
4540 however, the administrator, nor any member of MoDOT that had a part in the initial determination will
4541 be a part of the reconsideration determination.

4542
4543 As part of this reconsideration, the bidder will have the opportunity to provide written documentation or
4544 argument concerning the issue of whether it met the goal or made adequate good faith efforts to do so to
4545 the committee. The bidder may choose to meet in person with the Administrative Reconsideration
4546 Committee to discuss the finding. MoDOT and the city will notify the bidder, in writing of the decision
4547 on reconsideration, explaining the basis for finding that the bidder did or did not make adequate good
4548 faith efforts to meet the goal. The result of the reconsideration process is not administratively appealable
4549 to the USDOT.
4550

- 4551 4. Post Award Compliance: If the contract is awarded on less than full DBE goal participation, the contractor is
4552 not relieved of the responsibility to make a determined effort to meet the full goal amount during the life of
4553 the contract. In such a case, the contractor shall continue good faith efforts throughout the life of the contract
4554 to increase the DBE participation to meet the contract goal.
4555

4556 If a DBE is unwilling or unable to perform the work specified, the contractor shall request from the Sponsor
4557 and FAA, relief from the obligation to use that DBE. Efforts will be made by the contractor to acquire from
4558 the DBE a letter which states the reason the DBE is unwilling or unable to complete its obligations under the
4559 project. If this results in a DBE contract shortfall, the contractor shall immediately take steps to obtain another
4560 certified DBE to perform an equal dollar value of allowable credit. If a new DBE cannot be found, the
4561 contractor shall submit evidence of good faith efforts within 15 calendar days of the request for relief. The
4562 contractor shall submit the new DBE's name, address, work items and the dollar amount of each item. The
4563 sponsor and the FAA shall approve the new DBE before the DBE starts work.
4564

4565 If the contractor fails to conform to the approved DBE participation or if it becomes evident that the
4566 remaining work will not meet the approved participation, then the contractor shall submit evidence showing
4567 either how the contractor intends to meet the DBE participation, or what circumstances have changed
4568 affecting the DBE participation. If the sponsor is not satisfied with the evidence, then liquidated damages
4569 may be assessed for the difference between the approved and actual DBE participation.
4570

- 4571 5. Records and Reports: The contractor shall keep records as necessary to determine compliance with the DBE
4572 obligations. The records shall include but are not limited to:
4573
4574 a. Record of DBE Participation: The names of disadvantaged and non-disadvantaged subcontractors,
4575 regular dealers, manufacturers, consultant and service agencies; the type of work or materials or services
4576 performed on or incorporated in the project; and the actual value of such work.
4577
4578 b. Efforts to Utilize DBE Firms: Documentation of all efforts made to seek out disadvantaged contractor
4579 organizations and individual disadvantaged contractors for work on this project. All correspondence,
4580 personal contacts, telephone calls, etc., to obtain the services of DBE's should be documented.
4581
4582 c. Final DBE Certification: Upon completion of the individual DBE firm's work, the prime contractor shall
4583 submit a certification attesting to the actual work performed by the DBE firm and the amount paid the
4584 DBE firm. This certification shall be signed by both the prime contractor and the DBE firm.
4585
4586
4587

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PART C – LOCAL PROVISIONS

1. HAUL ROADS:

The Contractor shall obtain approval from the Engineer prior to establishing haul roads within the airport property. Once established, the haul roads shall be utilized for all equipment traffic, and the equipment shall not be allowed to stray or wander away from the established routes. The haul roads shall be the responsibility of the Contractor and shall be maintained and kept in good order at all times. Water, when required, shall be applied at the locations and in the amounts necessary to minimize dust and dirt in the air operations area. Haul roads across any active runway or taxiway shall be kept clean and in good order at all times. The Contractor shall repair any damage caused by the movement of equipment on any of the haul roads, whether in designated or undesignated areas. After completion of the project, the Contractor shall be required to re-grade any unpaved portions of the haul road and to reseed the area with local native grasses to match the existing conditions of the area. The performance of any work as specified by this provision, including watering, maintenance, and repair of the haul roads, shall not be measured and paid for directly, but shall be considered as necessary and incidental to the work.

Establishment of haul roads off of Airport property shall be the sole responsibility of the Contractor.

2. AIRPORT SECURITY:

The Contractor will be required to submit to the airport prior to the commencement of construction, evidence in the form of a certification letter that all of their employees who will have unescorted access to the AOA have been checked for employment, security, and criminal history for the last ten years. The letter will also certify that these employees meet all security regulations as required by the Sponsor's security program.

During the course of the construction operations, the Contractor will be allowed to utilize a maximum of two (2) airport access "Security Gates" as entrance to the construction site. This gate and the associated haul roads shall be designated by the Engineer. The Contractor shall be required to keep this gate guarded and closed during construction hours. The gate may be opened only for authorized vehicle traffic flow. At such times as this gate is not guarded, it shall be closed and securely locked. The Contractor will be required to obtain an "airport security" permit from the Office of the Airport Manager for all vehicles and personnel used on the construction project. Said permit shall hold the Contractor responsible for all vehicles and personnel on the airport property other than those that have individual authorization. All authorized vehicles and construction equipment must display a three foot by three foot flag with international orange and white 12 inch squares displayed in full view above the vehicles. Passengers in any authorized vehicles shall be the responsibility of the Contractor. The "gate guard" shall allow no unauthorized vehicle or person to enter the "air operations" side of the airport without the above stipulated "security clearance." The Contractor and the Contractor's "security gate guard" shall be held duly responsible to uphold the above security stipulations at all times during the progress of the construction project. No deviations from these security measures shall be allowed at any time. There shall be a \$1,000.00 penalty for each deviation from these security provisions.

3. RADIO COMMUNICATIONS:

The Contractor's superintendent and flagman shall be required to monitor transceiver radios tuned to the 122.90000000000001 MHz frequency at all times. Radios shall be supplied by the Contractor. Such radios shall be used to obtain proper clearance in regard to the movement of equipment, trucks, etc., on the airport. Further, any unusual occurrences in the flight pattern of approaching or departing aircraft shall be acknowledged by all concerned so that operation of the airport and the construction work can be safely carried on at all times.

4642 **4. WORK SCHEDULE:**

4643
4644 Immediately after the award of contract, the Contractor shall file with the Engineer a time chart or
4645 schedule of proposed progress, a plan of construction and proposed detailed methods of carrying out the
4646 work, including a full statement of equipment and equipment layout for the job.

4647
4648 The Sponsor reserves the right to request changes in the sequence of project schedules if such change is
4649 required in the interest of safety or airport operation.

4650
4651 **5. CONTRACTOR'S QUALITY CONTROL PROGRAM:**

4652
4653 The contractor and their chosen testing laboratory shall submit a quality control plan submitted and
4654 approved prior to the Notice to Proceed (NTP). The quality control plan should contain the following
4655 items:

- 4656
4657 a. Names of testing laboratories and consulting engineer firms with quality control responsibilities
4658 on the project, together with a description of the services to be provided.
- 4659
4660 b. Procedures for the testing laboratories to meet the requirements of the applicable ASTM,
4661 AASHTO or other standards referenced in the contract specifications.
- 4662
4663 c. Qualifications of engineering supervision and construction inspection personnel.
- 4664
4665 d. A listing of all tests required by the contract specifications, including the type and frequency of
4666 tests to be taken, the method of sampling, the applicable test standard, and the acceptance criteria
4667 or tolerance permitted for each type of test.
- 4668
4669 e. Procedures for ensuring that the tests are taken in accordance with the program, that they are
4670 documented daily, that the proper corrective actions, where necessary, are undertaken, and that
4671 the quantity of materials used is adequate.

4672
4673 **6. SEQUENCE OF WORK:**

4674
4675 The Contractor will be required to accomplish the work items according to the schedule of construction
4676 as submitted to the Engineer following the award of the contract. Prior to closing any taxiways or apron
4677 area, they shall be marked in conformance with the FAA Advisory Circular 150/5340-1 latest edition.
4678 This shall consist of placing barricades and flashers on each taxiway and closed runway crosses on the
4679 effected runways. Flashers must be well anchored so they do not blow over from jet blasts or strong
4680 winds. Closed taxiway, apron area, and other airfield markings and maintenance of these items are
4681 considered a necessity and an incidental part of the work, and no separate measurement or payment will
4682 be made. The Contractor shall consider the costs and distribute them to the various bid items.

4683
4684 The Contractor shall not allow men or equipment within **60** feet of any runway centerline or within **25**
4685 feet of the centerline of any taxiway, nor shall he permit materials to be stored or stocked within **200** feet
4686 of any runway centerline or within **45** feet of the centerline of any taxiway during the entire period of this
4687 project without first obtaining approval of the Engineer. When the Contractor's operations require the
4688 closing of any runway or taxiway, the Contractor shall mark said runway or taxiway in accordance with the
4689 plans and specifications at no additional cost to the Sponsor.

4690
4691 Prior to construction on any taxiway or runway, the Contractor shall, upon approval by the Engineer,
4692 close the taxiway or runway and begin work. The Contractor shall be responsible for clearly marking and
4693 defining the closed taxiways or runways by use of warning lights, barricades, flags and closed taxiway or
4694 runway markings in conformance with FAA Advisory Circular 150/5370-2 latest edition. The Contractor
4695 shall be responsible for maintaining these barricades and keeping them clearly visible at all times.

The Sponsor shall meet with the Contractor immediately after the award of the contract to work up the sequence of work for the project.

7. CLOSURE OF AIR OPERATIONS AREAS:

Barricades are considered a necessary and incidental part of the work and no separate measurement or payment will be made therefore. The Contractor shall consider the costs and distribute them to the various bid items.

8. ACCIDENT PREVENTION:

Precautions shall be exercised at all times for the protection of persons (including employees) and property, and that the safety provisions of applicable laws and of applicable building construction codes shall be observed, and that machinery, equipment, and explosives shall be guarded and all hazards shall be eliminated in accordance with the safety provisions of the Manual of Accident Prevention in Construction, published by the Associated General Contractors of America, to the extent that such provisions are not in contravention of applicable law.

9. EXISTING UNDERGROUND CABLES:

The FAA shall attempt to locate all of their underground cables that are located in the vicinity of the work areas, prior to construction in the area. The Contractor shall attempt to locate the Sponsor's and all other public underground cables prior to construction. Damage to the underground cables through negligence on the part of the Contractor will require replacement by the Contractor at no cost to the Sponsor. Any splicing or replacing of damaged cable shall meet current FAA specifications.

10. UTILITIES:

Any utilities required by the Contractor for the prosecution of the work shall be paid for by said Contractor.

11. INSURANCE:

The Contractor shall pay for and maintain during the life of this contract adequate Workmen's Compensation, Public Liability and Property Damage Insurance. The Contractor is charged with the responsibility for adequate and proper coverage for all his subcontract operations. Contractor shall furnish to the Sponsor satisfactory proof of carriage of the insurance required. Public Liability Insurance shall be in the amount of not less than \$1,000,000.00 for injuries, including accidental death, to any one person, nor less than \$1,000,000.00 on account of any one accident. Property Damage Insurance shall be carried in an amount not less than \$1,000,000.00. Such Liability Insurance shall include completed operation coverage.

12. INDEMNIFICATION:

The Contractor agrees to indemnify and save harmless City of Memphis, its officers, agents, and employees, against any and all damages to property or injuries to or death of any person or persons, including property and employees or agents of City of Memphis, and further agrees to defend, indemnify and save harmless, City of Memphis, its officers, agents, and employees from any claims, demands, suits, actions, proceedings of any kind or nature resulting from or arising out of operations in connection herewith, including operations of subcontractors and acts of omissions of employees or agents of the Contractor or his subcontractors.

4748 **13. SALES AND USE TAXES:**

4749
4750 Construction and building materials sold to the contractors and subcontractors for use on public works
4751 owned by City of Memphis, are exempt from State Sales and Use Taxes. However, such materials will be
4752 subject to any Sales and Use Taxes imposed by local cities and counties. This change in the State Tax Law
4753 has no effect of Sales and Use Taxes imposed by other local taxing authorities. Contractor shall provide
4754 proof of exemption prior to commencing work.
4755

4756 **14. PERMITS AND COMPLIANCE WITH LAWS:**

4757
4758 The Contractor shall procure and pay for all permits, licenses, and bonds necessary for the prosecution of
4759 his work, and/or required by Local, State, and Federal regulations and laws, as pertains particularly to
4760 permits and transportation of materials and equipment, or other operations which are not a specific
4761 requirement of these specifications. The Contractor shall give all notices, pay all fees and taxes, and
4762 comply with all Federal, State, and Local laws, ordinances, rules, and regulations, and building and
4763 construction codes bearing on the conduct of the work.
4764

4765 **15. EXECUTED CONTRACTS:**

4766
4767 Each contract shall be executed in five original copies and there shall be executed originals of the
4768 Contractor's Performance Bond and Payment Bond in equal number to the executed originals of the
4769 contract. Two copies of such executed documents will be retained by City of Memphis, one copy shall be
4770 delivered to the FAA, and two copies will be delivered to the Contractor. The cost of executing the
4771 Contract, bonds and insurance, including all notary fees and incidental expenses are to be paid by the
4772 Contractor to whom the contract is awarded.
4773

4774 **16. SUBLETTING OR ASSIGNING OF CONTRACTS:**

4775
4776 The Contractor shall perform, with his organization, an amount of work equal to at least 50 percent of
4777 the total contract cost. No assignment by the Contractor of any principal construction contract or any
4778 part thereof or of the funds to be received thereunder by the Contractor will be recognized unless such
4779 assignment has received the prior written approval of the Sponsor, which shall be at Sponsor's sole
4780 discretion, and the Surety has been given due notice of such assignment and has also consented in writing
4781 thereto.
4782

4783 Such written approval of the Sponsor shall not relieve the Contractor of any obligation incurred by him,
4784 under the contract, unless otherwise expressly stated in the approval.
4785

4786 The following language must appear in any assignment:

4787
4788 "It is agreed that the funds to be paid to the assignee under this assignment are subject to a prior lien for
4789 services rendered or materials supplied for the performance of the work called for in said contract in favor
4790 of all persons, firms, or corporations rendering such services or supplying such materials."
4791

4792 **17. QUALIFICATION OF DISADVANTAGED BUSINESS ENTERPRISES:**

4793
4794 A Contractor, or subcontractor, will be considered as certified if that company has received a letter of
4795 certification from an organization, whose procedures for certifying business, is acceptable to the FAA.
4796

4797 A Contractor is permitted to use 100 percent of the Contract amount for the unit of work if the Contractor,
4798 or subcontractor, performs the construction, installation, rehabilitation, etc. of that work item(s).
4799

4800 A Contractor is permitted to use only 60 percent of the Contract amount for the purchase of material
4801 from a certified DBE supplier.

The Contractor is required to submit, to the Engineer, the names, work terms and contract value of all subcontractors, prior to commencing work. The Contractor is required to submit the names, work items and final contract amounts of all subcontractors after the substantial completion of the project

18. LIQUIDATED DAMAGES:

Subject to the provisions of the Contract Documents, the Sponsor shall be entitled to liquidated damages for failure of the Contractor to complete the work within the specified contract time.

The Contractor further agrees to pay liquidated damages for failure to complete the work within the specified contract time and for expenses incurred by the Sponsor for unscheduled employment of the Engineer during the contract time overrun.

As compensation for non-use, the Contractor shall be assessed a liquidated damage of \$750/calendar day(s) for each day that the work remains uncompleted beyond the contract period. As compensation for expenses incurred for unscheduled employment of the Engineer, up to \$1,800/Calendar day for the construction manager plus up to \$1,400/Calendar day for each additional resident engineer plus any incurred expenses (per diem, lodging, etc.) will be charged to the Contractor for that time which exceeds the number of calendar day(s) allowed in this paragraph. Further, each phase of work under the project has additional liquidated damage clauses, as outlined in Section 80-08 FAILURE TO COMPLETE ON TIME.

The Contractor further agrees to pay compensation for the unscheduled employment of the Engineer (and their Sub-Contractors) necessitated by the Contractor for any of the following: 1) working more than ten (10) hours per day, 2) furnishing materials or equipment not in conformance with the Contract Documents necessitating redesign, retesting, or additional review time by the Engineer and their Sub-Contractors, and 3) working beyond the time of completion established in the Notice to Proceed with Construction according to the following hourly rates:

<u>Description</u>	<u>Straight Time</u>
Staff Engineer	\$178/hr.
Engineer	\$145/hr.
Out of Pocket Cost, material, equipment, supplies, transportation, subsistence	At Cost
<u>Sub-Contractor (Quality Assurance Testing)</u>	<u>Straight Time</u>
Project Engineer	\$80/hr.
Field Technician	\$50/hr.
Out of Pocket Cost, material, equipment, supplies, transportation, subsistence	At Cost

Compensation shall be paid by deduction from monthly progress payments and the final payment.

The engineering budget will be analyzed at the end of the project to determine whether any unscheduled employment of the Engineer, during the scheduled contract time, resulted in a cost savings to the Sponsor. If, as a result of working more than (10) ten hours per day, the Contractor completes the project within the scheduled contract time, and if the overtime results in a reduced contract time and cost savings to the Sponsor, no liquidated damages will be assessed for the unscheduled employment of the Engineer during the scheduled contract time. Liquidated damages will be assessed as stipulated for each day the work remains uncompleted beyond the scheduled contract time.

19. ACCEPTANCE TESTING:

Acceptance testing shall be the responsibility of the Engineer.

4856
4857 **20. GRADE CONTROL AND SURFACE TOLERANCE:**
4858

4859 The Contractor will be required to provide a minimum of one 2-person survey crew on site at all times
4860 during the work to assure compliance with Section 100 of the General Provisions and to provide the
4861 following at a minimum.
4862

- 4863 1. Provide all construction staking as required by Section 50 of the General Provisions.
- 4864
- 4865 2. Provide continuous straight edging records on a daily basis to the Engineer and under the direct
4866 observation/supervision of the Engineer as required. Submit results on forms provided by the
4867 Engineer. These will be accepted on a lot basis by the Engineer.
4868
- 4869 3. Provide daily grade tolerance surveys for completed courses of pavement to assure grade
4870 tolerances are being met. All survey data shall be provided in electronic ASCII format (or
4871 equivalent as approved by the engineer) and shall include Point Number, Northing, Easting,
4872 Elevation, and Description (PNEZD format). All point descriptions shall be coded in accordance
4873 with the naming convention specified in the contractor's "Point Description Key Code" as
4874 provided to the engineer prior to the beginning of construction.
4875
- 4876 4. Assist in other verification surveys during roto-milling operations, field design adjustments, and
4877 as-built survey work as required at the direction of the Engineer.
4878

4879 **21. CONSTRUCTION MANAGEMENT PLAN:**
4880

4881 The Contractor and testing firm are required to prepare a Quality Control Program as required under
4882 SECTION 100, CONTRACTOR QUALITY CONTROL PROGRAM, of the General provisions. The
4883 Contractor shall obtain from the testing laboratory a proposed schedule of material testing submitted on
4884 forms provided by the Engineer, an example of which, is included following this specification. The
4885 requirements for the quality control program specified under Section 100 shall formulate a portion of the
4886 **CONSTRUCTION MANAGEMENT PLAN (CMP)** required under this item.
4887

4888 The Engineer will assemble and submit the CMP. The Contractor must complete sections of the CMP as
4889 indicated on the following pages. All sections indicated to be completed by the Contractor must be titled
4890 as shown. Other sections will be completed by the Engineer as indicated. The plan will be submitted to
4891 the Sponsor and FAA for approval a minimum of 10 days prior to construction. Approval of the CMP
4892 must be obtained prior to commencing any paving operations. Changes in the Contractor's personnel,
4893 sub-contractor's personnel, testing laboratory's personnel or testing procedures will require revision to the
4894 plan. The Contractor is required to submit any changes immediately to the Engineer.
4895

4896 The following outline shall be utilized as a guide for preparation of the CMP. Modifications may be
4897 incorporated as approved by the Engineer.
4898

- 4899 I. Introduction/Summary (Completed by Engineer)
- 4900
- 4901 II. Personnel
- 4902
- 4903 1. Name of Sponsor representatives who have responsibility and authority for
4904 contract administration. (by Engineer)
- 4905 2. Consulting Engineer and staff showing qualifications, experience and project
4906 responsibilities. (by Engineer)
- 4907 3. Contractor project personnel and responsibilities. (by Contractor)

- 4908 4. Quality Control Testing Laboratory project personnel and responsibilities. (by
4909 Contractor)
- 4910 5. Acceptance Testing Laboratory project personnel and responsibilities (by
4911 Certified Testing Firm)
- 4912
- 4913 III. Inspection Procedures and Frequencies (by Contractor) (Refer to Section 100)
- 4914
- 4915 IV. Submittal Process (by Contractor) (Refer to Section 100)
- 4916
- 4917 V. Quality Control Testing (by Contractor) (Refer to Section 100)
- 4918
- 4919 VI. Acceptance Testing (by Certified Testing Firm)
- 4920
- 4921 VII. Test Results
- 4922
- 4923 1. Quality Control Testing (by Contractor) (Refer to Section 100)
- 4924 2. Acceptance Testing (by Certified Testing Laboratory)
- 4925
- 4926 VIII. Final Test and Quality Control Report (by Contractor)
- 4927

4928 At the end of the project and prior to final inspection and reduction of contract retainage, the prime
4929 contractor shall prepare and submit to the engineer for review and for FAA concurrence a final project
4930 summary report. Two bound copies and one loose leaf copy shall be submitted. The report shall include
4931 a summary of all tests taken with results, plus a narrative explaining the action taken for all failing tests
4932 within the context of the specifications. The Contractor shall correlate required tests shown in the
4933 specifications to those accomplished. Copies of all Certificates of Compliance for each material installed
4934 shall be included in the section pertaining to that material. Examples of typical Certificates of Compliance
4935 are for bituminous material, cement, fly ash, antistripping agent, pavement paint, etc. This summary shall
4936 contain all referenced material tests required by the Quality Control Program outlined in Section 100 of
4937 these specifications. In addition, it shall summarize all acceptance testing results.

4938

4939 The report shall be bound in booklet form with divisions for each bid item, i.e., excavation, base courses,
4940 pavement materials, electrical items, drainage items and any other materials. Each section shall be clearly
4941 marked with a divider including the section name and section table of contents. The report must contain
4942 a summary of all tests by lot or pay item, highlighted to indicate failed tests and/or reduced pay results,
4943 and reference to any approved change order that accepted any out of tolerance material. The individual
4944 sections shall begin with a narrative discussing any failed tests followed by a summary of the testing
4945 required and accomplished during the progress of the work. Within each section, the Contractor shall
4946 summarize individual test results in the format indicated on the following test summary forms provided
4947 by the Engineer. The forms are available in Microsoft Word format upon request. Additional or updated
4948 forms may be substituted by the Engineer prior to construction.

4949

4950 Any airfield lighting, electrical fixtures or other equipment used in the project shall have instruction books
4951 or factory installation sheets showing exploded views of the assembled parts with trouble shooting tips
4952 clearly shown. This information is of the type normally supplied by the manufacturer but must be in a
4953 presentable form. Single line wiring diagrams and circuit directories shall also be included in the summary
4954 with any recommended maintenance procedures suggested by the supplier or manufacturer.

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4956 ***Contractor is responsible for providing information before Notice to Proceed.***

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22. INSTRUCTION MANUALS:

At the end of project construction, the Contractor shall provide to the airport three instruction manuals. The manuals shall include as a minimum the following:

1. Names, addresses, and phone numbers of electrical equipment suppliers/manufacturers.
2. Component parts list with manufacturer and part number.
3. Final wiring diagrams of lighting control system (where a new control panel and/or control system is installed).
4. Equipment schematic and wiring diagrams showing all components cross referenced to the parts list.
5. Installation manuals.
6. Maintenance and troubleshooting instruction.
7. Operating instructions.
8. Equipment Warranties.

Manuals for each piece of equipment provided shall be separated by dividers. The dividers shall be labeled accordingly. Three ring binders marked with the project schedule(s), date of final inspection, as well as Contractor's electrical subcontractors' names, addresses, and phone numbers.

23. LAND DISTURBANCE PERMIT (LDP) AND STORMWATER POLLUTION PREVENTION PLAN (SWPPP):

The construction of this project will require a LDP from the Missouri Department of Natural Resources (MoDNR). The Engineer and City are responsible for obtaining the LDP and development of the SWPPP. The LDP requires adherence to the SWPPP developed for this project. The Contractor is required to comply with both the LDP and SWPPP in addition to inspecting and maintaining erosion control measures as outlined in the Contract Plans and Specifications for this project.

If the Contractor fails to comply with the LDP, SWPPP, Contract Documents and Specifications, any penalties for LDP and SWPPP noncompliance assessed by MoDNR will be the responsibility of the Contractor and deducted from the awarded contract amount.

PART D

FEDERAL AND STATE WAGE RATES

4999 The Contractor shall post the prevailing wage rates on the project in a prominent and accessible place.

5000

5001 The Contractor and any Subcontractor shall submit weekly certified copies of their payrolls to the Owner. All
5002 payrolls must be submitted to Owner prior to contract acceptance and final payment. The Contractor shall file
5003 with the Owner an affidavit that he has complied with all requirements of the prevailing wage law. The affidavit
5004 shall accompany or precede the Contractor's request for final payment.

5005

5006 Section 290.250 of reference law requires that the Contractor shall forfeit as a penalty to the Owner \$100,000
5007 dollars for each workman employed, for each calendar day, or portion thereof, such workman is paid less than the
5008 stipulated rates for any work done under said contract, by him or by any Subcontractor under him.

5009

5010 The Contractor's Bond shall include such provisions as will guarantee the faithful performance of the prevailing
5011 hourly wage law.

5012

5013

"General Decision Number: M020200001 04/24/2020

Superseded General Decision Number: M020190001

State: Missouri

Construction Types: Heavy and Highway

Counties: Missouri Statewide.

HEAVY AND HIGHWAY CONSTRUCTION PROJECTS

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.80 for calendar year 2020 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.80 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2020. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/03/2020
1	01/24/2020
2	02/07/2020
3	02/14/2020
4	03/13/2020
5	04/03/2020
6	04/24/2020

CARP0002-002 05/01/2019

ST. LOUIS COUNTY AND CITY

	Rates	Fringes
Carpenters.....	\$ 38.02	17.77

CARP0005-006 05/03/2015

CASS (Richards-Gebauer AFB ONLY), CLAY, JACKSON, PLATTE AND RAY
COUNTIES

	Rates	Fringes
Carpenters:		
CARPENTERS & LATHERS.....	\$ 36.34	15.55
MILLWRIGHTS & PILEDRIVERS...	\$ 36.34	15.55

CARP0011-001 05/01/2019		

	Rates	Fringes
Carpenter and Piledriver		
ADAIR, AUDRAIN (West of Hwy 19), BOONE, CALLAWAY, CHARITON, COLE, COOPER, HOWARD, KNOX, LINN, MACON, MILLER, MONITEAU, MONROE, OSAGE, PUTNAM, RANDOLPH, SCHUYLER, SHELBY AND SULLIVAN COUNTIES.....	\$ 32.28	17.77
ATCHISON, ANDREW, BATES, CALDWELL, CARROLL, DAVIESS, DEKALB, GENTRY, GRUNDY, HARRISON, HENRY, HOLT, LIVINGSTON, MERCER, NODAWAY, ST. CLAIR, SALINE AND WORTH COUNTIES.....	\$ 30.76	17.77
AUDRAIN (East of Hwy.19), RALLS, MARION, LEWIS, CLARK AND SCOTLAND COUNTIES.	\$ 32.29	17.77
BARRY, BARTON, CAMDEN, CEDAR, CHRISTIAN, DADE, DALLAS, DOUGLAS, GREENE, HICKORY, JASPER, LACLEDE, LAWRENCE, MCDONALD, NEWTON, OZARK, POLK, STONE, TANEY, VERNON, WEBSTER AND WRIGHT COUNTIES.	\$ 30.36	17.77
BENTON, MORGAN AND PETTIS...	\$ 30.81	17.77
BOLLINGER, BUTLER, CAPE GIRARDEAU, DUNKLIN, MISSISSIPPI, NEW MADRID, PEMISCOT, PERRY, STE. GENEVIEVE, SCOTT, STODDARD AND WAYNE COUNTIES.....	\$ 32.14	17.77
BUCHANAN, CLINTON, JOHNSON AND LAFAYETTE COUNTIES.....	\$ 31.49	17.77
CARTER, HOWELL, OREGON AND RIPLEY COUNTIES.....	\$ 31.09	17.77
CRAWFORD, DENT, GASCONADE, IRON, MADISON, MARIES, MONTGOMERY, PHELPS, PULASKI, REYNOLDS, SHANNON AND TEXAS COUNTIES.....	\$ 32.13	17.77
FRANKLIN COUNTY.....	\$ 35.56	17.77

JEFFERSON AND ST. CHARLES		
COUNTIES.....	\$ 38.02	17.77
LINCOLN COUNTY.....	\$ 34.00	17.77
PIKE, ST. FRANCOIS AND		
WASHINGTON COUNTIES.....	\$ 32.92	17.77
WARREN COUNTY.....	\$ 34.44	17.77

ELEC0001-002 07/14/2019

BOLLINGER, BUTLER, CAPE GIRARDEAU, CARTER, DUNKLIN, FRANKLIN,
IRON, JEFFERSON, LINCOLN, MADISON, MISSISSIPPI, NEW MADRID,
PEMISCOT, PERRY, REYNOLDS, RIPLEY, ST. CHARLES, ST. FRANCOIS,
ST. LOUIS (City and County), STE. GENEVIEVE, SCOTT, STODDARD,
WARREN, WASHINGTON AND WAYNE COUNTIES

	Rates	Fringes
Electricians.....	\$ 39.30	15.81

ELEC0002-001 09/01/2018

ADAIR, AUDRAIN, BOONE, CALLAWAY, CAMDEN, CARTER, CHARITON,
CLARK, COLE, COOPER, CRAWFORD, DENT, FRANKLIN, GASCONADE,
HOWARD, HOWELL, IRON, JEFFERSON, KNOX, LEWIS, LINCON, LINN,
MACON, MARIES, MARION, MILLER, MONITEAU, MONROE, MONTGOMERY,
MORGAN, OREGON, OSAGE, PERRY, PHELPS, PIKE, PULASKI, PUTNAM,
RALLS, RANDOLPH, REYNOLDS, RIPLEY, ST. CHARLES, ST. FRANCOIS,
ST. LOUIS (City and County), STE. GENEVIEVE, SCHUYLER,
SCOTLAND, SHANNON, SHELBY, SULLIVAN, TEXAS, WARREN AND
WASHINGTON COUNTIES

	Rates	Fringes
Line Construction:		
Equipment Operator.....	\$ 39.50	19.96
Groundman & Truck Driver....	\$ 30.36	16.67
Lineman & Cable Splicer.....	\$ 45.90	22.27

ELEC0053-004 01/01/2020

	Rates	Fringes
Line Construction: (ANDREW, ATCHINSON, BARRY, BARTON, BUCHANAN, CALDWELL, CEDAR, CHRISTIAN, CLINTON, DADE, DALLAS, DAVIES,, DEKALB, DOUGLAS, GENTRY, GREENE, GRUNDY, HARRISON, HICKORY, HOLT, JASPER, LACLEDE, LAWRENCE, LIVINGSTON, MCDONALD, MERCER, NEWTON, NODAWAY, OZARK, POLK, ST. CLAIR, STONE, TANEY, VERNON, WEBSTER, WORTH AND WRIGHT COUNTIES)		

Groundman Powderman.....	\$ 32.27	16.09
Groundman.....	\$ 30.12	15.38
Lineman Operator.....	\$ 43.40	19.30
Lineman.....	\$ 47.30	20.45

Line Construction; (BATES,
BENTON, CARROLL, CASS, CLAY,
HENRY, JACKSON, JOHNSON,
LAFAYETTE, PETTIS, PLATTE,
RAY AND SALINE COUNTIES)

Groundman Powderman.....	\$ 32.27	15.52
Groundman.....	\$ 30.12	14.88
Lineman Operator.....	\$ 43.40	18.80
Lineman.....	\$ 47.30	19.95

ELEC0095-001 06/01/2019

BARRY, BARTON, CEDAR, DADE, JASPER, LAWRENCE, MCDONALD, NEWTON,
ST CLAIR, AND VERNON COUNTIES

	Rates	Fringes
Electricians:		
Cable Splicers.....	\$ 25.40	12.19
Electricians.....	\$ 27.43	14.97

ELEC0124-007 08/26/2019

BATES, BENTON, CARROLL, CASS, CLAY, COOPER, HENRY, JACKSON,
JOHNSON, LAFAYETTE, MORGAN, PETTIS, PLATTE, RAY AND SALINE
COUNTIES:

	Rates	Fringes
Electricians.....	\$ 40.79	22.92

* ELEC0257-003 03/01/2020

AUDRAIN (Except Cuivre Township), BOONE, CALLAWAY, CAMDEN,
CHARITON, COLE, CRAWFORD, DENT, GASCONADE, HOWARD, MARIES,
MILLER, MONITEAU, OSAGE, PHELPS AND RANDOLPH COUNTIES

	Rates	Fringes
Electricians:		
Cable Splicers.....	\$ 30.42	16.085
Electricians.....	\$ 34.00	15.25

ELEC0350-002 12/01/2019

ADAIR, AUDRAIN (East of Highway 19), CLARK, KNOX, LEWIS, LINN,
MACON, MARION, MONROE, MONTGOMERY, PIKE, PUTNAM, RALLS,
SCHUYLER, SCOTLAND, SHELBY AND SULLIVAN COUNTIES

Rates	Fringes
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Electricians.....	\$ 32.50	17.65
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ELEC0453-001 09/01/2019

Rates	Fringes
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Electricians:

CHRISITAN, DALLAS, DOUGLAS, GREENE, HICKORY, HOWELL, LACLEDE, OREGON, OZARK, POLK, SHANNON, WEBSTER and WRIGHT COUNTIES..	\$ 27.88	14.99
PULASKI and TEXAS COUNTIES..	\$ 32.53	15.46
STONE and TANEY COUNTIES....	\$ 23.67	14.17

ELEC0545-003 06/01/2019

ANDREW, BUCHANAN, CLINTON, DEKALB, ATCHISON, HOLT, MERCER,
GENTRY, HARRISON, DAVIESS, GRUNDY, WORTH, LIVINGSTON, NODAWAY,
AND CALDWELL COUNTIES

Rates	Fringes
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Electricians:.....	\$ 32.00	17.30
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ELEC0702-004 12/30/2019

BOLLINGER, BUTLER, CAPE GIRARDEAU, DUNKLIN, MADISON,
MISSISSIPPI, NEW MADRID, PEMISCOT, SCOTT, STODDARD AND WAYNE
COUNTIES

Rates	Fringes
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Line Construction:

Groundman - Class A.....	\$ 30.31	29% + 7.75
Groundman-Equipment Operator Class II (all other equipment).....	\$ 38.46	29% + 7.75
Heavy-Equipment Operator Class I (all crawler type equipment D-4 and larger)...	\$ 43.88	29% + 7.75
Lineman.....	\$ 53.51	29% + 7.75

ENGI0101-001 05/01/2019

ANDREW, ATCHISON, BATES, BENTON, BUCHANAN, CALDWELL, CARROLL,
CHARITON, CLINTON, COOPER, DAVIESS, DEKALB, GENTRY, GRUNDY,
HARRISON, HENRY, HOLT, HOWARD, JOHNSON, LAFAYETTE, LINN,
LIVINGSTON, MERCER, NODAWAY, PETTIS, SALINE, SULLIVAN AND WORTH
COUNTIES

Rates	Fringes
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Power equipment operators:

GROUP 1.....	\$ 34.28	17.45
GROUP 2.....	\$ 33.88	17.45
GROUP 3.....	\$ 31.88	17.45

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Asphalt roller operator, finish; asphalt paver and spreader; asphalt plant operator; auto grader or trimmer or sub-grader; backhoe; blade operator (all types); boilers - 2; booster pump on dredge; bulldozer operator; boring machine (truck or crane mounted); clamshell operator; concrete mixer paver; concrete plant operator; concrete pump operator; crane operator; derrick or derrick trucks; ditching machine; dragline operator; dredge engineman; dredge operator; drill cat with compressor mounted (self-contained) or similar type self-propelled rotary drill (not air tract); drilling or boring machine (rotary-self-propelled); finishing machine operator; greaser; high loader-fork lift-skid loader (all types); hoisting engineer (2 active drums); locomotive operator (standard guage); mechanics and welders (field and plants); mucking machine operator; pile drive operator; pitman crane or boom truck (all types); push cat; quad track; scraper operators (all types); shovel operator; sideboom cats; side discharge spreader; skimmer scoop operators; slip form paver operator (CMI, Rex, Gomeco or equal); la tourneau rooter (all tiller types); tow boat operator; truck crane; wood and log chippers (all types).

GROUP 2: A-frame truck operator; articulated dump truck; back filler operator; boilers (1); chip spreader; churn drill operator; compressor; concrete mixer operator, skip loader; concrete saws (self-propelled); conveyor operator; crusher operator; distributor operator; elevating grader operator; farm tractor (all attachments); fireman rig; float operator; form grade operator; hoisting engine (one drum); maintenance operator; multiple compactor; pavement breaker, self-propelled hydra-hammer (or similar type); paymill operator; power shield; pumps; roller operator (with or without blades); screening and washing plant; self-propelled street broom or sweeper; siphons and jets; straw blower; stump cutting machine; siphons and jets; tank car heater operator (combination boiler and booster); welding machine; vibrating machine operator (not hand held); welding machine.

GROUP 3: (a) Oiler;
 (b) Oiler driver
 (c) Mechanic.

HOURLY PREMIUMS:

THE FOLLOWING CLASSIFICATIONS SHALL RECEIVE (\$.25) ABOVE GROUP 1 RATE: Dragline operator - 3 yds. & over; shovel 3 yds. & over; clamshell 3 yds. & over; Crane, rigs or piledrivers, 100' of boom or over (incl. jib.), hoist - each additional active drum over 2 drums

THE FOLLOWING CLASSIFICATIONS SHALL RECEIVE (\$.50) ABOVE

GROUP 1 RATE: Tandem scoop operator; crane, rigs or
piledrivers 150' to 200' of boom (incl. jib.)

THE FOLLOWING CLASSIFICATIONS SHALL RECEIVE (\$.75) ABOVE
GROUP 1 RATE: Crane rigs, or piledrivers 200 ft. of boom
or over (including jib.)

ENGI0101-005 04/01/2019

CASS, CLAY, JACKSON, PLATTE AND RAY COUNTIES

	Rates	Fringes
Power equipment operators:		
GROUP 1.....	\$ 36.62	18.74
GROUP 2.....	\$ 35.58	18.74
GROUP 3.....	\$ 31.11	18.74
GROUP 4.....	\$ 34.46	18.74

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Asphalt roller operator, finish; asphalt paver and spreader; asphalt plant operator; auto grader or trimmer or sub-grader; backhoe; blade operator (all types); boilers-2; booster pump on dredge; boring machine (truck or crane mounted); bulldozer operator; clamshell operator; concrete cleaning decontamination machine operator; concrete mixer paver; concrete plant operator; concrete pump operator; crane operator; derrick or derrick trucks; ditching machine; dragline operator; dredge engineman; dredge operator; drillcat with compressor mounted (self-contained) or similar type self propelled rotary drill (not air tract); drilling or boring machine (rotary - self-propelled); finishing machine operator; greaser; heavy equipment robotics operator/mechanic; horizontal directional drill operator; horizontal directional drill locator; loader-forklift - skid loader (all types); hoisting engineer (2 active drums); locomotive operator (standard guage); master environmental maintenance mechanic; mechanics and welders (field and plants); mucking machine operator; piledrive operator; pitman crane or boom truck (all types); push cat; quad-track; scraper operators (all types); shovel operator; side discharge spreader; sideboom cats; skimmer scoop operator; slip-form paver (CMI, REX, Gomaco or equal); la tourneau rooter (all tiller types); tow boat operator; truck crane; ultra high perssure waterjet cutting tool system operator/mechanic; vacuum blasting machine operator/mechanic; wood and log chippers (all types)

GROUP 2: ""A"" Frame truck operator; back filler operator; boilers (1); chip spreader; churn drill operator; concrete mixer operator, skip loader; concrete saws (self-propelled); conveyor operator; crusher operator; distributor operator; elevating grader operator; farm tractor (all attachments); fireman rig; float operator; form grader operator; hoisting engine (1 drum); maintenance

operator; multiple compactor; pavement breaker, self-propelled hydra- hammer (or similar type); power shield; paymill operator; pumps; siphons and jets; stump cutting machine; tank car heater operator (combination boiler and booster); compressor; roller operator (with or without blades); screening and washing plant; self-propelled street broom or sweeper; straw blower; tank car heater operator (combination boiler and booster); vibrating machine operator (not hand held)

GROUP 3: Oilers

GROUP 4: Oiler Driver (All Types)

FOOTNOTE:

HOURLY PREMIUMS FOLLOWING CLASSIFICATIONS SHALL RECEIVE (\$1.00) ABOVE GROUP 1 RATE:

Clamshells - 3 yd. capacity or over; Cranes or rigs, 80 ft. of boom or over (including jib); Draglines, 3 yd. capacity or over;

Piledrivers 80 ft. of boom or over (including jib);

Shovels & backhoes, 3 yd. capacity or over.

ENGI0101-022 05/01/2019

BARRY, BARTON, CAMDEN, CEDAR, CHRISTIAN, DADE, DALLAS, DOUGLAS, GREENE, HICKORY, JASPER, LACLEDE, LAWRENCE, MCDONALD, NEWTON, OZARK, POLK, ST. CLAIR, STONE, TANEY, VERNON, WEBSTER AND WRIGHT COUNTIES and CITY OF SPRINGFIELD

	Rates	Fringes
Power equipment operators:		
GROUP 1.....	\$ 31.72	14.88
GROUP 2.....	\$ 31.37	14.88
GROUP 3.....	\$ 31.17	14.88
GROUP 4.....	\$ 29.12	14.88

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Asphalt finishing machine & trench widening spreader; asphalt plant console operator; autograder; automatic slipform paver; backhoe; blade operator - all types; boat operator - tow; boilers-2; central mix concrete plant operator; clamshell operator; concrete mixer paver; crane operator; derrick or derrick trucks; ditching machine; dozer operator; dragline operator; dredge booster pump; dredge engineman; dredge operator; drill cat with compressor mounted on cat; drilling or boring machine rotary self-propelled; highloader; hoisting engine - 2 active drums; launch hammer wheel; locomotive operator; - standard guage; mechanic and welders; mucking machine; off-road trucks; piledriver operator; pitman crane operator; push cat operator; quad trac; scoop operator - all types; shovel operator; sideboom cats; skimmer scoop operators; trenching machine operator; truck crane.

GROUP 2: A-frame; asphalt hot-mix silo; asphalt plant fireman (drum or boiler); asphalt plant man; asphalt plant man; asphalt plant mixer operator; asphalt roller operator; backfiller operator; barber-greene loader; boat operator (bridges and dams); chip spreader; concrete mixer operator - skip loader; concrete plant operator; concrete pump operator; crusher operator; dredge oiler; elevating grader operator; fork lift; greaser-fleet; hoisting engine - 1; locomotive operator - narrow gauge; multiple compactor; pavement breaker; powerbroom - self-propelled; power shield; rooter; side discharge concrete spreader; slip form finishing machine; stumpcutter machine; throttle man; tractor operator (over 50 h.p.); winch truck.

GROUP 3: Boilers - 1; chip spreader (front man); churn drill operator; clef plane operator; concrete saw operator (self-propelled); curb finishing machine; distributor operator; finishing machine operator; flex plane operator; float operator; form grader operator; pugmill operator; roller operator, other than high type asphalt; screening & washing plant operator; siphons & jets; sub-grading machine operator; spreader box operator, self-propelled (not asphalt); tank car heater operator (combination boiler & booster); tractor operator (50 h.p. or less); Ulmac, Ulric or similar spreader; vibrating machine operator, not hand;

GROUP 4: Grade checker; Oiler; Oiler-Driver

HOURLY PREMIUMS:

The following classifications shall receive \$.25 above GROUP 1 rate:

Clamshells - 3 yds. or over; Cranes - Rigs or Piledrivers, 100 ft. of boom or over (including jib);
 Draglines - 3 yds. or over; Hoists - each additional active drum over 2 drums; Shovels - 3 yds. or over;

The following classifications shall receive \$.50 above GROUP 1 rate:

Tandem scoop operator; Cranes - Rigs or Piledrivers, 150 ft. to 200 ft. of boom (including jib); Tandem scoop.

The following classifications shall receive \$.75 above GROUP 1 rate:

Cranes - Rigs or Piledrivers, 200 ft. of boom or over (including jib.).

 ENGI0513-004 05/06/2019

FRANKLIN, JEFFERSON, LINCOLN, ST CHARLES, AND WARREN COUNTIES

	Rates	Fringes
Power equipment operators:		
GROUP 1.....	\$ 34.36	27.36
GROUP 2.....	\$ 34.36	27.36

GROUP 3.....	\$ 33.06	27.36
GROUP 4.....	\$ 32.61	27.36

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Backhoe, Cable; Backhoe, Hydraulic (2 cu yds bucket and under regardless of attachment, one oiler for 2 or 3, two oilers for 4 through 6); Backhoe, Hydraulic over 2 cu yds; Cableway; Crane, Crawler or Truck; Crane, Hydraulic - Truck or Cruiser mounted, 16 tons and over; Crane, Locomotive; crane with boom including jib over 100 ft from pin to pin; Crane using rock socket tool; Derrick, Steam; Derrick Car and Derrick Boat; Dragline, 7 cu yds and over; Dredge; Gradall, Crawler or tire mounted; Locomotive, Gas, Steam & other powers; Pile Driver, Land or Floating; Scoop, Skimmer; Shovel, Power (Electric, Gas, Steam or other powers); Shovel, Power (7 cu yds and over); Switch Boat; Whirley; Air Tugger with air compressor; Anchor Placing Barge; Asphalt Spreader; Athey Force Feeder Loader, self-propelled; Backfilling Machine; Boat Operator - Push Boat or Tow Boat (job site); Boiler, High Pressure Breaking in Period; Boom Truck, Placing or Erecting; Boring Machine, Footing Foundation; Bullfloat; Cherry Picker; Combination Concrete Hoist and Mixer (such as Mixermobile); Compressor, Two 125 CFM and under; Compressor, Two through Four over 125 CFM; Compressor when operator runs throttle; Concrete Breaker (Truck or Tractor mounted); Concrete Pump (such as Pumpcrete machine); Concrete Saw (self-propelled); Concrete Spreader; Conveyor, Large (not selfpropelled) hoisting or moving brick and concrete into, or into and on floor level, one or both; Crane, Climbing (such as Linden); Crane, Hydraulic - Rough Terrain, self-propelled; Crane, Hydraulic - Truck or Cruiser mounted - under 16 tons; Drilling machine - Self-powered, used for earth or rock drilling or boring (wagon drills and any hand drills obtaining power from other sources including concrete breakers, jackhammers and Barco equipment no engineer required); Elevating Grader; Engine Man, Dredge; Excavator or Powerbelt Machine; Finishing Machine, self-propelled oscillating screed; Forklift; Generators, Two through Six 30 KW or over; Grader, Road with power blade; Greaser; Highlift; Hoist, Concrete and Brick (Brick cages or concrete skips operating or on tower, Towermobile, or similar equipment); Hoist, Three or more drums in use; Hoist, Stack; Hydro-Hammer; Lad-A-Vator, hoisting brick or concrete; Loading Machine such as Barber-Greene; Mechanic on job site

GROUP 2: Air Tugger with plant air; Boiler (for power or heating shell of building or temporary enclosures in connection with construction work); Boiler, Temporary; Compressor, One over 125 CFM; Compressor, truck mounted; Conveyor, Large (not self-propelled); Conveyor, Large (not self-propelled) moving brick and concrete (distributing) on floor level; Curb Finishing Machine; Ditch Paving Machine; Elevator (outside); Endless Chain Hoist; Fireman (as required); Form Grader; Hoist, One Drum regardless of size (except brick or concrete); Lad-A-Vator, other hoisting; Manlift; Mixer, Asphalt, over 8 cu ft capacity;

Mixer, one bag capacity or less; Mixer, without side loader, two bag capacity or more; Mixer, with side loader, regardless of size, not Paver; Mud Jack (where mud jack is used in conjunction with an air compressor, operator shall be paid \$.55 per hour in addition to his basic hourly rate for covering both operations); Pug Mill operator; Pump, Sump - self powered, automatic controlled over 2""; Scissor Lift (used for hoisting); Skid Steer Loader; Sweeper, Street; Tractor, small wheel type 50 HP and under with grader blade and similar equipment; Welding Machine, One over 400 amp; Winch, operating from truck

GROUP 3: Boat operator - outboard motor, job site; Conveyors (such as Con-Vay-It) regardless of how used; Elevator (inside); Heater operator, 2 through 6; Sweeper, Floor

GROUP 4: Crane type

HOURLY PREMIUMS:

Backhoe, Hydraulic 2 cu yds or less without oiler - \$2.00;
 Crane, climbing (such as Linden) - \$.50;
 Crane, Pile Driving and Extracting - \$.50
 Crane with boom (including job) over
 100 ft from pin to pin - add \$.01 per foot
 to maximum of \$4.00);
 Crane, using rock socket tool - \$.50;
 Derrick, diesel, gas or electric hoisting material
 and erecting steel (150 ft or more above ground) - \$.50;
 Dragline, 7 cu yds and over - \$.50;
 Hoist, Three or more drums in use - \$.50;
 Scoop, Tandem - \$.50;
 Shovel, Power - 7 cu yds and over - \$.50;
 Tractor, Tandem Crawler - \$.50;
 Tunnel, man assigned to work in tunnel or
 tunnel shaft - \$.50;
 Wrecking, when machines are working on
 second floor or higher - \$.50

 * ENGI0513-006 05/01/2019

ADAIR, AUDRAIN, BOLLINGER, BOONE, BUTLER, CALLAWAY, CAPE
 GIRARDEAU, CARTER, CLARK, COLE, CRAWFORD, DENT, DUNKLIN,
 GASCONADE, HOWELL, IRON, KNOX, LEWIS, MACON, MADISON, MARIES,
 MARION, MILLER, MISSISSIPPI, MONITEAU, MONROE, MONTGOMERY,
 MORGAN, NEW MADRID, OREGON, OSAGE, PEMISCOT, PERRY, PHELPS,
 PIKE, PULASKI, PUTNAM, RALLS, RANDOLPH, REYNOLDS, RIPLEY, ST.
 FRANCOIS, STE. GENEVIEVE, SCHUYLER, SCOTLAND, SCOTT, SHANNON,
 SHELBY, STODDARD, TEXAS, WASHINGTON, AND WAYNE COUNTIES

	Rates	Fringes
Power equipment operators:		
GROUP 1.....	\$ 29.69	27.16
GROUP 2.....	\$ 29.34	27.16
GROUP 3.....	\$ 29.14	27.16

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Asphalt finishing machine & trench widening spreader, asphalt plant console operator; autograder; automatic slipform paver; back hoe; blade operator - all types; boat operator tow; boiler two; central mix concrete plant operator; clam shell operator; concrete mixer paver; crane operator; derrick or derrick trucks; ditching machine; dozer operator; dragline operator; dredge booster pump; dredge engineman; dredge operator; drill cat with compressor mounted on cat; drilling or boring machine rotary self-propelled; highloader; hoisting engine 2 active drums; launchhammer wheel; locomotive operator standrad guage; mechanics and welders; mucking machine; piledriver operator; pitman crane operator; push cat operator; quad-trac; scoop operator; sideboom cats; skimmer scoop operator; trenching machine operator; truck crane, shovel operator.

GROUP 2: A-Frame; asphalt hot-mix silo; asphalt roller operator asphalt plant fireman (drum or boiler); asphalt plant man; asphalt plant mixer operator; backfiller operator; barber-greene loader; boat operator (bridge & dams); chip spreader; concrete mixer operator skip loader; concrete plant operator; concrete pump operator; dredge oiler; elevating graded operator; fork lift; grease fleet; hoisting engine one; locomotive operator narrow guage; multiple compactor; pavement breaker; powerbroom self-propelled; power shield; rooter; slip-form finishing machine; stumpcutter machine; side discharge concrete spreader; throttleman; tractor operator (over 50 hp); winch truck; asphalt roller operator; crusher operator.

GROUP 3: Spreader box operator, self-propelled not asphalt; tractor operator (50 h.p. or less); boilers one; chip spreader (front man); churn drill operator; compressor over 105 CFM 2-3 pumps 4" & over; 2-3 light plant 7.5 KWA or any combination thereof; clef plane operator; compressor maintenance operator 2 or 3; concrete saw operator (self-propelled); curb finishing mancine; distributor operator; finishing machine operator; flex plane operator; float operator; form grader operator; pugmill operator; riller operator other than high type asphalt; screening & washing plant operator; siphons & jets; subgrading machine operator; tank car heater (combination boiler & booster); ulmac, ulric or similar spreader; vibrating machine operator; hydrobroom.

GROUP 4: Oiler; grout machine; oiler driver; compressor over 105 CFM one; conveyor operator one; maintenance operator; pump 4" & over one.

FOOTNOTE: HOURLY PREMIUMS

Backhoe hydraulic, 2 cu. yds. or under Without oiler - \$2.00
Certified Crane Operator - \$1.50;

Certified Hazardous Material Operator \$1.50;
 Crane, climbing (such as Linden) - \$0.50;
 Crane, pile driving and extracting - \$0.50;
 Crane, with boom (including jib) over 100' from pin to pin
 add \$0.01 per foot to maximum of \$4.00;
 Crane, using rock socket tool - \$0.50;
 Derrick, diesel, gas or electric, hoisting material and
 erecting steel (150' or more above the ground) - \$0.50;
 Dragline, 7 cu. yds, and over - \$0.50;
 Hoist, three or more drums in use - \$0.50; Scoop, Tandem -
 \$0.50;
 Shovel, power - 7 cu. yds. or more - \$0.50;
 Tractor, tandem crawler - \$0.50;
 Tunnel, man assigned to work in tunnel or tunnel shaft -
 \$0.50;
 Wrecking, when machine is working on second floor or higher -
 \$0.50;

 ENGI0513-007 05/06/2019

ST. LOUIS CITY AND COUNTY

	Rates	Fringes
Power equipment operators:		
GROUP 1.....	\$ 34.36	27.36
GROUP 2.....	\$ 34.36	27.36
GROUP 3.....	\$ 33.06	27.36
GROUP 4.....	\$ 32.61	27.36

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Backhoe, cable or hydraulic; cableway; crane
 crawler or truck; crane, hydraulic-truck or cruiser mounted
 16 tons & over; crane locomotive; derrick, steam; derrick
 car & derrick boat; dragline; dredge; gradall, crawler or
 tire mounted; locomotive, gas, steam & other powers; pile
 driver, land or floating; scoop, skimmer; shovel, power
 (steam, gas, electric or other powers); switch boat;
 whirley.

GROUP 2: Air tugger w/air compressor; anchor-placing barge;
 asphalt spreader; atehy force feeder loader (self-
 propelled); backfilling machine; backhoe-loader; boat
 operator-push boat or tow boat (job site); boiler, high
 pressure breaking in period; boom truck, placing or
 erecting; boring machine, footing foundation; bull- float;
 cherry picker; combination concrete hoist & mixer (such as
 mixer mobile); compressor (when operator runs throttle);
 concrete breaker (truck or tractor mounted); concrete pump,
 such as pump-crete machine; concrete saw (self-propelled),
 concrete spreader; conveyor, large (not self-propelled),
 hoisting or moving brick and concrete into, or into and on
 floor level, one or both; crane, hydraulic-rough terrain,
 self-propelled; crane hydraulic-truck or cruiser
 mounted-under 16 tons; drilling machines, self-powered use
 for earth or rock drilling or boring (wagon drills nd any

hand drills obtaining power from other sources including concrete breakers, jackhammers and barco equipment-no engineer required); elevating grader; engineman, dredge; excavator or powerbelt machine; finishing machine, self-propelled oscillating screed; forklift; grader, road with power blade; highlift. greaser; hoist, stack, hydro-hammer; loading machine (such as barber-greene); machanic, on job site; mixer, pipe wrapping machines; plant asphalt; plant, concrete producing or ready-mix job site; plant heating-job site; plant mixing-job site; plant power, generating-job site; pumps, two through six self-powered over 2""; pumps, electric submersible, two through six, over 4""; quad-track; roller, asphalt, top or sub-grade; scoop, tractor drawn; spreader box; sub-grader; tie tamper; tractor-crawler, or wheel type with or without power unit, power take-offs and attachments regardless of size; trenching machine; tunnel boring machine; vibrating machine automatic, automatic propelled; welding machines (gasoline or diesel) two through six; well drilling machine

GROUP 3: Conveyor, large (not self-propelled); conveyor, large (not self-propelled) moving brick and concrete distributing) on floor level; mixer two or more mixers of one bag capacity or less; air tugger w/plant air; boiler, for power or heating on construction projects; boiler, temporary; compressor (mounted on truck; curb finishing machine; ditch paving machine; elevator; endless chain hoist; form grader; hoist, one drum regardless of size; lad-a-vator; manlift; mixer, asphalt, over 8 cu. ft. capacity, without side loader, 2 bag capacity or more; mixer, with side loader, regardless of size; pug mill operator; pump, sump-self-powered, automatic controlled over 2"" during use in connection with construction work; sweeper, street; welding machine, one over 400 amp.; winch operating from truck; scissor lift (used for hoisting); tractor, small wheel type 50 h.p. & under with grader blade & similar equipment; Oiler on dredge and on truck crane.

GROUP 4: Boat operator-outboard motor (job site); conveyor (such as con-vay-it) regardless of how used; sweeper, floor

HOURLY PREMIUMS:

Backhoe, hydraulic	
2 cu. yds. or under without oiler	\$2.00
Certified Crane Operator	1.50
Certified Hazardous Material Operator	1.50
Crane, climbing (such as Linden)	.50
Crane, pile driving and extracting	.50
Crane, with boom (including jib) over 100' (from pin to pin) add \$.01 per foot to maximum of	4.00
Crane, using rock socket tool	.50
Derrick, diesel, gas or electric, hoisting material and erecting steel (150' or more above ground)	.50
Dragline, 7 cu. yds. and over	.50
Hoist, three (3) or more drums in use	.50
Scoop, Tandem	.50

Shovel, power - 7 cu. yds. or more	.50
Tractor, tandem crawler	.50
Tunnel, man assigned to work in tunnel or tunnel shaft	.50
Wrecking, when machine is working on second floor or higher	.50

* IRON0010-012 04/01/2020

	Rates	Fringes
Ironworkers:		
ANDREW, BARTON, BENTON, CAMDEN, CEDAR, CHARITON, CHRISTIAN, COOPER, DADE, DALLAS, DAVIESS, DE KALB, GENTRY, GREENE, GRUNDY, HARRISON, HICKORY, HOLT, HOWARD, LACLEDE, LINN, LIVINGSTON, MERCER, MONITEAU, MORGAN, NODAWAY, PETTIS, POLK, PUTNAM, RANDLOPH, ST. CLAIR, SULLIVAN, TANEY, VERNON, WEBSTER, WRIGHT and WORTH Counties and portions of ADAIR, BOONE, MACON, MILLER and RANDOLPH Counties.....\$ 31.00		31.24
ATCHISON, BATES, BUCHANAN, CALDWELL, CARROLL, CASS, CLAY, CLINTON, HENRY, JACKSON, JOHNSON, LAFAYETTE, PETTIS, PLATTE, SALINE, AND RAY COUNTIES....\$ 34.00		31.24

IRON0321-002 09/01/2019

DOUGLAS, HOWELL and OZARK COUNTIES

	Rates	Fringes
Ironworker.....\$ 21.10		19.01

IRON0396-004 08/07/2019

ST. LOUIS (City and County), ST. CHARLES, JEFFERSON, IRON,
FRANKLIN, LINCOLN, WARREN, WASHINGTON, ST. FRANCOIS, STE.
GENEVIEVE, and REYNOLDS Counties; and portions of MADISON,
PERRY, BOLLINGER, WAYNE, and CARTER Counties

	Rates	Fringes
Ironworker.....\$ 34.91		27.36

IRON0396-009 08/07/2019

AUDRAIN, CALLAWAY, COLE, CRAWFORD, DENT, GASCONADE, MARIES,
MONTGOMERY, OSAGE, PHELPS, PIKE, PULASKI, TEXAS and WRIGHT
Counties; and portions of BOONE, CAMDEN, DOUGLAS, HOWELL,
LACLEDE, MILLER, MONROE, OREGON, SHANNON and RALLS Counties

	Rates	Fringes
Ironworker.....	\$ 30.44	27.36

IRON0577-005 06/01/2019		

ADAIR, CLARK, KNOX, LEWIS, MACON, MARION, MONROE, RALLS,
SCHUYLER, SCOTLAND, AND SHELBY COUNTIES

	Rates	Fringes
Ironworker.....	\$ 26.60	24.00

IRON0584-004 06/01/2019		

BARRY, JASPER, LAWRENCE, MCDONALD, NEWTON AND STONE Counties

	Rates	Fringes
Ironworkers:.....	\$ 26.00	15.35

IRON0782-003 05/01/2019		

CAPE GIRARDEAU, MISSISSIPPI, NEW MADRID, SCOTT, & STODDARD
Counties; and portions of BOLLINGER, BUTLER, CARTER, DUNKLIN,
MADISON, PEMISCOT, PERRY, RIPLEY, and WAYNE Counties

	Rates	Fringes
Ironworkers:		
Locks, Dams, Bridges and other major work on the Mississippi and Ohio River only.....	\$ 31.63	24.27
All Other Work.....	\$ 27.38	23.29

LAB00042-003 03/06/2019		

ST. LOUIS (City and County)

	Rates	Fringes
LABORER		
Plumber Laborer.....	\$ 33.22	15.67

LAB00042-005 03/06/2019		

ST. LOUIS (City and County)

	Rates	Fringes
LABORER		
Dynamiter, Powderman.....	\$ 33.22	15.67
Laborers, Flaggers.....	\$ 33.22	15.67
Wrecking.....	\$ 33.22	15.67

LAB00424-002 05/01/2016

	Rates	Fringes
LABORER		
ADAIR, AUDRAIN, BOONE, CALLAWAY, CHARITON, CLARK, COLE, COOPER, HOWARD, IRON, KNOX, LEWIS, LINN, MACON, MADISON, MARION, MILLER, MONITEAU, MONROE, PERRY, PIKE, PUTNAM, RALLS, RANDOLPH, REYNOLDS, ST. FRANCOIS, STE. GENEVIEVE, SCHUYLER, SCOTLAND, SHELBY AND SULLIVAN COUNTIES		
GROUP 1.....	\$ 27.96	13.17
GROUP 2.....	\$ 27.96	13.17
BOLLINGER, BUTLER, CAPE GIRARDEAU, CARTER, CRAWFORD, DENT, DUNKLIN, GASCONADE, HOWELL, MARIES, MISSISSIPPI, NEW MADRID, OREGON, OSAGE, PEMISCOT, PHELPS, PULASKI, RIPLEY, SCOTT, SHANNON, STODDARD, TEXAS, WASHINGTON AND WAYNE COUNTIES		
GROUP 1.....	\$ 27.96	13.17
GROUP 2.....	\$ 27.96	13.17
FRANKLIN COUNTY		
GROUP 1.....	\$ 29.71	13.17
GROUP 2.....	\$ 30.31	13.17
JEFFERSON COUNTY		
GROUP 1.....	\$ 29.76	13.17
GROUP 2.....	\$ 30.36	13.17
LINCOLN, MONTGOMERY AND WARREN COUNTIES		
GROUP 1.....	\$ 31.18	13.32
GROUP 2.....	\$ 31.18	13.32
ST.CHARLES COUNTY		
GROUP 1.....	\$ 3.18	13.32
GROUP 2.....	\$ 31.18	13.32

LABORERS CLASSIFICATIONS

GROUP 1 - General laborer-flagman, carpenter tenders;
salamander Tenders; Dump Man; Ticket Takers; loading trucks
under bins, hoppers, and conveyors; track man; cement
handler; dump man on earth fill; georgie buggy man;

material batch hopper man; spreader on asphalt machine; material mixer man (except on manholes); coffer dams; riprap pavers rock, block or brick; scaffolds over ten feet not self-supported from ground up; skip man on concrete paving; wire mesh setters on concrete paving; all work in connection with sewer, water, gas, gasoling, oil, drainage pipe, conduit pipe, tile and duct lines and all other pipe lines; power tool operator; all work in connection with hydraulic or general dredging operations; form setters, puddlers (paving only); straw blower nozzle man; asphalt plant platform man; chuck tender; crusher feeder; men handling creosote ties or creosote materials; men working with and handling epoxy material; topper of standing trees; feeder man on wood pulverizers, board and willow mat weavers and cable ties on river work; deck hands; pile dike and revetment work; all laborers working on underground tunnels less than 25 ft. where compressed air is not used; abutment and pier hole men working six (6) ft. or more below ground; men working in coffer dams for bridge piers and footing in the river; barco tamper; jackson or any other similar tamp; cutting torch man; liners, curb, gutters, ditch lines; hot mastic kettlemen; hot tar applicator; hand blade operator; mortar men or brick or block manholes; rubbing concrete, air tool operator under 65 lbs.; caulker and lead man; chain or concrete saw under 15 h.p.; signal Gan; Guard rail and sign erectors.

GROUP 2 - Skilled laborers - Vibrator man; asphalt raker; head pipe layer on sewer work; batterboard man on pipe and ditch work; cliff scalers working from bosun's chairs; scaffolds or platforms on dams or power plants over 10 ft. high; air tool operator over 65 lbs.; stringline man on concrete paving; sandblast man; laser beam man; wagon drill; churn drill; air track drill and all other similar type drills, gunite nozzle man; pressure grout man; screed man on asphalt; concrete saw 15 h.p. and over; grade checker; stringline man on electronic grade control; manhole builder; dynamite man; powder man; welder; tunnel man; waterblaster - 1000 psi or over; asbestos and/or hazardous waste removal and/or disposal

LAB00579-005 05/01/2019

	Rates	Fringes
LABORER (ANDREW, ATCHISON, BUCHANAN, CALDWELL, CLINTON, DAVIESS, DEKALB, GENTRY, GRUNDY, HARRISON, HOLT, LIVINGSTON, MERCER, NODAWAY and WORTH COUNTIES.)		
GROUP 1.....	\$ 26.66	14.97
GROUP 2.....	\$ 27.01	14.97
LABORER (BARRY, BARTON, BATES, BENTON, CAMDEN, CARROLL, CEDAR, CHRISTIAN,		

DADE, DALLAS, DOUGLAS,
 GREENE, HENRY. HICKORY,
 JASPER, JOHNSON, LACLEDE,
 LAWRENCE, MCDONALD, MORGAN,
 NEWTON, OZARK, PETTIS, POLK,
 ST.CLAIR, SALINE, STONE,
 TANEY, VERNON, WEBSTER and
 WRIGHT COUNTIES)

GROUP 1.....	\$ 25.66	14.17
GROUP 2.....	\$ 26.21	14.17
LABORER (LAFAYETTE COUNTY)		
GROUP 1.....	\$ 27.21	0.0014.42
GROUP 2.....	\$ 27.56	0.0014.42

LABORERS CLASSIFICATIONS

GROUP 1: General Laborers - Carpenter tenders; salamander tenders; loading trucks under bins; hoppers & conveyors; track men & all other general laborers; air tool operator; cement handler-bulk or sack; dump man on earth fill; georgie buggy man; material batch hopper man; material mixer man (except on manholes); coffer dams; riprap pavers - rock, block or brick; signal man; scaffolds over ten feet not self-supported from ground up; skipman on concrete paving; wire mesh setters on concrete paving; all work in connection with sewer, water, gas, gasoline, oil drainage pipe, conduit pipe, tile and duct lines and all other pipe lines; power tool operator, all work in connection with hydraulic or general dredging operations; puddlers (paving only); straw blower nozzle man; asphalt plant platform man; chuck tender; crusher feeder; men handling creosote ties or creosote materials; men working with and handling epoxy material or materials (where special protection is required); rubbing concrete; toppler of standing trees; batter board man on pipe and ditch work; feeder man on wood pulverizers; board and willow mat weavers and cable tiers on river work; deck hands; pile dike and revetment work; all laborers working on underground tunnels less than 25 feet where compressed air is not used; abutment and pier hole men working six (6) feet or more below ground; men working in coffer dams for bridge piers and footings in the river; ditchliners; pressure groutmen; caulker; chain or concrete saw; cliffscalers working from scaffolds, bosuns' chairs or platforms on dams or power plants over (10) feet above ground; mortarmen on brick or block manholes; toxic and hazardous waste work.

GROUP 2: Skilled Laborers - Head pipe layer on sewer work; laser beam man; Jackson or any other similar tamp; cutting torch man; form setters; liners and stringline men on concrete paving, curb, gutters; hot mastic kettleman; hot tar applicator; sandblasting and gunite nozzle men; air tool operator in tunnels; screed man on asphalt machine; asphalt raker; barco tamper; churn drills; air track drills and all similar drills; vibrator man; stringline man for electronic grade control; manhole builders-brick or block; dynamite and powder men; grade checker.

LABO0663-002 04/01/2019

CASS, CLAY, JACKSON, PLATTE AND RAY COUNTIES

	Rates	Fringes
LABORER		
GROUP 1.....	\$ 30.73	15.98
GROUP 2.....	\$ 31.94	15.98

LABORERS CLASSIFICATIONS

GROUP 1: General laborers, Carpenter tenders, salamander tenders, loading trucks under bins, hoppers and conveyors, track men and all other general laborers, air tool operator, cement handler (bulk or sack), chain or concrete saw, deck hands, dump man on earth fill, Georgie Buggies man, material batch hopper man, scale man, material mixer man (except on manholes), coffer dams, abutments and pier hole men working below ground, riprap pavers rock, black or brick, signal man, scaffolds over ten feet not self-supported from ground up, skipman on concrete paving, wire mesh setters on concrete paving, all work in connection with sewer, water, gas, gasoling, oil, drainage pipe, conduit pipe, tile and duct lines and all other pipelines, power tool operator, all work in connection with hydraulic or general dredging operations, straw blower nozzleman, asphalt plant platform man, chuck tender, crusher feeder, men handling creosote ties on creosote materials, men working with and handling epoxy material or materials (where special protection is required), toppler of standing trees, batter board man on pipe and ditch work, feeder man on wood pulverizers, board and willow mat weavers and cable tiers on river work, deck hands, pile dike and revetment work, all laborers working on underground tunnels less than 25 feet where compressed air is not used, abutment and pier hole men working six (6) feet or more below ground, men working in coffer dams for bridge piers and footings in the river, ditchliners, pressure groutmen, caulker and chain or concrete saw, cliffscalers working from scaffolds, bosuns' chairs or platforms on dams or power plants over (10) feet above ground, mortarmen on brick or block manholes, signal man.

GROUP 2: Skilled Laborer - spreader or screed man on asphalt machine, asphalt raker, grade checker, vibrator man, concrete saw over 5 hp., laser beam man, barco tamper, jackson or any other similar tamp, wagon driller, churn drills, air track drills and other similar drills, cutting torch man, form setters, liners and stringline men on concrete paving, curb, gutters and etc., hot mastic kettleman, hot tar applicator, hand blade operators, mortar men on brick or block manholes, sand blasting and gunnite nozzle men, rubbing concrete, air tool operator in tunnels, head pipe layer on sewer work, manhole builder (brick or block), dynamite and powder men.

PAIN0002-002 09/01/2007

CLARK, FRANKLIN, JEFFERSON, LEWIS, LINCOLN, MARION, PIKE,
RALLS, ST. CHARLES, ST. LOUIS (CITY & COUNTY), AND WARREN
COUNTIES

	Rates	Fringes
Painters:		
Brush and Roller; Taper.....	\$ 28.61	10.24
High work over 60 feet.....	\$ 29.11	10.24
Lead Abatement.....	\$ 29.36	10.24
Pressure Roller; High work under 60 ft.....	\$ 28.86	10.24
Spray & Abrasive Blasting; Water Blasting (Over 5000 PSI).....	\$ 30.61	10.24
Taper (Ames Tools & Bazooka).....	\$ 30.21	10.24

PAIN0002-006 04/01/2018

ADAIR, AUDRAIN, BOONE, CALLAWAY, CHARITON, COLE, GASCONADE,
HOWARD, KNOX, LINN, MACON, MONROE, MONTGOMERY, OSAGE, PUTNAM,
RANDOLPH, SCHUYLER, SCOTLAND, SHELBY AND SULLIVAN COUNTIES and
the City of Booneville.

	Rates	Fringes
Painters:		
Bridges, Dams, Locks or Powerhouses.....	\$ 25.93	12.79
Brush and Roll; Taping, Paperhanging.....	\$ 23.93	12.79
Epoxy or Any Two Part Coating; Sandblasting; Stage or other Aerial Work - Platforms over 50 feet high; Lead Abatement.....	\$ 24.93	12.79
Spray; Structural Steel (over 50 feet).....	\$ 24.93	12.79
Tapers using Ames or Comparable Tools.....	\$ 24.68	12.79

PAIN0003-004 04/01/2017

CASS, CLAY, CLINTON, JACKSON, JOHNSON, LAFAYETTE, PLATTE & RAY
COUNTIES

	Rates	Fringes
Painters:		
Bridgeman; Lead Abatement; Sandblast; Storage Bin &		

Tanks.....	\$ 31.96	16.96
Brush & Roller.....	\$ 29.34	16.96
Drywall.....	\$ 30.34	16.96
Paper Hanger.....	\$ 29.84	16.96
Stageman; Beltman;		
Steelman; Elevator Shaft;		
Bazooka, Boxes and Power		
Sander; Sprayman; Dipping...	\$ 30.96	16.96
Steeplejack.....	\$ 35.53	16.96

PAIN0003-011 04/01/2011

BATES, BENTON, CALDWELL, CARROLL, COOPER, DAVIESS, GRUNDY,
HARRISON, HENRY, LIVINGSTON, MERCER, MONITEAU, MORGAN, PETTIS &
SALINE COUNTIES

	Rates	Fringes
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Painters:

Bridgeman; Lead Abatement;		
Sandblast; Storage Bin &		
Tanks.....	\$ 24.06	14.04
Brush & Roller.....	\$ 22.67	14.04
Drywall.....	\$ 22.84	14.04
Paper Hanger.....	\$ 23.07	14.04
Stageman; Beltman;		
Steelman; Elevator Shaft;		
Bazooka, Boxes and Power		
Sander; Sprayman; Dipping...	\$ 23.56	14.04
Steeplejack.....	\$ 26.82	14.04

PAIN0203-001 04/01/2012

BARRY, BARTON, CEDAR, CHRISTIAN, DADE, DALLAS, DOUGLAS, GREENE,
HICKORY, HOWELL, JASPER, LAWRENCE, MCDONALD, NEWTON, OZARK,
POLK, ST. CLAIR, STONE, TANEY, VERNON, WEBSTER, and WRIGHT
COUNTIES

	Rates	Fringes
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Painters:

Finisher.....	\$ 20.18	11.33
Painter.....	\$ 19.75	11.76
Sandblaster, High Man,		
Spray Man, Vinyl Hanger,		
Tool Operator.....	\$ 21.18	11.33

PAIN1265-003 07/01/2013

CAMDEN, CRAWFORD, DENT, LACLEDE, MARIES, MILLER, PHELPS,
PULASKI AND TEXAS COUNTIES

	Rates	Fringes
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Painters:

Brush and Roller.....	\$ 25.64	13.27
Floor Work.....	\$ 26.14	13.27
Lead Abatement.....	\$ 27.89	13.27
Spray.....	\$ 27.14	13.27
Structural Steel, Sandblasting and All Tank Work.....	\$ 26.89	13.27
Taping, Paperhanging.....	\$ 26.64	13.27

PAIN1292-002 09/01/2016

BOLLINGER, BUTLER, CAPE GIRARDEAU, CARTER, DUNKLIN,
MISSISSIPPI, NEW MADRID, OREGON, PEMISCOT, PERRY, REYNOLDS,
RIPLEY, SCOTT, SHANNON, STODDARD and WAYNE COUNTIES

	Rates	Fringes
Painters:		
Bridges, Stacks & Tanks.....	\$ 30.85	11.64
Brush & Roller.....	\$ 25.35	11.64
Spray & Abrasive Blasting; Waterblasting (over 5000 PSI).....	\$ 28.95	11.64

Height Rates (All Areas):
Over 60 ft. \$0.50 per hour.
Under 60 ft. \$0.25 per hour.

PAIN1292-003 09/01/2017

IRON, MADISON, ST. FRANCOIS, STE. GENEVIEVE and WASHINGTON
COUNTIES

	Rates	Fringes
Painters:		
Bridges, Stacks & Tanks.....	\$ 31.05	12.74
Brush & Roller.....	\$ 25.70	12.74
Spray & Abrasive Blasting; Waterblasting (Over 5000 PSI).....	\$ 28.70	12.74

Height Rates (All Areas):
Over 60 ft. \$0.50 per hour
Under 60 ft. \$0.25 per hour.

PAIN2012-001 04/01/2019

ANDREW, ATCHISON, BUCHANAN, DE KALB, GENTRY, HOLT, NODAWAY &
WORTH COUNTIES

Rates	Fringes
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Painters:

Brush & Roller.....	\$ 31.26	17.26
Sandblaster.....	\$ 32.76	17.26
Steeplejack.....	\$ 36.33	17.26

* PLAS0518-006 03/01/2020

BARRY, BARTON, CEDAR, CHRISTIAN, DADE, DALLAS, DOUGLAS, GREENE,
HICKORY, JASPER, LACLEDE, LAWRENCE, MCDONALD, NEWTON, OZARK,
POLK, ST. CLAIR, STONE, TANEY, VERNON, WEBSTER, AND WRIGHT
COUNTIES

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...	\$ 24.44	12.11

* PLAS0518-007 04/01/2020

CASS (Richards-Gebaur AFB only), CLAY, JACKSON, PLATTE AND RAY
COUNTIES

	Rates	Fringes
Cement Masons:.....	\$ 32.72	18.30

PLAS0518-011 04/01/2019

ANDREW, ATCHISON, BATES, BUCHANNAN, CLINTON, DEKALB, GENTRY,
HENRY, HOLT, JOHNSON, LAFAYETTE, NODAWAY & WORTH COUNTIES

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...	\$ 32.00	20.13

PLAS0527-001 04/01/2018

	Rates	Fringes
CEMENT MASON FRANKLIN, LINCOLN AND WARREN COUNTIES.....	\$ 30.74	18.07
JEFFERSON, ST. CHARLES COUNTIES AND ST. LOUIS (City and County).....	\$ 32.66	18.62

PLAS0527-004 06/01/2017

CRAWFORD, DENT, IRON, MADISON, MARION, PHELPS, PIKE, PULASKI,
RALLS, REYNOLDS, ST. FRANCOIS, STE. GENEVIEVE, SHANNON, TEXAS,
WASHINGTON COUNTIES

	Rates	Fringes
CEMENT MASON.....	\$ 28.10	18.07

PLAS0908-001 05/01/2017

BOLLINGER, BUTLER, CAPE GIRARDEAU, CARTER, DUNKLIN, HOWELL,
MISSISSIPPI, NEW MADRID, OREGON, PEMISCOT, PERRY, RIPLEY,
SCOTT, STODDARD, AND WAYNE COUNTIES

	Rates	Fringes
CEMENT MASON.....	\$ 27.60	15.73

PLAS0908-005 05/01/2017

BENTON, CALDWELL, CALLAWAY, CAMDEN, CARROLL, COLE, DAVIESS,
GASCONADE, GRUNDY, HARRISON, LIVINGSTON, MACON, MARIES, MERCER,
MILLER, MONTGOMERY, MORGAN, OSAGE, PETTIS & SALINE COUNTIES

	Rates	Fringes
CEMENT MASON.....	\$ 27.60	15.73

PLUM0008-003 06/01/2019

CASS, CLAY, JACKSON, JOHNSON, AND PLATTE COUNTIES

	Rates	Fringes
Plumbers.....	\$ 47.14	21.39

PLUM0008-017 06/01/2019

BATES, BENTON, CARROLL, HENRY, LAFAYETTE, MORGAN, PETTIS, RAY,
ST. CLAIR, SALINE AND VERNON COUNTIES

	Rates	Fringes
Plumbers.....	\$ 47.14	21.39

PLUM0045-003 08/01/2019

ANDREW, ATCHISON, BUCHANAN, CALDWELL, CLINTON, DAVIESS, DEKALB,
GENTRY, HARRISON, HOLT, NODAWAY AND WORTH COUNTIES

	Rates	Fringes
Plumbers and Pipefitters.....	\$ 37.75	23.65

PLUM0178-003 11/01/2019

BARRY, CEDAR, CHRISTIAN, DADE, DALLAS, DOUGLAS, GREENE,
HICKORY, LACLEDE, LAWRENCE, POLK, STONE, TANEY, WEBSTER AND
WRIGHT COUNTIES

	Rates	Fringes
Plumbers and Pipefitters.....	\$ 31.75	15.12

PLUM0178-006 11/01/2019

BARTON, JASPER, MCDONALD AND NEWTON COUNTIES

	Rates	Fringes
Plumbers and Pipefitters		
Projects \$750,000 & under...	\$ 27.93	15.35
Projects over \$750,000.....	\$ 31.75	15.12

PLUM0533-004 06/01/2019

BATES, BENTON, CARROLL, CASS, CLAY, HENRY, HICKORY, JACKSON,
JOHNSON, LAFAYETTE, MORGAN, PETTIS, PLATTE, RAY, SALINE, ST.
CLAIR AND VERNON COUNTIES

	Rates	Fringes
Pipefitters.....	\$ 46.68	22.55

PLUM0562-004 07/01/2019

ADAIR, AUDRAIN, BOLLINGER, BOONE, BUTLER, CALLAWAY, CAMDEN, CAPE
GIRARDEAU, CARTER, CHARITON, CLARK, COLE, COOPER, CRAWFORD,
DENT, DUNKLIN, FRANKLIN, GASCONADE, GRUNDY, HOWARD, HOWELL,
IRON, JEFFERSON, KNOX, LEWIS, LINCOLN, LINN, LIVINGSTON, MACON,
MADISON, MARIES, MARION, MERCER, MILLER, MISSISSIPPI, MONITEAU,
MONROE, MONTGOMERY, NEW MADRID, OREGON, OSAGE, PEMISCOTT,
PERRY, PHELPS, PIKE, PULASKI, PUTNAM, RALLS, RANDOLPH,
REYNOLDS, RIPLEY, ST. CHARLES, ST. FRANCOIS, STE. GENEVIEVE, ST.
LOUIS, SCHUYLER, SCOTLAND, SCOTT, SHANNON, SHELBY, STODDARD,
SULLIVAN, TEXAS, WARREN, WASHINGTON, AND WAYNE COUNTIES.

	Rates	Fringes
Plumbers and Pipefitters		
Mechanical Contracts		
including all piping and		
temperature control work		
\$7.0 million & under.....	\$ 40.41	21.49
Mechanical Contracts		
including all piping and		
temperature control work		
over \$7.0 million.....	\$ 41.85	27.85

PLUM0562-016 07/01/2019

CAMDEN, COLE, CRAWFORD, FRANKLIN, JEFFERSON, MARIES, MILLER,
MONITEAU, OSAGE, PHELPS, PULASKI, ST. CHARLES, ST. LOUIS (City
and County), WARREN and WASHINGTON COUNTIES

	Rates	Fringes
Plumbers		
Mechanical Contracts including all piping and temperature control work \$7.0 million & under.....	\$ 40.41	21.49
Mechanical Contracts including all piping and temperature control work over \$7.0 million.....	\$ 41.85	27.85

TEAM0013-001 05/01/2019		

	Rates	Fringes
Truck drivers (ADAIR, BUTLER, CLARK, DUNKIN, HOWELL, KNOX, LEWIS, OREGON, PUTNAM, RIPLEY, SCHUYLER AND SCOTLAND COUNTIES)		
GROUP 1.....	\$ 30.34	13.75
GROUP 2.....	\$ 30.49	13.75
GROUP 3.....	\$ 30.61	13.75
GROUP 4.....	\$ 30.50	13.75
Truck drivers (AUDRAIN, BOLLINGER, BOONE, CALLAWAY, CAPE GIRARDEAU, CARTER, COLE, CRAWFORD, DENT, GASCONADE, IRON, MACON, MADISON, MARIES, MARION, MILLER, MISSISSIPPI, MONROE, MONTGOMERY, NEW MADRID, OSAGE, PEMISCOT, PERRY, PHELPS, PIKE, PULASKI, RALLS, REYNOLDS, ST. FRANCOIS, STE. GENEVIEVE, SCOTT, SHANNON, SHELBY, STODDARD, TEXAS, WASHINGTON AND WAYNE COUNTIES)		
GROUP 1.....	\$ 31.07	13.75
GROUP 2.....	\$ 31.22	13.75
GROUP 3.....	\$ 31.34	13.75
GROUP 4.....	\$ 31.23	13.75
Truck drivers (FRANKLIN, JEFFERSON and ST. CHARLES COUNTIES)		
GROUP 1.....	\$ 33.43	13.75
GROUP 2.....	\$ 33.58	13.75
GROUP 3.....	\$ 33.65	13.75
GROUP 4.....	\$ 33.54	13.75
Truck drivers (LINCOLN and WARREN COUNTIES)		
GROUP 1.....	\$ 32.08	13.75
GROUP 2.....	\$ 33.23	13.75
GROUP 3.....	\$ 32.30	13.75
GROUP 4.....	\$ 32.19	13.75

TRUCK DRIVERS CLASSIFICATIONS:

GROUP 1: Flat Bed Trucks, Single Axle; Station Wagons;
Pickup Trucks; Material Trucks, Single Axle; Tank Wagon,
Single Axle

GROUP 2: Agitator and Transit Mix Trucks

GROUP 3: Flat Bed Trucks, Tandem Axle; Articulated Dump
Trucks; Material Trucks, Tandem Axle; Tank Wagon, Tandem
Axle

GROUP 4: Semi and/or Pole Trailers; Winch, Fork & Steel
Trucks; Distributor Drivers and Operators; Tank Wagon,
Semi-Trailer; Insley Wagons, Dumpsters, Half-Tracks,
Speedace, Euclids and other similar equipment; A-Frame and
Derrick Trucks; Float or Low Boy

TEAM0056-001 05/01/2019

	Rates	Fringes
Truck drivers (ANDREW, BARTON, BATES, BENTON, CALDWELL, CAMDEN, CARROLL, CEDAR, CHARITON, CHRISTIAN, CLINTON, COOPER, DADE, DALLAS, DAVIESS, DEKALB, DOUGLAS, GREENE, HENRY, HICKORY, HOWARD, JASPER, LACLEDE, LAWRENCE, LINN, LIVINGSTON, MONITEAU, MORGAN, NEWTON, PETTIS, POLK, RANDOLPH, ST. CLAIR, SALINE, VERNON, WEBSTER AND WRIGHT COUNTIES)		
GROUP 1.....	\$ 30.77	13.75
GROUP 2.....	\$ 30.92	13.75
GROUP 3.....	\$ 31.04	13.75
GROUP 4.....	\$ 30.93	13.75
Truck drivers: (ATCHISON, BARRY, GENTRY, GRUNDY, HARRISON, HOLT, MCDONALD, MERCER, NODAWAY, OZARK, STONE, SULLIVAN, TANEY AND WORTH COUNTIES)		
GROUP 1.....	\$ 30.04	13.75
GROUP 2.....	\$ 30.19	13.75
GROUP 3.....	\$ 30.31	13.75
GROUP 4.....	\$ 30.20	13.75
Truck drivers; (BUCHANAN, JOHNSON AND LAFAYETTE COUNTIES)		
GROUP 1.....	\$ 31.98	13.75
GROUP 2.....	\$ 32.13	13.75
GROUP 3.....	\$ 32.20	13.75
GROUP 4.....	\$ 32.09	13.75

TRUCK DRIVER CLASSIFICATIONS

GROUP 1: Flat bed trucks single axle; station wagons; pickup trucks; material trucks single axle; tank wagons single axle.

GROUP 2: Agitator and transit mix-trucks.

GROUP 3: Flat bed trucks tandem axle; articulated dump trucks; material trucks tandem axle; tank wagons tandem axle.

GROUP 4: Semi and/or pole trailers; winch, fork & steel trucks; distributor drivers & operators; tank wagons semi-trailer; insley wagons, dumpsters, half-tracks, speedace, euclids & other similar equipment; A-frames and derrick trucks; float or low boy.

TEAM0245-001 03/26/2012

BARRY, BARTON, CAMDEN, CEDAR, CHRISTIAN, DALLAS, DENT, DOUGLAS, GREENE, HICKORY, HOWELL, JASPER, LACLEDE, LAWRENCE, MCDONALD, MILLER, NEWTON, OZARK, PHELPS, POLK, PULASKI, SHANNON, STONE, TANEY, TEXAS, VERNON, WEBSTER AND WRIGHT COUNTIES

	Rates	Fringes
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Truck drivers:

Traffic Control Service

Driver.....	\$ 20.45	0.00
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PAID HOLIDAYS: New Year's Day, Decoration Day, July 4th, Labor Day, Thanksgiving Day, Christmas Day, employee's birthday and 2 personal days.

TEAM0541-001 04/01/2019

CASS, CLAY, JACKSON, PLATTE AND RAY COUNTIES

	Rates	Fringes
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Truck drivers:

GROUP 1.....	\$ 33.01	15.75
GROUP 2.....	\$ 32.44	15.75
GROUP 3.....	\$ 31.92	15.75

TRUCK DRIVERS CLASSIFICATIONS

GROUP 1: Mechanics and Welders, Field; A-Frame Low Boy-Boom ruck Driver.

GROUP 2: Articulated Dump Truck; Insley Wagons: Dump Trucks, Excavating, 5 cu yds and over; Dumpsters; Half-Tracks: Speedace: Euclids & similar excavating equipment Material trucks, Tandem Two teams; Semi-Trailers; Winch trucks-Fork

trucks; Distributor Drivers and Operators; Agitator and Transit Mix; Tank Wagon Drivers, Tandem or Semi; One Team; Station Wagons; Pickup Trucks; Material Trucks, Single Axle; Tank Wagon Drivers, Single Axle

GROUP 3: Oilers and Greasers - Field

TEAM0682-002 05/01/2017

ST LOUIS CITY AND COUNTY

	Rates	Fringes
Truck drivers:		
GROUP 1.....	\$ 33.30	13.79+a+b+c+d
GROUP 2.....	\$ 33.50	13.79+a+b+c+d
GROUP 3.....	\$ 33.60	13.79+a+b+c+d

a. PENSION: 5/1/2012 - \$182.20 per week.

b. HAZMAT PREMIUM: If Hazmat certification on a job site is required by a state or federal agency or requested by project owner or by the employer, employees on that job site shall receive \$1.50 premium pay.

TRUCK DRIVERS CLASSIFICATIONS

GROUP 1 - Pick-up trucks; forklift, single axle; flatbed trucks; job site ambulance, and trucks or trailers of a water level capacity of 11.99 cu. yds. or less

GROUP 2 - Trucks or trailers of a water level capacity of 12.0 cu yds. up to 22.0 cu yds. including euclids, speedace and similar equipment of same capacity and compressors

GROUP 3 - Trucks or trailers of a water level capacity of 22.0 cu. yds & over including euclids, speedace & all floats, flatbed trailers, boom trucks, winch trucks, including small trailers, farm wagons tilt-top trailers, field offices, tool trailers, concrete pumps, concrete conveyors & gasoline tank trailers and truck mounted mobile concrete mixers

FOOTNOTE FOR TRUCK DRIVERS:

c. PAID HOLIDAYS: Christmas Day, Independence Day, Labor Day, Memorial Day, Veterans Day, New Years Day, Thanksgiving Day

d. PAID VACATION: 3 days paid vacation for 600 hours of service in any one contract year; 4 days paid vacation for 800 hours of service in any one contract year; 5 days paid vacation for 1,000 hours of service in any one contract year. When such an employee has completed 3 years of continuous employment with the same employer and then works the above required number of hours, he shall receive double the number of days of vacation specified above. When such

an employee has completed 10 years of continuous employment with the same employer and then works the above required number of hours, he shall receive triple the number of days of vacation specified above. When such an employee has completed 15 years of continuous employment with the same employer and then works the above required number of hours, he shall receive 4 times the number of days of vacation specified above.

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example:

PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can

be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

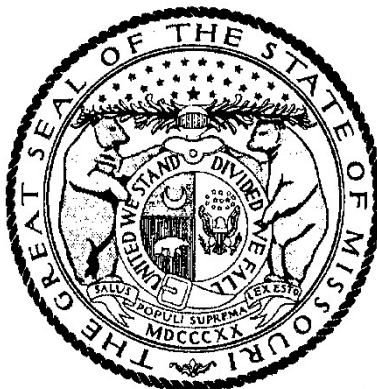
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END OF GENERAL DECISION"

Missouri

Division of Labor Standards

WAGE AND HOUR SECTION



MICHAEL L. PARSON, Governor

Annual Wage Order No. 26

Section 103
SCOTLAND COUNTY

In accordance with Section 290.262 RSMo 2000, within thirty (30) days after a certified copy of this Annual Wage Order has been filed with the Secretary of State as indicated below, any person who may be affected by this Annual Wage Order may object by filing an objection in triplicate with the Labor and Industrial Relations Commission, P.O. Box 599, Jefferson City, MO 65102-0599. Such objections must set forth in writing the specific grounds of objection. Each objection shall certify that a copy has been furnished to the Division of Labor Standards, P.O. Box 449, Jefferson City, MO 65102-0449 pursuant to 8 CSR 20-5.010(1). A certified copy of the Annual Wage Order has been filed with the Secretary of State of Missouri.

Original Signed by

Taylor Burks, Director
Division of Labor Standards

Filed With Secretary of State: March 8, 2019

Last Date Objections May Be Filed: April 8, 2019

Prepared by Missouri Department of Labor and Industrial Relations

OCCUPATIONAL TITLE	** Date of Increase	Basic Hourly Rates
Asbestos Worker		\$18.20*
Boilermaker		\$18.20*
Bricklayer		\$18.20*
Carpenter		\$44.82
Lather		
Linoleum Layer		
Millwright		
Pile Driver		
Cement Mason		\$18.20*
Plasterer		
Communications Technician		\$18.20*
Electrician (Inside Wireman)		\$18.20*
Electrician Outside Lineman		\$18.20*
Lineman Operator		
Lineman - Tree Trimmer		
Groundman		
Groundman - Tree Trimmer		
Elevator Constructor		\$18.20*
Glazier		\$18.20*
Ironworker		\$18.20*
Laborer		\$39.09
General Laborer		
First Semi-Skilled		
Second Semi-Skilled		
Mason		\$18.20*
Marble Mason		
Marble Finisher		
Terrazzo Worker		
Terrazzo Finisher		
Tile Setter		
Tile Finisher		
Operating Engineer		\$55.06
Group I		
Group II		
Group III		
Group III-A		
Group IV		
Group V		
Painter		\$18.20*
Plumber		\$18.20*
Pipe Fitter		
Roofer		\$18.20*
Sheet Metal Worker		\$18.20*
Sprinkler Fitter		\$18.20*
Truck Driver		\$18.20*
Truck Control Service Driver		
Group I		
Group II		
Group III		
Group IV		

*The Division of Labor Standards received less than 1,000 reportable hours as required by RSMo 290.257.4(b). Public works contracting minimum wage is established for this occupational title using data provided by Missouri Economic Research and Information Center, in accordance with RSMo 290.257.2.

Heavy Construction Rates for
SCOTLAND County

Section 103

OCCUPATIONAL TITLE	** Date of Increase	Basic Hourly Rates
Carpenter		\$18.20*
Millwright		
Pile Driver		
Electrician (Outside Lineman)		\$18.20*
Lineman Operator		
Lineman - Tree Trimmer		
Groundman		
Groundman - Tree Trimmer		
Laborer		\$18.20*
General Laborer		
Skilled Laborer		
Operating Engineer		\$18.20*
Group I		
Group II		
Group III		
Group IV		
Truck Driver		\$18.20*
Truck Control Service Driver		
Group I		
Group II		
Group III		
Group IV		

Use Heavy Construction Rates on Highway and Heavy construction in accordance with the classifications of construction work established in 8 CSR 30-3.040(3).

Use Building Construction Rates on Building construction in accordance with the classifications of construction work established in 8 CSR 30-3.040(2).

If a worker is performing work on a heavy construction project within an occupational title that is not listed on the Heavy Construction Rate Sheet, use the rate for that occupational title as shown on the Building Construction Rate Sheet.

*The Division of Labor Standards received less than 1,000 reportable hours as required by RSMo 290.257.4(b). Public works contracting minimum wage is established for this occupational title using data provided by Missouri Economic Research and Information Center, in accordance with RSMo 290.257.2.

OVERTIME and HOLIDAYS

OVERTIME

For all work performed on a Sunday or a holiday, not less than twice (2x) the prevailing hourly rate of wages for work of a similar character in the locality in which the work is performed or the public works contracting minimum wage, whichever is applicable, shall be paid to all workers employed by or on behalf of any public body engaged in the construction of public works, exclusive of maintenance work.

For all overtime work performed, not less than one and one-half (1½) the prevailing hourly rate of wages for work of a similar character in the locality in which the work is performed or the public works contracting minimum wage, whichever is applicable, shall be paid to all workers employed by or on behalf of any public body engaged in the construction of public works, exclusive of maintenance work or contractual obligation. For purposes of this subdivision, "**overtime work**" shall include work that exceeds ten hours in one day and work in excess of forty hours in one calendar week; and

A thirty-minute lunch period on each calendar day shall be allowed for each worker on a public works project, provided that such time shall not be considered as time worked.

HOLIDAYS

January first;
The last Monday in May;
July fourth;
The first Monday in September;
November eleventh;
The fourth Thursday in November; and
December twenty-fifth;

If any holiday falls on a Sunday, the following Monday shall be considered a holiday.

SECTION 5

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08 3600
13 3419

BIFOLD HANGAR DOORS
METAL BUILDING SYSTEMS

ITEM P-101 PREPARATION/REMOVAL OF EXISTING PAVEMENTS

DESCRIPTION

101-1.1 This item shall consist of preparation of existing pavement surfaces for overlay, surface treatments, removal of existing pavement, and other miscellaneous items. The work shall be accomplished in accordance with these specifications and the applicable plans.

EQUIPMENT AND MATERIALS

101-2.1 All equipment and materials shall be specified here and in the following paragraphs or approved by the Resident Project Representative (RPR). The equipment shall not cause damage to the pavement to remain in place.

CONSTRUCTION

101-3.1 REMOVAL OF EXISTING PAVEMENT.

The Contractor's removal operation shall be controlled to not damage adjacent pavement structure, and base material, cables, utility ducts, pipelines, or drainage structures which are to remain under the pavement.

- a. **Concrete pavement removal.** Not Used.
- b. **Asphalt pavement removal.** Asphalt pavement to be removed shall be cut to the full depth of the asphalt pavement around the perimeter of the area to be removed. The material is to be wasted off the airport site unless otherwise approved by the RPR. **The pavement shall be removed so the joint for each layer of pavement replacement is offset 1 foot from the joint in the preceding layer. This does not apply if the removed pavement is to be replaced with concrete or soil.**
- c. **Repair or removal of Base, Subbase, and/or Subgrade.** All failed material including surface, base course, subbase course, and subgrade shall be removed and repaired as shown on the plans or as directed by the RPR. Materials and methods of construction shall comply with the applicable sections of these specifications. Any damage caused by Contractor's removal process shall be repaired at the Contractor's expense.

101-3.2 PREPARATION OF JOINTS AND CRACKS PRIOR TO OVERLAY/SURFACE TREATMENT. Not Used.

101-3.3 REMOVAL OF FOREIGN SUBSTANCES/CONTAMINATES PRIOR TO REMARKING.

Removal of foreign substances/contaminates from existing pavement that will affect the bond of the new treatment shall consist of removal of rubber, fuel spills, oil, crack sealer, at least 90% of paint, and other foreign substances from the surface of the pavement. Areas that require removal are designated on the plans and as directed by the RPR in the field during construction.

High-pressure water may be used. If chemicals are used, they shall comply with the state's environmental protection regulations. Removal methods used shall not cause major damage to the pavement, or to any

structure or utility within or adjacent to the work area. Major damage is defined as changing the properties of the pavement, removal of asphalt causing the aggregate to ravel, or removing pavement over 1/8 inch (3 mm) deep. If it is deemed by the RPR that damage to the existing pavement is caused by operational error, such as permitting the application method to dwell in one location for too long, the Contractor shall repair the damaged area without compensation and as directed by the RPR.

Removal of foreign substances shall not proceed until approved by the RPR. Water used for high-pressure water equipment shall be provided by the Contractor at the Contractor's expense. No material shall be deposited on the pavement shoulders. All wastes shall be disposed of in areas indicated in this specification or shown on the plans.

101-3.4 CONCRETE SPALL OR FAILED ASPHALTIC CONCRETE PAVEMENT REPAIR.

- a. **Repair of concrete spalls in areas to be overlaid with asphalt.** Not Used.
- b. **Asphalt pavement repair.** Not Used.

101-3.5 COLD MILLING. Milling shall be performed with a power-operated milling machine or grinder, capable of producing a uniform finished surface. The milling machine or grinder shall operate without tearing or gouging the underlaying surface. The milling machine or grinder shall be equipped with grade and slope controls, and a positive means of dust control. All millings shall be removed and disposed off Airport property. If the Contractor mills or grinds deeper or wider than the plans specify, the Contractor shall replace the material removed with new material at the Contractor's Expense. Cold milling is not required but is included in the specification in case it is used as part of the partial depth asphalt removal.

- a. **Patching.** Not Used.
- b. **Profiling, grade correction, or surface correction.** Not Used.
- c. **Clean-up.** The Contractor shall sweep the milled surface daily and immediately after the milling until all residual materials are removed from the pavement surface. Prior to paving, the Contractor shall wet down the milled pavement and thoroughly sweep and/or blow the surface to remove loose residual material. Waste materials shall be collected and removed from the pavement surface and adjacent areas by sweeping or vacuuming. Waste materials shall be removed and disposed off Airport property.

101-3.6. PREPARATION OF ASPHALT PAVEMENT SURFACES PRIOR TO SURFACE TREATMENT. Not Used.

101-3.7 MAINTENANCE. The Contractor shall perform all maintenance work necessary to keep the pavement in a satisfactory condition until the full section is complete and accepted by the RPR. The surface shall be kept clean and free from foreign material. The pavement shall be properly drained at all times. If cleaning is necessary or if the pavement becomes disturbed, any work repairs necessary shall be performed at the Contractor's expense.

101-3.8 PREPARATION OF JOINTS IN RIGID PAVEMENT PRIOR TO RESEALING. Not Used.

101-3.9 PREPARATION OF CRACKS IN FLEXIBLE PAVEMENT PRIOR TO SEALING. Not Used.

101-3.10 REMOVAL OF PIPE AND OTHER BURIED STRUCTURES.

- a. **Removal of Existing Pipe Material.** Remove the types of pipe as indicated on the plans. The pipe material shall be legally disposed of off-site in a timely manner following removal. Trenches shall be backfilled with material equal to or better in quality than adjacent embankment. Trenches under paved areas must be compacted to 95% of ASTM D698.

METHOD OF MEASUREMENT

101-4.1 PAVEMENT REMOVAL. The unit of measurement for pavement removal shall be the number of square yards (square meters) removed by the Contractor. Any pavement removed outside the limits of removal because the pavement was damaged by negligence on the part of the Contractor shall not be included in the measurement for payment. No direct measurement or payment shall be made for saw cutting. Saw cutting shall be incidental to pavement removal.

101-4.2 REMOVAL OF FOREIGN SUBSTANCES/CONTAMINATES. Removal of foreign substances/contaminates shall not be measured separately but shall be considered incidental to P-620, Runway and Taxiway Painting.

101-4.3 COLD MILLING. If used, cold milling shall not be measured separately, but shall be considered incidental to other items.

101-4.7 REMOVAL OF PIPE AND OTHER BURIED STRUCTURES. The unit of measurement for removal of pipe and other buried structures will be made at the contract unit price for each completed and accepted item. This price shall be full compensation for all labor, equipment, tools, and incidentals necessary to complete this item in accordance with paragraph 101-3.10.

BASIS OF PAYMENT

101-5.1 PAYMENT. Payment shall be made at contract unit price for the unit of measurement as specified above. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

Item P-101a	Partial Depth Pavement Removal - per square yard
Item P-101b	Removal of Drainage – per lump sum

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)	
AC 150/5380-6	Guidelines and Procedures for Maintenance of Airport Pavements.
ASTM International (ASTM)	
ASTM D6690	Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements

****END OF ITEM P-101****

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ITEM P-152 EXCAVATION, SUBGRADE, AND EMBANKMENT

DESCRIPTION

152-1.1 This item covers excavation, disposal, placement, and compaction of all materials within the limits of the work required to construct safety areas, runways, taxiways, aprons, and intermediate areas as well as other areas for drainage, building construction, parking, or other purposes in accordance with these specifications and in conformity to the dimensions and typical sections shown on the plans.

152-1.2 CLASSIFICATION. All material excavated shall be classified as defined below:

- a. **Unclassified excavation.** Unclassified excavation shall consist of the excavation and disposal of all material, regardless of its nature.

152-1.3 UNSUITABLE EXCAVATION. Unsuitable material shall be disposed in designated waste areas as shown on the plans. Materials containing vegetable or organic matter, such as muck, peat, organic silt, or sod shall be considered unsuitable for use in embankment construction. Material suitable for topsoil may be used on the embankment slope when approved by the RPR.

CONSTRUCTION METHODS

152-2.1 GENERAL. Before beginning excavation, grading, and embankment operations in any area, the area shall be stripped of grass and topsoil.

The suitability of material to be placed in embankments shall be subject to approval by the RPR. All unsuitable material shall be disposed of in waste areas as shown on the plans. All waste areas shall be graded to allow positive drainage of the area and adjacent areas. The surface elevation of waste areas shall be specified on the plans or approved by the RPR.

When the Contractor's excavating operations encounter artifacts of historical or archaeological significance, the operations shall be temporarily discontinued and the RPR notified per Section 70, paragraph 70-20. At the direction of the RPR, the Contractor shall excavate the site in such a manner as to preserve the artifacts encountered and allow for their removal. Such excavation will be paid for as extra work.

Areas outside the limits of the pavement areas where the top layer of soil has become compacted by hauling or other Contractor activities shall be scarified and disked to a depth of 4 inches (100 mm), to loosen and pulverize the soil. Stones or rock fragments larger than 4 inches (100 mm) in their greatest dimension will not be permitted in the top 6 inches (150 mm) of the subgrade.

If it is necessary to interrupt existing surface drainage, sewers or under-drainage, conduits, utilities, or similar underground structures, the Contractor shall be responsible for and shall take all necessary precautions to preserve them or provide temporary services. When such facilities are encountered, the Contractor shall notify the RPR, who shall arrange for their removal if necessary. The Contractor, at their own expense, shall satisfactorily repair or pay the cost of all damage to such facilities or structures that may result from any of the Contractor's operations during the period of the contract.

- a. **Blasting.** Blasting shall not be allowed.

152-2.2 EXCAVATION. No excavation shall be started until the work has been staked out by the Contractor and the RPR has obtained from the Contractor, the survey notes of the elevations and

measurements of the ground surface. The Contractor and RPR shall agree that the original ground lines shown on the original topographic mapping are accurate, or agree to any adjustments made to the original ground lines.

Existing grades on the design cross sections or DTM's, where they do not match the locations of actual spot elevations shown on the topographic map, were developed by computer interpolation from those spot elevations. Prior to disturbing original grade, Contractor shall verify the accuracy of the existing ground surface by verifying spot elevations at the same locations where original field survey data was obtained as indicated on the topographic map. Contractor shall recognize that, due to the interpolation process, the actual ground surface at any particular location may differ somewhat from the interpolated surface shown on the design cross sections or obtained from the DTM's. Contractor's verification of original ground surface, however, shall be limited to verification of spot elevations as indicated herein, and no adjustments will be made to the original ground surface unless the Contractor demonstrates that spot elevations shown are incorrect. For this purpose, spot elevations which are within 0.1 foot (30 mm) of the stated elevations for ground surfaces, or within 0.04 foot (12 mm) for hard surfaces (pavements, buildings, foundations, structures, etc.) shall be considered "no change". Only deviations in excess of these will be considered for adjustment of the original ground surface. If Contractor's verification identifies discrepancies in the topographic map, Contractor shall notify the RPR in writing at least two weeks before disturbance of existing grade to allow sufficient time to verify the submitted information and make adjustments to the design cross sections or DTM's. Disturbance of existing grade in any area shall constitute acceptance by the Contractor of the accuracy of the original elevations shown on the topographic map for that area.

All areas to be excavated shall be stripped of vegetation and topsoil. Topsoil shall be stockpiled for future use in areas designated on the plans or by the RPR. All suitable excavated material shall be used in the formation of embankment, subgrade, or other purposes as shown on the plans. All unsuitable material shall be disposed of as shown on the plans.

The grade shall be maintained so that the surface is well drained at all times.

When the volume of the excavation exceeds that required to construct the embankments to the grades as indicated on the plans, the excess shall be used to grade the areas of ultimate development or disposed as directed by the RPR. When the volume of excavation is not sufficient for constructing the embankments to the grades indicated, the deficiency shall be obtained from borrow areas.

a. **Selective grading.** Not Used.

b. **Undercutting.** Rock, shale, hardpan, loose rock, boulders, or other material unsatisfactory for safety areas, subgrades, roads, shoulders, or any areas intended for turf shall be excavated to a minimum depth of 12 inches (300 mm) below the subgrade or to the depth specified by the RPR. Muck, peat, matted roots, or other yielding material, unsatisfactory for subgrade foundation, shall be removed to the depth specified. Unsuitable materials shall be disposed off the airport. The cost is incidental to this item. This excavated material shall be paid for at the contract unit price per cubic yard (per cubic meter) for **Overexcavation and Replacement**. The excavated area shall be backfilled with suitable material obtained from the grading operations or borrow areas and compacted to specified densities. The necessary backfill will constitute a part of the embankment and will be considered incidental to overexcavation. Where rock cuts are made, backfill with select material. Any pockets created in the rock surface shall be drained in accordance with the details shown on the plans.

c. **Over-break.** Over-break, including slides, is that portion of any material displaced or loosened beyond the finished work as planned or authorized by the RPR. All over-break shall be graded or removed by the Contractor and disposed of as directed by the RPR. The RPR shall determine if the displacement of such material was unavoidable and their own decision shall be final. Payment

will not be made for the removal and disposal of over-break that the RPR determines as avoidable. Unavoidable over-break will be classified as "Unclassified Excavation."

- d. **Removal of utilities.** The removal of existing structures and utilities required to permit the orderly progress of work will be accomplished [by someone other than the Contractor] [by the Contractor as indicated on the plans]. All existing foundations shall be excavated at least 2 feet (60 cm) below the top of subgrade or as indicated on the plans, and the material disposed of as directed by the RPR. All foundations thus excavated shall be backfilled with suitable material and compacted as specified for embankment or as shown on the plans.

152-2.3 BORROW EXCAVATION. Borrow areas are not required.

152-2.4 DRAINAGE EXCAVATION. Not Used.

152-2.5 PREPARATION OF CUT AREAS OR AREAS WHERE EXISTING PAVEMENT HAS BEEN REMOVED. In those areas on which a subbase or base course is to be placed, the top 12 inches (300 mm) of subgrade shall be compacted to not less than 100 % of maximum density for non-cohesive soils, and 95% of maximum density for cohesive soils as determined by ASTM **D698**. As used in this specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM **D4318**.

152-2.6 PREPARATION OF EMBANKMENT AREA. All sod and vegetative matter shall be removed from the surface upon which the embankment is to be placed. The cleared surface shall be broken up by plowing or scarifying to a minimum depth of 6 inches (150 mm) and shall then be compacted per paragraph 152-2.10.

Sloped surfaces steeper than one (1) vertical to four (4) horizontal shall be plowed, stepped, benched, or broken up so that the fill material will bond with the existing material. When the subgrade is part fill and part excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of 12 inches (300 mm) and compacted as specified for the adjacent fill.

No direct payment shall be made for the work performed under this section. The necessary clearing and grubbing and the quantity of excavation removed will be paid for under the respective items of work.

152-2.7 CONTROL STRIP. The first half-day of construction of subgrade and/or embankment shall be considered as a control strip for the Contractor to demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of this specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. The maximum compacted thickness may be increased to a maximum of 12 inches (300 mm) upon the Contractor's demonstration that approved equipment and operations will uniformly compact the lift to the specified density. The RPR must witness this demonstration and approve the lift thickness prior to full production.

Control strips that do not meet specification requirements shall be reworked, re-compacted, or removed and replaced at the Contractor's expense. Full operations shall not begin until the control strip has been accepted by the RPR. The Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved in advance by the RPR.

152-2.8 FORMATION OF EMBANKMENTS. The material shall be constructed in lifts as established in the control strip, but not less than 6 inches (150 mm) nor more than 12 inches (300 mm) of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications.

The lifts shall be placed, to produce a soil structure as shown on the typical cross-section or as directed by the RPR. Materials such as brush, hedge, roots, stumps, grass and other organic matter, shall not be incorporated or buried in the embankment.

Earthwork operations shall be suspended at any time when satisfactory results cannot be obtained due to rain, freezing, or other unsatisfactory weather conditions in the field. Frozen material shall not be placed in the embankment nor shall embankment be placed upon frozen material. Material shall not be placed on surfaces that are muddy, frozen, or contain frost. The Contractor shall drag, blade, or slope the embankment to provide surface drainage at all times.

The material in each lift shall be within $\pm 2\%$ of optimum moisture content before rolling to obtain the prescribed compaction. The material shall be moistened or aerated as necessary to achieve a uniform moisture content throughout the lift. Natural drying may be accelerated by blending in dry material or manipulation alone to increase the rate of evaporation.

The Contractor shall make the necessary corrections and adjustments in methods, materials or moisture content to achieve the specified embankment density.

The contractor will take samples of excavated materials which will be used in embankment for testing and develop a Moisture-Density Relations of Soils Report (Proctor) in accordance with ASTM D698. A new Proctor shall be developed for each soil type based on visual classification.

Density tests will be taken by the contractor for every 3,000 square yards of compacted embankment for each lift which is required to be compacted, or other appropriate frequencies as determined by the RPR.

If the material has greater than 30% retained on the 3/4-inch (19.0 mm) sieve, follow AASHTO T-180 Annex Correction of maximum dry density and optimum moisture for oversized particles.

Rolling operations shall be continued until the embankment is compacted to not less than 100% of maximum density for non-cohesive soils, and 95% of maximum density for cohesive soils as determined by ASTM **D698**. Under all areas to be paved, the embankments shall be compacted to a depth of **12 inches** and to a density of not less than **100** percent of the maximum density as determined by ASTM **D698**. As used in this specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318.

On all areas outside of the pavement areas, no compaction will be required on the top 4 inches (100 mm) which shall be prepared for a seedbed in accordance with Item T-901.

The in-place field density shall be determined in accordance with ASTM 6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938.

The Contractor's laboratory shall perform all density tests in the RPR's presence and provide the test results upon completion to the RPR for acceptance. If the specified density is not attained, the area represented by the test or as designated by the RPR shall be reworked and/or re-compact and additional random tests made. This procedure shall be followed until the specified density is reached.

Compaction areas shall be kept separate, and no lift shall be covered by another lift until the proper density is obtained.

During construction of the embankment, the Contractor shall route all construction equipment evenly over the entire width of the embankment as each lift is placed. Lift placement shall begin in the deepest portion of the embankment fill. As placement progresses, the lifts shall be constructed approximately parallel to the finished pavement grade line.

When rock, concrete pavement, asphalt pavement, and other embankment material are excavated at approximately the same time as the subgrade, the material shall be incorporated into the outer portion of the embankment and the subgrade material shall be incorporated under the future paved areas. Stones, fragmentary rock, and recycled pavement larger than 4 inches (100 mm) in their greatest dimensions will not be allowed in the top 12 inches (300 mm) of the subgrade. Rockfill shall be brought up in lifts as specified or as directed by the RPR and the finer material shall be used to fill the voids forming a dense, compact mass. Rock, cement concrete pavement, asphalt pavement, and other embankment material shall not be disposed of except at places and in the manner designated on the plans or by the RPR.

When the excavated material consists predominantly of rock fragments of such size that the material cannot be placed in lifts of the prescribed thickness without crushing, pulverizing or further breaking down the pieces, such material may be placed in the embankment as directed in lifts not exceeding 2 feet (60 cm) in thickness. Each lift shall be leveled and smoothed with suitable equipment by distribution of spalls and finer fragments of rock. The lift shall not be constructed above an elevation 4 feet (1.2 m) below the finished subgrade.

There will be no separate measurement of payment for compacted embankment. All costs incidental to placing in lifts, compacting, discing, watering, mixing, sloping, and other operations necessary for construction of embankments will be included in the contract price for excavation, borrow, or other items.

152-2.9 PROOF ROLLING. The purpose of proof rolling the subgrade is to identify any weak areas in the subgrade and not for compaction of the subgrade. After compaction is completed, the subgrade area shall be proof rolled with a 20 ton (18.1 metric ton) Tandem axle Dual Wheel Dump Truck loaded to the legal limit with tires inflated to 80/100/150 psi (0.551 MPa/0.689 MPa/1.034 MPa) in the presence of the RPR. Apply a minimum of **50%** coverage, or as specified by the RPR, under pavement areas. A coverage is defined as the application of one tire print over the designated area. Soft areas of subgrade that deflect more than 1 inch (25 mm) or show permanent deformation greater than 1 inch (25 mm) shall be removed and replaced with suitable material or reworked to conform to the moisture content and compaction requirements in accordance with these specifications. Removal and replacement of soft areas is incidental to this item.

152-2.10 COMPACTION REQUIREMENTS. The subgrade under areas to be paved shall be compacted to a depth of 12 inches (300 mm) and to a density of not less than 100 percent of the maximum dry density as determined by ASTM D698. The subgrade in areas outside the limits of the pavement areas shall be compacted to a depth of 12 inches (300 mm) and to a density of not less than 95 percent of the maximum density as determined by ASTM D698.

The material to be compacted shall be within $\pm 2\%$ of optimum moisture content before being rolled to obtain the prescribed compaction (except for expansive soils). When the material has greater than 30 percent retained on the $\frac{3}{4}$ inch (19.0 mm) sieve, follow the methods in ASTM D698 for correction of maximum dry density and optimum moisture for oversized particles. Tests for moisture content and compaction will be taken at a minimum of **3,000** S.Y. of subgrade. All quality assurance testing shall be done by the Contractor's laboratory in the presence of the RPR, and density test results shall be furnished upon completion to the RPR for acceptance determination.

The in-place field density shall be determined in accordance with ASTM D6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938 within 12 months prior to its use on this contract. The gage shall be field standardized daily.

Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

If the specified density is not attained, the entire lot shall be reworked and/or re-compacted and additional random tests made. This procedure shall be followed until the specified density is reached.

All cut-and-fill slopes shall be uniformly dressed to the slope, cross-section, and alignment shown on the plans or as directed by the RPR and the finished subgrade shall be maintained.

152-2.11 FINISHING AND PROTECTION OF SUBGRADE. Finishing and protection of the subgrade is incidental to this item. Grading and compacting of the subgrade shall be performed so that it will drain readily. All low areas, holes or depressions in the subgrade shall be brought to grade. Scarifying, blading, rolling and other methods shall be performed to provide a thoroughly compacted subgrade shaped to the lines and grades shown on the plans. All ruts or rough places that develop in the completed subgrade shall be graded, re-compacted, and retested. The Contractor shall protect the subgrade from damage and limit hauling over the finished subgrade to only traffic essential for construction purposes.

The Contractor shall maintain the completed course in satisfactory condition throughout placement of subsequent layers. No subbase, base, or surface course shall be placed on the subgrade until the subgrade has been accepted by the RPR.

152-2.12 HAUL. All hauling will be considered a necessary and incidental part of the work. The Contractor shall include the cost in the contract unit price for the pay of items of work involved. No payment will be made separately or directly for hauling on any part of the work.

The Contractor's equipment shall not cause damage to any excavated surface, compacted lift or to the subgrade as a result of hauling operations. Any damage caused as a result of the Contractor's hauling operations shall be repaired at the Contractor's expense.

The Contractor shall be responsible for providing, maintaining and removing any haul roads or routes within or outside of the work area, and shall return the affected areas to their former condition, unless otherwise authorized in writing by the Owner. No separate payment will be made for any work or materials associated with providing, maintaining and removing haul roads or routes.

152-2.13 SURFACE TOLERANCES. In those areas on which a subbase or base course is to be placed, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches (75 mm), reshaped and re-compacted to grade until the required smoothness and accuracy are obtained and approved by the RPR. The Contractor shall perform all final smoothness and grade checks in the presence of the RPR. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense.

- a. **Smoothness.** The finished surface shall not vary more than $\pm \frac{1}{2}$ inch (12 mm) when tested with a 12-foot (3.7-m) straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot (3.7-m) straightedge for the full length of each line on a 50-foot (15-m) grid.
- b. **Grade.** The grade and crown shall be measured on a 50-foot (15-m) grid and shall be within ± 0.05 feet (15 mm) of the specified grade.

On safety areas, turfed areas and other designated areas within the grading limits where no subbase or base is to placed, grade shall not vary more than 0.10 feet (30 mm) from specified grade. Any deviation in excess of this amount shall be corrected by loosening, adding or removing materials, and reshaping.

152-2.14 TOPSOIL. When topsoil is specified or required as shown on the plans, it shall be salvaged from stripping or other grading operations. If, at the time of excavation or stripping, the topsoil cannot be placed in its final section of finished construction, the material shall be stockpiled at approved locations. Stockpiles shall be located as shown on the plans and the approved CSPP, and shall not be placed on areas that subsequently will require any excavation or embankment fill. If, in the judgment of the RPR, it is practical to place the salvaged topsoil at the time of excavation or stripping, the material shall be placed in its final position without stockpiling or further re-handling.

Upon completion of grading operations, stockpiled topsoil shall be handled and placed as shown on the plans. Topsoil shall not be paid separately and shall be considered incidental to excavation. No direct payment will be made for topsoil under Item P-152.

METHOD OF MEASUREMENT

152-3.1 Measurement for payment specified by the cubic yard (cubic meter) shall be computed by the comparison of digital terrain model (DTM) surfaces for computation of neat line design quantities. The end area is that bound by the original ground line established by field cross-sections and the final theoretical pay line established by cross-sections shown on the plans, subject to verification by the RPR.

152-3.2 The quantity of unclassified excavation to be paid for shall be the number of cubic yards (cubic meters) measured in its original position. Measurement shall not include the quantity of materials excavated without authorization beyond normal slope lines, or the quantity of material used for purposes other than those directed.

152-3.3 The quantity of subgrade preparation shall be the number of square yards (square meters) measured in its original position.

152-3.4 The quantity of overexcavation and replacement shall be the number of cubic yards (cubic meters) measured in its original position.

152-3.5 The quantity of Import and place low volume charge (LVC) granular fill shall be the number of cubic yards (cubic meters) measured in its original position.

BASIS OF PAYMENT

152-4.1 Unclassified excavation payment shall be made at the contract unit price per cubic yard (cubic meter). This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

152-4.2 Subgrade preparation payment shall be made at the contract unit price per square yard (square meter). This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

152-4.3 Overexcavation and Replacement payment shall be made at the contract unit price per cubic yard (cubic meter). This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

152-4.4 Import and place low volume charge (LVC) granular fill payment shall be made at the contract unit price per cubic yard (cubic meter). This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-152a	Unclassified Excavation - per cubic yard (cubic meter)
Item P-152b	Subgrade Preparation- 24 Inches – per square yard (square meter)
Item P-152c	Overexcavation and Replacement – per cubic yard (cubic meter)
Item P-152d	Import and Place Low Volume Charge (LVC) Granular Fill – per cubic yard (cubic meter)

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO T-180	Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop
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ASTM International (ASTM)

ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft ³ (600 kN-m/m ³))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ³ (2700 kN-m/m ³))
ASTM D6938	Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

Advisory Circulars (AC)

AC 150/5370-2	Operational Safety on Airports During Construction Software
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Software

FAARFIELD – FAA Rigid and Flexible Iterative Elastic Layered Design

U.S. Department of Transportation

FAA RD-76-66	Design and Construction of Airport Pavements on Expansive Soils
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****END OF ITEM P-152****

ITEM P-208 AGGREGATE BASE COURSE

DESCRIPTION

208-1.1 This item shall consist of a base course composed of course aggregate bonded with fine aggregate base. It shall be constructed on a prepared subgrade or subbase course per these specifications and shall conform to the dimensions and typical cross-section shown on the plans.

MATERIALS

208-2.1 AGGREGATE BASE. The aggregate base material shall consist of both fine and coarse aggregate. Material shall be clean, sound, durable particles and fragments of stone or gravel, crushed stone, crushed slag, or crushed gravel mixed or blended with sand, screenings, or other materials. Materials shall be handled and stored in accordance with all federal, state, and local requirements. The aggregate shall be free from clay lumps, organic matter, or other deleterious materials or coatings. The method used to produce the crushed gravel shall result in the fractured particles in the finished product as nearly constant and uniform as practicable. The fine aggregate portion, defined as the portion passing the No. 4 (4.75 mm) sieve produced in crushing operations, shall be incorporated in the base material to the extent permitted by the gradation requirements. Aggregate base material requirements are listed in the following table.

22

AGGREGATE BASE MATERIAL REQUIREMENTS

Material Test	Requirement	Standard
Coarse Aggregate		
Resistance to Degradation	Loss: 50% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate - or - 18% maximum using magnesium sulfate	ASTM C88
Percentage of Fractured Particles	Minimum 60% by weight of particles with at least two fractured faces and 75% with at least one fractured face ¹	ASTM D5821
Flat Particles, Elongated Particles, or Flat and Elongated Particles	10% maximum, by weight, of flat, elongated, or flat and elongated particles ²	ASTM D4791
Bulk density of slag	Weigh not less than 70 pounds per cubic foot (1.12 Mg/cubic meter)	ASTM C29
Clay lumps and friable particles	Less than or equal to 3 percent	ASTM C142
Fine Aggregate		
Liquid limit	Less than or equal to 25	ASTM D4318
Plasticity Index	Not more than five (5)	ASTM D4318

¹ The area of each face shall be equal to at least 75% of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces.

² A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

208-2.2 GRADATION REQUIREMENTS. The gradation of the aggregate base material shall meet the requirements of the gradation given in the following table when tested per ASTM C117 and ASTM C136. The gradation shall be well graded from coarse to fine and shall not vary from the lower limit on one sieve to the high limit on an adjacent sieve or vice versa.

34

GRADATION OF AGGREGATE BASE

Sieve Size	Design Range Percentage by Weight passing	Contractor's Final Gradation	Job Control Grading Band Tolerances for Contractor's Final Gradation ¹ Percent
2 inch (50 mm)	--		±0
1-1/2 inch (37.5 mm)	100		±5
1 inch (25.0 mm)	70-100		±8
3/4 inch (19.0 mm)	55-85		±8
No. 4 (4.75 mm)	30-60		±8
No. 40 (425 µm)	10-30		±5
No. 200 (75 µm)	0-5		±3

35

36 ¹The fraction of material passing the No. 200 (75 µm) sieve shall not exceed two-thirds the fraction passing
37 the No. 40 (425 µm) sieve.

38

39 ²The "Job Control Grading Band Tolerances for Contractor's Final Gradation" in the table shall be applied
40 to "Contractor's Final Gradation" to establish a job control grading band. The full tolerance still applies if
41 application of the tolerances results in a job control grading band outside the design range.

43

208-2.3 SAMPLING AND TESTING.

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46 **a. Aggregate base materials.** The Contractor shall take samples of the aggregate base in accordance with
47 ASTM D75 to verify initial aggregate base requirements and gradation. Material shall meet the requirements in
48 paragraphs 208-2.1 and 208-2.2. This sampling and testing will be the basis for approval of the aggregate base
49 quality requirements.

50

51 **b. Gradation requirements.** The Contractor shall take at least two aggregate base samples per day in the
52 presence of the Resident Project Representative (RPR) to check the final gradation. Sampling shall be per
53 ASTM D75. Material shall meet the requirements in paragraph 208-2.2. The samples shall be taken from the
54 in-place, un-compacted material at sampling points and intervals designated by the RPR.

55

56 **208-2.4 SEPARATION GEOTEXTILE.** Separation geotextile shall be Class 2, 0.02 sec⁻¹ permittivity per
57 ASTM D4491, Apparent opening size per ASTM D4751 with 0.60 mm maximum average roll value.

58

59

CONSTRUCTION METHODS

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62 **208-3.1 CONTROL STRIP.** The first half-day of construction shall be considered the control strip. The
63 Contractor shall demonstrate, in the presence of the RPR, that the materials, equipment, and construction
64 processes meet the requirements of the specification. The sequence and manner of rolling necessary to obtain
65 specified density requirements shall be determined. The maximum compacted thickness may be increased to
66 a maximum of 12 inches (300 mm) upon the Contractor's demonstration that approved equipment and
67 operations will uniformly compact the lift to the specified density. The RPR must witness this demonstration
68 and approve the lift thickness prior to full production.

69

70 Control strips that do not meet specification requirements shall be reworked, re-compacted or removed and
71 replaced at the Contractor's expense. Full operations shall not continue until the control strip has been accepted

by the RPR. The Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved by the RPR.

208-3.2 PREPARING UNDERLYING SUBGRADE AND/OR SUBBASE. The underlying subgrade and/or subbase shall be checked and accepted by the RPR before base course placing and spreading operations begin. Re-proof rolling of the subgrade or proof rolling of the subbase in accordance with Item P-152, at the Contractor's expense, may be required by the RPR if the Contractor fails to ensure proper drainage or protect the subgrade and/or subbase. Any ruts or soft, yielding areas due to improper drainage conditions, hauling, or any other cause, shall be corrected before the base course is placed. To ensure proper drainage, the spreading of the base shall begin along the centerline of the pavement on a crowned section or on the high side of the pavement with a one-way slope.

208-3.3 PRODUCTION. The aggregate shall be uniformly blended and, when at a satisfactory moisture content per paragraph 208-3.5, the approved material may be transported directly to the placement.

208-3.4 PLACEMENT. The aggregate shall be placed and spread on the prepared underlying layer by spreader boxes or other devices as approved by the RPR, to a uniform thickness and width. The equipment shall have positive thickness controls to minimize the need for additional manipulation of the material. Dumping from vehicles that require re-handling shall not be permitted. Hauling over the uncompacted base course shall not be permitted.

The aggregate shall meet gradation and moisture requirements prior to compaction. The base course layer shall be constructed in lifts as established in the control strip, but not less than 4 inches (100 mm) nor more than 12 inches (300 mm) of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications at the Contractor's expense.

208-3.5 COMPACTION. Immediately upon completion of the spreading operations, compact each layer of the base course, as specified, with approved compaction equipment. The number, type, and weight of rollers shall be sufficient to compact the material to the required density within the same day that the aggregate is placed on the subgrade.

The field density of each compacted lift of material shall be at least 100% of the maximum density of laboratory specimens prepared from samples of the subbase material delivered to the jobsite. The laboratory specimens shall be compacted and tested in accordance with ASTM **D698**. The moisture content of the material during placing operations shall be within ± 2 percentage points of the optimum moisture content as determined by ASTM **D698**. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

208-3.6 WEATHER LIMITATIONS. Material shall not be placed unless the ambient air temperature is at least 40°F (4°C) and rising. Work on base course shall not be conducted when the subgrade or subbase is wet or frozen or the base material contains frozen material.

208-3.7 MAINTENANCE. The base course shall be maintained in a condition that will meet all specification requirements. When material has been exposed to excessive rain, snow, or freeze-thaw conditions, prior to placement of additional material, the Contractor shall verify that materials still meet all specification requirements. Equipment may be routed over completed sections of base course, provided that no damage results and the equipment is routed over the full width of the completed base course. Any damage resulting to

the base course from routing equipment over the base course shall be repaired by the Contractor at their expense.

208-3.8 SURFACE TOLERANCES. After the course has been compacted, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches (75 mm), reshaped and recompact to grade until the required smoothness and accuracy are obtained and approved by the RPR. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense. The smoothness and accuracy requirements specified here apply only to the top layer when base course is constructed in more than one layer.

a. Smoothness. The finished surface shall not vary more than 3/8-inch (9 mm) when tested with a 12-foot (3.7-m) straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot (3.7-m) straightedge for the full length of each line on a 50-foot (15-m) grid.

b. Grade. The grade and crown shall be measured on a 50-foot (15-m) grid and shall be within +0 and -1/2 inch (12 mm) of the specified grade.

208-3.9 ACCEPTANCE SAMPLING AND TESTING. Aggregate base course shall be accepted for density and thickness on an area basis. Two tests will be made for density and thickness for each 1200 square yards (1000 square meters). Sampling locations will be determined on a random basis per ASTM D3665.

a. Density. The Contractor's laboratory shall perform all density tests in the RPR's presence and provide the test results upon completion to the RPR for acceptance.

Each area shall be accepted for density when the field density is at least 100% of the maximum density of laboratory specimens compacted and tested per ASTM D698. The in-place field density shall be determined per ASTM D6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938. If the specified density is not attained, the area represented by the failed test must be reworked and/or recompact and two additional random tests made. This procedure shall be followed until the specified density is reached. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

b. Thickness. Depth tests shall be made by test holes at least 3 inches (75 mm) in diameter that extend through the base. The thickness of the base course shall be within +0 and -1/2 inch (12 mm) of the specified thickness as determined by depth tests taken by the Contractor in the presence of the RPR for each area. Where the thickness is deficient by more than 1/2-inch (12 mm), the Contractor shall correct such areas at no additional cost by scarifying to a depth of at least 3 inches (75 mm), adding new material of proper gradation, and the material shall be blended and recompact to grade. The Contractor shall replace, at his expense, base material where depth tests have been taken.

METHOD OF MEASUREMENT

208-4.1 The quantity of aggregate base course shall be measured by the number of square yards (square meters) of material actually constructed and accepted by the RPR as complying with the plans and specifications. Base materials shall not be included in any other excavation quantities.

208-4.2 Separation geotextile shall be measured by the number of square yards of materials placed and accepted by the RPR as complying with the plans and specifications excluding seam overlaps and edge anchoring.

BASIS OF PAYMENT

208-5.1 Payment shall be made at the contract unit price per square yards (square meters) for aggregate base course. This price shall be full compensation for furnishing all materials and for all operations, hauling, placing, and compacting of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

208-5.2 Payment shall be made at the contract unit price per square yard for separation geotextile. The price shall be full compensation for furnishing all labor, equipment, material, anchors, and incidentals necessary.

Payment will be made under:

Item P-208a	Aggregate Base Course - per square yards (square meters)
Item P-208b	Separation Geotextile - per square yard

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C29	Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM C88	Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C117	Standard Test Method for Materials Finer than 75- μ m (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C142	Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft ³ (600 kN-m/m ³))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ³ (2700 kN-m/m ³))
ASTM D2167	Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method

219	ASTM D2487	Standard Practice for Classification of Soils for Engineering Purposes
220		(Unified Soil Classification System)
221	ASTM D3665	Standard Practice for Random Sampling of Construction Materials
222	ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index
223		of Soils
224	ASTM D4491	Standard Test Methods for Water Permeability of Geotextiles by
225		Permittivity
226	ASTM D4643	Standard Test Method for Determination of Water Content of Soil and
227		Rock by Microwave Oven Heating
228	ASTM D4751	Standard Test Methods for Determining Apparent Opening Size of a
229		Geotextile
230	ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and
231		Elongated Particles in Coarse Aggregate
232	ASTM D5821	Standard Test Method for Determining the Percentage of Fractured
233		Particles in Coarse Aggregate
234	ASTM D6938	Standard Test Method for In-Place Density and Water Content of Soil and
235		Soil-Aggregate by Nuclear Methods (Shallow Depth)
236	ASTM D7928	Standard Test Method for Particle-Size Distribution (Gradation) of Fine-
237		Grained Soils Using the Sedimentation (Hydrometer) Analysis
238	American Association of State Highway and Transportation Officials (AASHTO)	
239	M288	Standard Specification for Geosynthetic Specification for Highway
240		Applications

END OF ITEM P-208

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ITEM P-401 ASPHALT MIX PAVEMENT

DESCRIPTION

401-1.1 This item shall consist of pavement courses composed of mineral aggregate and asphalt binder mixed in a central mixing plant and placed on a prepared base or stabilized course in accordance with these specifications and shall conform to the lines, grades, thicknesses, and typical cross-sections shown on the plans. Each course shall be constructed to the depth, typical section, and elevation required by the plans and shall be rolled, finished, and approved before the placement of the next course.

MATERIALS

401-2.1 AGGREGATE. Aggregates shall consist of crushed stone, crushed gravel, crushed slag, screenings, natural sand, and mineral filler, as required. The aggregates should have no known history of detrimental pavement staining due to ferrous sulfides, such as pyrite. Coarse aggregate is the material retained on the No. 4 (4.75 mm) sieve. Fine aggregate is the material passing the No. 4 (4.75 mm) sieve.

- a. **Coarse aggregate.** Coarse aggregate shall consist of sound, tough, durable particles, free from films of matter that would prevent thorough coating and bonding with the asphalt material and free from organic matter and other deleterious substances. Coarse aggregate material requirements are given in the table below.

Coarse Aggregate Material Requirements

Material Test	Requirement	Standard
Resistance to Degradation	Loss: 40% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate - or - 18% maximum using magnesium sulfate	ASTM C88
Clay lumps and friable particles	0.3% maximum	ASTM C142
Percentage of Fractured Particles	For pavements designed for aircraft gross weights of 60,000 pounds (27200 kg) or more: Minimum 75% by weight of particles with at least two fractured faces and 85% with at least one fractured face ¹	ASTM D5821
	For pavements designed for aircraft gross weights less than 60,000 pounds (27200 kg): Minimum 50% by weight of particles with at least two fractured faces and 65% with at least one fractured face ¹	

Material Test	Requirement	Standard
Flat, Elongated, or Flat and Elongated Particles	8% maximum, by weight, of flat, elongated, or flat and elongated particles at 5:1 ²	ASTM D4791
Bulk density of slag ³	Weigh not less than 70 pounds per cubic foot (1.12 Mg/cubic meter)	ASTM C29.

¹ The area of each face shall be equal to at least 75% of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces.

² A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

³ Only required if slag is specified.

- b. Fine aggregate.** Fine aggregate shall consist of clean, sound, tough, durable, angular shaped particles produced by crushing stone, slag, or gravel and shall be free from coatings of clay, silt, or other objectionable matter. Natural (non-manufactured) sand may be used to obtain the gradation of the fine aggregate blend or to improve the workability of the mix. Fine aggregate material requirements are listed in the table below.

Fine Aggregate Material Requirements

Material Test	Requirement	Standard
Liquid limit	25 maximum	ASTM D4318
Plasticity Index	4 maximum	ASTM D4318
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 10% maximum using Sodium sulfate - or - 15% maximum using magnesium sulfate	ASTM C88
Clay lumps and friable particles	0.3% maximum	ASTM C142
Sand equivalent	45 minimum	ASTM D2419
Natural Sand	5% maximum by weight of total aggregate	ASTM D1073

- c. Sampling.** ASTM D75 shall be used in sampling coarse and fine aggregate.

401-2.2 MINERAL FILLER. Mineral filler (baghouse fines) may be added in addition to material naturally present in the aggregate. Mineral filler shall meet the requirements of ASTM D242.

Mineral Filler Requirements

Material Test	Requirement	Standard
Plasticity Index	4 maximum	ASTM D4318

401-2.3 ASPHALT BINDER. Asphalt binder shall conform to ASTM D6373 Performance Grade (PG) 70-22.

Asphalt Binder PG Plus Test Requirements

Material Test	Requirement	Standard
Elastic Recovery	75% minimum	ASTM D6084 ¹

¹ Follow procedure B on RTFO aged binder

401-2.4 ANTI-STRIPPING AGENT. Any anti-stripping agent or additive (anti-strip) shall be heat stable and shall not change the asphalt binder grade beyond specifications. Anti-strip shall be an approved material of the Department of Transportation of the State in which the project is located.

COMPOSITION

401-3.1 COMPOSITION OF MIXTURE(S). The asphalt mix shall be composed of a mixture of aggregates, filler and anti-strip agent if required, and asphalt binder. The aggregate fractions shall be sized, handled in separate size groups, and combined in such proportions that the resulting mixture meets the grading requirements of the job mix formula (JMF).

401-3.2 JOB MIX FORMULA (JMF) LABORATORY. The laboratory used to develop the JMF shall possess a current certificate of accreditation, listing D3666 from a national accrediting authority and all test methods required for developing the JMF; and be listed on the accrediting authority's website. A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the Resident Project Representative (RPR) prior to start of construction.

401-3.3 JOB MIX FORMULA (JMF). No asphalt mixture shall be placed until an acceptable mix design has been submitted to the RPR for review and accepted in writing. The RPR's review shall not relieve the Contractor of the responsibility to select and proportion the materials to comply with this section. When the project requires asphalt mixtures of differing aggregate gradations and/or binders, a separate JMF shall be submitted for each mix. Add anti-stripping agent to meet tensile strength requirements. The JMF shall be prepared by an accredited laboratory that meets the requirements of paragraph 401-3.2. The asphalt mixture shall be designed using procedures contained in Asphalt Institute MS-2 Mix Design Manual, 7th Edition. Samples shall be prepared and compacted using a Marshall compactor in accordance with ASTM D6926.

Should a change in sources of materials be made, a new JMF must be submitted to the RPR for review and accepted in writing before the new material is used. After the initial production JMF has been approved by the RPR and a new or modified JMF is required for whatever reason, the subsequent cost of the new or modified JMF, including a new control strip when required by the RPR, will be borne by the Contractor.

The RPR may request samples at any time for testing, prior to and during production, to verify the quality of the materials and to ensure conformance with the applicable specifications.

The JMF shall be submitted in writing by the Contractor at least 30 days prior to the start of paving operations. The JMF shall be developed within the same construction season using aggregates proposed for project use.

The JMF shall be dated, and stamped or sealed by the responsible professional Engineer of the laboratory and shall include the following items as a minimum:

- Manufacturer's Certificate of Analysis (COA) for the asphalt binder used in the JMF in accordance with paragraph 401-2.3. Certificate of asphalt performance grade is with modifier already added, if used and must indicate compliance with ASTM D6373. For plant modified asphalt binder, certified test report indicating grade certification of modified asphalt binder.
- Manufacturer's Certificate of Analysis (COA) for the anti-stripping agent if used in the JMF in accordance with paragraph 401-2.4.

- Certified material test reports for the course and fine aggregate and mineral filler in accordance with paragraphs 401-2.1.
- Percent passing each sieve size for individual gradation of each aggregate cold feed and/or hot bin; percent by weight of each cold feed and/or hot bin used; and the total combined gradation in the JMF.
- Specific Gravity and absorption of each coarse and fine aggregate.
- Percent natural sand.
- Percent fractured faces.
- Percent by weight of flat particles, elongated particles, and flat and elongated particles (and criteria).
- Percent of asphalt.
- Number of blows or gyrations.
- Laboratory mixing and compaction temperatures.
- Supplier-recommended field mixing and compaction temperatures.
- Plot of the combined gradation on a 0.45 power gradation curve.
- Graphical plots of air voids, voids in the mineral aggregate (VMA), and unit weight versus asphalt content. To achieve minimum VMA during production, the mix design needs to account for material breakdown during production.
- Tensile Strength Ratio (TSR).
- Type and amount of Anti-strip agent when used.
- Asphalt Pavement Analyzer (APA) results.
- Date the JMF was developed. Mix designs that are not dated or which are from a prior construction season shall not be accepted.

140

Table 1. Asphalt Design Criteria

Test Property	Value	Test Method
Number of blows or gyrations	50	
Air voids (%)	3.5	ASTM D3203
Percent voids in mineral aggregate (VMA), minimum	See Table 2	ASTM D6995
Tensile Strength Ratio (TSR) ¹	not less than 80 at a saturation of 70-80%	ASTM D4867
Asphalt Pavement Analyzer (APA) ²	Less than 10 mm @ 4000 passes	AASHTO T340 at 250 psi hose pressure at 64°C test temperature

141 ¹ Test specimens for TSR shall be compacted at 7 ± 1.0 % air voids. In areas subject to freeze-thaw, use
 142 freeze-thaw conditioning in lieu of moisture conditioning per ASTM D4867.

143 ² AASHTO T340 at 100 psi hose pressure at 64°C test temperature may be used in the interim. If this
 144 method is used the required Value shall be less than 5 mm @ 8000 passes
 145

146 The mineral aggregate shall be of such size that the percentage composition by weight, as determined by
 147 laboratory sieves, will conform to the gradation or gradations specified in Table 2 when tested in accordance
 148 with ASTM C136 and ASTM C117.
 149

150 The gradations in Table 2 represent the limits that shall determine the suitability of aggregate for use from the
 151 sources of supply; be well graded from coarse to fine and shall not vary from the low limit on one sieve to the
 152 high limit on the adjacent sieve, or vice versa.

153

Table 2. Aggregate - Asphalt Pavements

Sieve Size	Percentage by Weight Passing Sieve
1 inch (25.0 mm)	--
3/4 inch (19.0 mm)	100
1/2 inch (12.5 mm)	90-100
3/8 inch (9.5 mm)	72-88
No. 4 (4.75 mm)	53-73
No. 8 (2.36 mm)	38-60
No. 16 (1.18 mm)	26-48
No. 30 (600 μ m)	18-38
No. 50 (300 μ m)	11-27
No. 100 (150 μ m)	6-18
No. 200 (75 μ m)	3-6
Minimum Voids in Mineral Aggregate (VMA)¹	15.0

Sieve Size	Percentage by Weight Passing Sieve
Asphalt Percent:	
Stone or gravel	5.0-7.5
Slag	6.5-9.5
Recommended Minimum Construction Lift Thickness	2 inch

¹To achieve minimum VMA during production, the mix design needs to account for material breakdown during production.

The aggregate gradations shown are based on aggregates of uniform specific gravity. The percentages passing the various sieves shall be corrected when aggregates of varying specific gravities are used, as indicated in the Asphalt Institute MS-2 Mix Design Manual, 7th Edition.

401-3.4 RECLAIMED ASPHALT PAVEMENT (RAP). RAP shall not be used.

401-3.5 CONTROL STRIP. A control strip is not required.

CONSTRUCTION METHODS

401-4.1 WEATHER LIMITATIONS. The asphalt shall not be placed upon a wet surface or when the surface temperature of the underlying course is less than specified in Table 4. The temperature requirements may be waived by the RPR, if requested; however, all other requirements including compaction shall be met.

Table 4. Surface Temperature Limitations of Underlying Course

Mat Thickness	Base Temperature (Minimum)	
	°F	°C
3 inches (7.5 cm) or greater	40 ¹	4
Greater than 2 inches (50 mm) but less than 3 inches (7.5 cm)	45	7

401-4.2 ASPHALT PLANT. Plants used for the preparation of asphalt shall conform to the requirements of American Association of State Highway and Transportation Officials (AASHTO) M156 including the following items.

- a. **Inspection of plant.** The RPR, or RPR's authorized representative, shall have access, at all times, to all areas of the plant for checking adequacy of equipment; inspecting operation of the plant; verifying weights, proportions, and material properties; and checking the temperatures maintained in the preparation of the mixtures.
- b. **Storage bins and surge bins.** The asphalt mixture stored in storage and/or surge bins shall meet the same requirements as asphalt mixture loaded directly into trucks. Asphalt mixture shall not be stored in storage and/or surge bins for a period greater than twelve (12) hours. If the RPR determines there is an excessive heat loss, segregation, or oxidation of the asphalt mixture due to temporary storage, temporary storage shall not be allowed.

401-4.3 AGGREGATE STOCKPILE MANAGEMENT. Aggregate stockpiles shall be constructed in a manner that prevents segregation and intermixing of deleterious materials. Aggregates from different sources shall be stockpiled, weighed and batched separately at the asphalt batch plant. Aggregates that have become segregated or mixed with earth or foreign material shall not be used.

A continuous supply of materials shall be provided to the work to ensure continuous placement.

401-4.4 HAULING EQUIPMENT. Trucks used for hauling asphalt shall have tight, clean, and smooth metal beds. To prevent the asphalt from sticking to the truck beds, the truck beds shall be lightly coated with a minimum amount of paraffin oil, lime solution, or other material approved by the RPR. Petroleum products shall not be used for coating truck beds. Each truck shall have a suitable cover to protect the mixture from adverse weather. When necessary, to ensure that the mixture will be delivered to the site at the specified temperature, truck beds shall be insulated or heated and covers shall be securely fastened.

401-4.4.1 MATERIAL TRANSFER VEHICLE (MTV). Material transfer vehicles are not required.

401-4.5 ASPHALT PAVERS. Asphalt pavers shall be self-propelled with an activated heated screed, capable of spreading and finishing courses of asphalt that will meet the specified thickness, smoothness, and grade. The paver shall have sufficient power to propel itself and the hauling equipment without adversely affecting the finished surface. The asphalt paver shall be equipped with a control system capable of automatically maintaining the specified screed grade and elevation.

If the spreading and finishing equipment in use leaves tracks or indented areas, or produces other blemishes in the pavement that are not satisfactorily corrected by the scheduled operations, the use of such equipment shall be discontinued.

The paver shall be capable of paving to a minimum width specified in paragraph 401-4.12.

401-4.6 ROLLERS. The number, type, and weight of rollers shall be sufficient to compact the asphalt to the required density while it is still in a workable condition without crushing of the aggregate, depressions or other damage to the pavement surface. Rollers shall be in good condition, clean, and capable of operating at slow speeds to avoid displacement of the asphalt. All rollers shall be specifically designed and suitable for compacting asphalt concrete and shall be properly used. Rollers that impair the stability of any layer of a pavement structure or underlying soils shall not be used.

401-4.7 DENSITY DEVICE. The Contractor shall have on site a density gauge during all paving operations in order to assist in the determination of the optimum rolling pattern, type of roller and frequencies, as well as to monitor the effect of the rolling operations during production paving. The Contractor shall supply a qualified technician during all paving operations to calibrate the gauge and obtain accurate density readings for all new asphalt. These densities shall be supplied to the RPR upon request at any time during construction. No separate payment will be made for supplying the density gauge and technician.

401-4.8 PREPARATION OF ASPHALT BINDER. The asphalt binder shall be heated in a manner that will avoid local overheating and provide a continuous supply of the asphalt binder to the mixer at a uniform temperature. The temperature of unmodified asphalt binder delivered to the mixer shall be sufficient to provide a suitable viscosity for adequate coating of the aggregate particles, but shall not exceed 325°F (160°C) when added to the aggregate. The temperature of modified asphalt binder shall be no more than 350°F (175°C) when added to the aggregate.

401-4.9 PREPARATION OF MINERAL AGGREGATE. The aggregate for the asphalt shall be heated and dried. The maximum temperature and rate of heating shall be such that no damage occurs to the aggregates. The temperature of the aggregate and mineral filler shall not exceed 350°F (175°C) when the asphalt binder is

added. Particular care shall be taken that aggregates high in calcium or magnesium content are not damaged by overheating. The temperature shall not be lower than is required to obtain complete coating and uniform distribution on the aggregate particles and to provide a mixture of satisfactory workability.

401-4.10 PREPARATION OF ASPHALT MIXTURE. The aggregates and the asphalt binder shall be weighed or metered and mixed in the amount specified by the JMF. The combined materials shall be mixed until the aggregate obtains a uniform coating of asphalt binder and is thoroughly distributed throughout the mixture. Wet mixing time shall be the shortest time that will produce a satisfactory mixture, but not less than 25 seconds for batch plants. The wet mixing time for all plants shall be established by the Contractor, based on the procedure for determining the percentage of coated particles described in ASTM D2489, for each individual plant and for each type of aggregate used. The wet mixing time will be set to achieve 95% of coated particles. For continuous mix plants, the minimum mixing time shall be determined by dividing the weight of its contents at operating level by the weight of the mixture delivered per second by the mixer. The moisture content of all asphalt upon discharge shall not exceed 0.5%.

401-4.11 APPLICATION OF PRIME AND TACK COAT. Immediately before placing the asphalt mixture, the underlying course shall be cleaned of all dust and debris.

A tack coat shall be applied in accordance with Item P-603 to all vertical and horizontal asphalt and concrete surfaces prior to placement of the first and each subsequent lift of asphalt mixture.

401-4.12 LAYDOWN PLAN, TRANSPORTING, PLACING, AND FINISHING. Prior to the placement of the asphalt, the Contractor shall prepare a laydown plan with the sequence of paving lanes and width to minimize the number of cold joints; the location of any temporary ramps; laydown temperature; and estimated time of completion for each portion of the work (milling, paving, rolling, cooling, etc.). The laydown plan and any modifications shall be approved by the RPR.

Deliveries shall be scheduled so that placing and compacting of asphalt is uniform with minimum stopping and starting of the paver. Hauling over freshly placed material shall not be permitted until the material has been compacted, as specified, and allowed to cool to approximately ambient temperature. The Contractor, at their expense, shall be responsible for repair of any damage to the pavement caused by hauling operations.

Contractor shall survey each lift of asphalt surface course and certify to RPR that every lot of each lift meets the grade tolerances of paragraph 401-6.2d before the next lift can be placed.

Edges of existing asphalt pavement abutting the new work shall be saw cut and the cut off material and laitance removed. Apply a tack coat in accordance with P-603 before new asphalt material is placed against it.

The speed of the paver shall be regulated to eliminate pulling and tearing of the asphalt mat. Placement of the asphalt mix shall begin along the centerline of a crowned section or on the high side of areas with a one way slope unless shown otherwise on the laydown plan as accepted by the RPR. The asphalt mix shall be placed in consecutive adjacent lanes having a minimum width of 10 feet (m) except where edge lanes require less width to complete the area. Additional screed sections attached to widen the paver to meet the minimum lane width requirements must include additional auger sections to move the asphalt mixture uniformly along the screed extension.

The longitudinal joint in one course shall offset the longitudinal joint in the course immediately below by at least one foot (30 cm); however, the joint in the surface top course shall be at the centerline of crowned pavements. Transverse joints in one course shall be offset by at least 10 feet (3 m) from transverse joints in the previous course. Transverse joints in adjacent lanes shall be offset a minimum of 10 feet (3 m). On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the asphalt may be spread and luted by hand tools.

The RPR may at any time, reject any batch of asphalt, on the truck or placed in the mat, which is rendered unfit for use due to contamination, segregation, incomplete coating of aggregate, or overheated asphalt mixture. Such rejection may be based on only visual inspection or temperature measurements. In the event of such rejection, the Contractor may take a representative sample of the rejected material in the presence of the RPR, and if it can be demonstrated in the laboratory, in the presence of the RPR, that such material was erroneously rejected, payment will be made for the material at the contract unit price.

Areas of segregation in the surface course, as determined by the RPR, shall be removed and replaced at the Contractor's expense. The area shall be removed by saw cutting and milling a minimum of the construction lift thickness as specified in paragraph 401-3.3, Table 2 for the approved mix design. The area to be removed and replaced shall be a minimum width of the paver and a minimum of 10 feet (3 m) long.

401-4.13 COMPACTION OF ASPHALT MIXTURE. After placing, the asphalt mixture shall be thoroughly and uniformly compacted by self-propelled rollers. The surface shall be compacted as soon as possible when the asphalt has attained sufficient stability so that the rolling does not cause undue displacement, cracking or shoving. The sequence of rolling operations and the type of rollers used shall be at the discretion of the Contractor. The speed of the roller shall, at all times, be sufficiently slow to avoid displacement of the hot mixture and be effective in compaction. Any surface defects and/or displacement occurring as a result of the roller, or from any other cause, shall be corrected at the Contractor's expense.

Sufficient rollers shall be furnished to handle the output of the plant. Rolling shall continue until the surface is of uniform texture, true to grade and cross-section, and the required field density is obtained. To prevent adhesion of the asphalt to the roller, the wheels shall be equipped with a scraper and kept moistened with water as necessary.

In areas not accessible to the roller, the mixture shall be thoroughly compacted with approved power tampers.

Any asphalt that becomes loose and broken, mixed with dirt, contains check-cracking, or in any way defective shall be removed and replaced with fresh hot mixture and immediately compacted to conform to the surrounding area. This work shall be done at the Contractor's expense. Skin patching shall not be allowed.

401-4.14 JOINTS. The formation of all joints shall be made to ensure a continuous bond between the courses and obtain the required density. All joints shall have the same texture as other sections of the course and meet the requirements for smoothness and grade.

The roller shall not pass over the unprotected end of the freshly laid asphalt except when necessary to form a transverse joint. When necessary to form a transverse joint, it shall be made by means of placing a bulkhead or by tapering the course. The tapered edge shall be cut back to its full depth and width on a straight line to expose a vertical face prior to placing the adjacent lane. In both methods, all contact surfaces shall be coated with an asphalt tack coat before placing any fresh asphalt against the joint.

Longitudinal joints which have been left exposed for more than four (4) hours; the surface temperature has cooled to less than 175°F (80°C); or are irregular, damaged, uncompacted or otherwise defective shall be cut back with a cutting wheel or pavement saw a maximum of 3 inches (75 mm) to expose a clean, sound, uniform vertical surface for the full depth of the course. All cutback material and any laitance produced from cutting joints shall be removed from the project. Asphalt tack coat in accordance with P-603 shall be applied to the clean, dry joint prior to placing any additional fresh asphalt against the joint. The cost of this work shall be considered incidental to the cost of the asphalt.

401-4.15 SAW-CUT GROOVING. Saw-cut grooving is not required.

401-4.16 DIAMOND GRINDING. Diamond grinding shall be accomplished by sawing with saw blades impregnated with industrial diamond abrasive.

Diamond grinding shall be performed with a machine designed specifically for diamond grinding capable of cutting a path at least 3 feet (0.9 m) wide. The saw blades shall be 1/8-inch (3-mm) wide with a sufficient number of blades to create grooves between 0.090 and 0.130 inches (2 and 3.5 mm) wide; and peaks and ridges approximately 1/32 inch (1 mm) higher than the bottom of the grinding cut. The actual number of blades will be determined by the Contractor and depend on the hardness of the aggregate. Equipment or grinding procedures that cause ravels, aggregate fractures, spalls or disturbance to the pavement will not be permitted. Contractor shall demonstrate to the RPR that the grinding equipment will produce satisfactory results prior to making corrections to surfaces. Grinding will be tapered in all directions to provide smooth transitions to areas not requiring grinding. The slurry resulting from the grinding operation shall be continuously removed and the pavement left in a clean condition. The Contractor shall apply a surface treatment per P-608 to all areas that have been subject to grinding.

401-4.17 NIGHTTIME PAVING REQUIREMENTS. The Contractor shall provide adequate lighting during any nighttime construction. A lighting plan shall be submitted by the Contractor and approved by the RPR prior to the start of any nighttime work. All work shall be in accordance with the approved CSPP and lighting plan.

CONTRACTOR QUALITY CONTROL (CQC)

401-5.1 GENERAL. The Contractor shall develop a Contractor Quality Control Program (CQCP) in accordance with Item C-100. No partial payment will be made for materials without an approved CQCP.

401-5.2 CONTRACTOR QUALITY CONTROL (QC) FACILITIES. The Contractor shall provide or contract for testing facilities in accordance with Item C-100. The RPR shall be permitted unrestricted access to inspect the Contractor's QC facilities and witness QC activities. The RPR will advise the Contractor in writing of any noted deficiencies concerning the QC facility, equipment, supplies, or testing personnel and procedures. When the deficiencies are serious enough to be adversely affecting the test results, the incorporation of the materials into the work shall be suspended immediately and will not be permitted to resume until the deficiencies are satisfactorily corrected.

401-5.3 CONTRACTOR QC TESTING. The Contractor shall perform all QC tests necessary to control the production and construction processes applicable to these specifications and as set forth in the approved CQCP. The testing program shall include, but not necessarily be limited to, tests for the control of asphalt content, aggregate gradation, temperatures, aggregate moisture, field compaction, and surface smoothness. A QC Testing Plan shall be developed as part of the CQCP.

- a. **Asphalt content.** A minimum of two tests shall be performed per day in accordance with ASTM D6307 or ASTM D2172 for determination of asphalt content. When using ASTM D6307, the correction factor shall be determined as part of the first test performed at the beginning of plant production; and as part of every tenth test performed thereafter. The asphalt content for the day will be determined by averaging the test results.
- b. **Gradation.** Aggregate gradations shall be determined a minimum of twice per day from mechanical analysis of extracted aggregate in accordance with ASTM D5444, ASTM C136, and ASTM C117.

- c. **Moisture content of aggregate.** The moisture content of aggregate used for production shall be determined a minimum of once per day in accordance with ASTM C566.
- d. **Moisture content of asphalt.** The moisture content shall be determined once per day in accordance with AASHTO T329 or ASTM D1461.
- e. **Temperatures.** Temperatures shall be checked, at least four times per day, at necessary locations to determine the temperatures of the dryer, the asphalt binder in the storage tank, the asphalt at the plant, and the asphalt at the job site.
- f. **In-place density monitoring.** The Contractor shall conduct any necessary testing to ensure that the specified density is being achieved. A nuclear gauge may be used to monitor the pavement density in accordance with ASTM D2950.
- g. **Smoothness for Contractor Quality Control.**

The Contractor shall perform smoothness testing in transverse and longitudinal directions daily to verify that the construction processes are producing pavement with variances less than 1/4 inch in 12 feet, identifying areas that may pond water which could lead to hydroplaning of aircraft. If the smoothness criteria is not met, appropriate changes and corrections to the construction process shall be made by the Contractor before construction continues

The Contractor may use a 12-foot (3.7 m) "straightedge", a rolling inclinometer meeting the requirements of ASTM E2133 or rolling external reference device that can simulate a 12-foot (3.7m) straightedge approved by the RPR. Straight-edge testing shall start with one-half the length of the straightedge at the edge of pavement section being tested and then moved ahead one-half the length of the straightedge for each successive measurement. Testing shall be continuous across all joints. The surface irregularity shall be determined by placing the freestanding (unleveled) straightedge on the pavement surface and allowing it to rest upon the two highest spots covered by its length, and measuring the maximum gap between the straightedge and the pavement surface in the area between the two high points. If the rolling inclinometer or external reference device is used, the data may be evaluated using the FAA profile program, ProFAA or FHWA ProVal, using the 12-foot straightedge simulation function.

Smoothness readings shall not be made across grade changes or cross slope transitions. The transition between new and existing pavement shall be evaluated separately for conformance with the plans.

- (1) **Transverse measurements.** Transverse measurements shall be taken for each day's production placed. Transverse measurements shall be taken perpendicular to the pavement centerline each 50 feet (15 m) or more often as determined by the RPR. The joint between lanes shall be tested separately to facilitate smoothness between lanes.
- (2) **Longitudinal measurements.** Longitudinal measurements shall be taken for each day's production placed. Longitudinal tests shall be parallel to the centerline of paving; at the center of paving lanes when widths of paving lanes are less than 20 feet (6 m); and at the third points of paving lanes when widths of paving lanes are 20 ft (6 m) or greater.

Deviations on the final surface course in either the transverse or longitudinal direction that will trap water greater than 1/4 inch (6 mm) shall be corrected with diamond grinding per paragraph 401-4.16 or by removing and replacing the surface course to full depth. Grinding shall be tapered in all directions to provide smooth transitions to areas not requiring grinding. All areas in which diamond grinding has been performed shall be subject to the

final pavement thickness tolerances specified in paragraph 401-6.1d(3). Areas that have been ground shall be sealed with a surface treatment in accordance with Item P-608. To avoid the surface treatment creating any conflict with runway or taxiway markings, it may be necessary to seal a larger area.

Control charts shall be kept to show area of each day's placement and the percentage of corrective grinding required. Corrections to production and placement shall be initiated when corrective grinding is required. If the Contractor's machines and/or methods produce significant areas that need corrective actions in excess of 10 percent of a day's production, production shall be stopped until corrective measures are implemented by the Contractor.

- h. Grade.** Grade shall be evaluated daily to allow adjustments to paving operations when grade measurements do not meet specifications. As a minimum, grade shall be evaluated prior to and after the placement of the first lift and after placement of the surface lift.

Measurements will be taken at appropriate gradelines (as a minimum at center and edges of paving lane) and longitudinal spacing as shown on cross-sections and plans. The final surface of the pavement will not vary from the gradeline elevations and cross-sections shown on the plans by more than 1/2 inch (12 mm) vertically and 0.1 feet (30 mm) laterally. The documentation will be provided by the Contractor to the RPR by the end of the following working day.

Areas with humps or depressions that exceed grade or smoothness criteria and that retain water on the surface must be ground off provided the course thickness after grinding is not more than 1/2 inch (12 mm) less than the thickness specified on the plans. Grinding shall be in accordance with paragraph 401-4.16.

The Contractor shall repair low areas or areas that cannot be corrected by grinding by removal of deficient areas to the depth of the final course plus 1/2 inch and replacing with new material. Skin patching is not allowed.

401-5.4 SAMPLING. When directed by the RPR, the Contractor shall sample and test any material that appears inconsistent with similar material being sampled, unless such material is voluntarily removed and replaced or deficiencies corrected by the Contractor. All sampling shall be in accordance with standard procedures specified.

401-5.5 CONTROL CHARTS. The Contractor shall maintain linear control charts for both individual measurements and range (i.e. difference between highest and lowest measurements) for aggregate gradation, asphalt content, and VMA. The VMA for each day will be calculated and monitored by the QC laboratory.

Control charts shall be posted in a location satisfactory to the RPR and kept current. As a minimum, the control charts shall identify the project number, the contract item number, the test number, each test parameter, the Action and Suspension Limits applicable to each test parameter, and the Contractor's test results. The Contractor shall use the control charts as part of a process control system for identifying potential problems and assignable causes before they occur. If the Contractor's projected data during production indicates a problem and the Contractor is not taking satisfactory corrective action, the RPR may suspend production or acceptance of the material.

- a. Individual measurements.** Control charts for individual measurements shall be established to maintain process control within tolerance for aggregate gradation, asphalt content, and VMA. The control charts shall use the job mix formula target values as indicators of central tendency for the following test parameters with associated Action and Suspension Limits:

Control Chart Limits for Individual Measurements

Sieve	Action Limit	Suspension Limit
3/4 inch (19.0 mm)	±6%	±9%
1/2 inch (12.5 mm)	±6%	±9%
3/8 inch (9.5 mm)	±6%	±9%
No. 4 (4.75 mm)	±6%	±9%
No. 16 (1.18 mm)	±5%	±7.5%
No. 50 (300 µm)	±3%	±4.5%
No. 200 (75 µm)	±2%	±3%
Asphalt Content	±0.45%	±0.70%
Minimum VMA	-0.5%	-1.0%

- b. **Range.** Control charts shall be established to control gradation process variability. The range shall be plotted as the difference between the two test results for each control parameter. The Suspension Limits specified below are based on a sample size of $n = 2$. Should the Contractor elect to perform more than two tests per lot, the Suspension Limits shall be adjusted by multiplying the Suspension Limit by 1.18 for $n = 3$ and by 1.27 for $n = 4$.

Control Chart Limits Based on Range

Sieve	Suspension Limit
1/2 inch (12.5 mm)	11%
3/8 inch (9.5 mm)	11%
No. 4 (4.75 mm)	11%
No. 16 (1.18 mm)	9%
No. 50 (300 µm)	6%
No. 200 (75 µm)	3.5%
Asphalt Content	0.8%

- c. **Corrective Action.** The CQCP shall indicate that appropriate action shall be taken when the process is believed to be out of tolerance. The Plan shall contain rules to gauge when a process is out of control and detail what action will be taken to bring the process into control. As a minimum, a process shall be deemed out of control and production stopped and corrective action taken, if:

- (1) One point falls outside the Suspension Limit line for individual measurements or range; or
- (2) Two points in a row fall outside the Action Limit line for individual measurements.

401-5.6 QC REPORTS. The Contractor shall maintain records and shall submit reports of QC activities daily, in accordance with Item C-100.

MATERIAL ACCEPTANCE

401-6.1 ACCEPTANCE SAMPLING AND TESTING. Unless otherwise specified, all acceptance sampling and testing necessary to determine conformance with the requirements specified in this section will be performed by the RPR at no cost to the Contractor except that coring as required in this section shall be completed and paid for by the Contractor.

- a. **Quality assurance (QA) testing laboratory.** The QA testing laboratory performing these acceptance tests will be accredited in accordance with ASTM D3666. The QA laboratory accreditation will be current and listed on the accrediting authority's website. All test methods required for acceptance sampling and testing will be listed on the lab accreditation.
- b. **Lot size.** A standard lot will be equal to one day's production divided into approximately equal sublots of between 400 to 600 tons. When only one or two sublots are produced in a day's production, the sublots will be combined with the production lot from the previous or next day.

Where more than one plant is simultaneously producing asphalt for the job, the lot sizes will apply separately for each plant.

- c. **Asphalt air voids.** Plant-produced asphalt will be tested for air voids on a subplot basis.
 - (1) **Sampling.** Material from each subplot shall be sampled in accordance with ASTM D3665. Samples shall be taken from material deposited into trucks at the plant or at the job site in accordance with ASTM D979. The sample of asphalt may be put in a covered metal tin and placed in an oven for not less than 30 minutes nor more than 60 minutes **(60 and 90 minutes, respectively if absorptive aggregates are used)** to maintain the material at or above the compaction temperature as specified in the JMF.
 - (2) **Testing.** Air voids will be determined for each subplot in accordance with ASTM D3203 for a set of compacted specimens prepared in accordance with ASTM D6926.
- d. **In-place asphalt mat and joint density.** Each subplot will be tested for in-place mat and joint density as a percentage of the theoretical maximum density (TMD).
 - (1) **Sampling.** The Contractor will cut minimum 5 inch (125 mm) diameter samples in accordance with ASTM D5361. The Contractor shall furnish all tools, labor, and materials for cleaning, and filling the cored pavement. Laitance produced by the coring operation shall be removed immediately after coring, and core holes shall be filled within one day after sampling in a manner acceptable to the RPR.
 - (2) **Bond.** Each lift of asphalt shall be bonded to the underlying layer. If cores reveal that the surface is not bonded, additional cores shall be taken as directed by the RPR to determine the extent of unbonded areas. Unbonded areas shall be removed by milling and replaced at no additional cost as directed by the RPR.
 - (3) **Thickness.** Thickness of each lift of surface course will be evaluated by the RPR for compliance to the requirements shown on the plans after any necessary corrections for grade. Measurements of thickness will be made using the cores extracted for each subplot for density measurement. The maximum allowable deficiency at any point will not be more than 1/4 inch (6 mm) less than the thickness indicated for the lift. Average thickness of lift, or combined lifts, will not be less than the indicated thickness. Where the thickness tolerances are not met, the lot or subplot shall be corrected by the Contractor at his expense by removing

the deficient area and replacing with new pavement. The Contractor, at his expense, may take additional cores as approved by the RPR to circumscribe the deficient area.

(4) **Mat density.** One core shall be taken from each subplot. Core locations will be determined by the RPR in accordance with ASTM D3665. Cores for mat density shall not be taken closer than one foot (30 cm) from a transverse or longitudinal joint. The bulk specific gravity of each cored sample will be determined in accordance with ASTM D2726. The percent compaction (density) of each sample will be determined by dividing the bulk specific gravity of each subplot sample by the TMD for that subplot.

(5) **Joint density.** One core centered over the longitudinal joint shall be taken for each subplot that has a longitudinal joint. Core locations will be determined by the RPR in accordance with ASTM D3665. The bulk specific gravity of each core sample will be determined in accordance with ASTM D2726. The percent compaction (density) of each sample will be determined by dividing the bulk specific gravity of each joint density sample by the average TMD for the lot. The TMD used to determine the joint density at joints formed between lots will be the lower of the average TMD values from the adjacent lots.

401-6.2 ACCEPTANCE CRITERIA.

a. **General.** Acceptance will be based on the implementation of the Contractor Quality Control Program (CQCP) and the following characteristics of the asphalt and completed pavements: air voids, mat density, joint density, grade.

b. **Air Voids and Mat density.** Acceptance of each lot of plant produced material for mat density and air voids will be based on the percentage of material within specification limits (PWL). If the PWL of the lot equals or exceeds 90%, the lot will be acceptable. Acceptance and payment will be determined in accordance with paragraph 401-8.1.

c. **Joint density.** Acceptance of each lot of plant produced asphalt for joint density will be based on the PWL. If the PWL of the lot is equal to or exceeds 90%, the lot will be considered acceptable. If the PWL is less than 90%, the Contractor shall evaluate the reason and act accordingly. If the PWL is less than 80%, the Contractor shall cease operations and until the reason for poor compaction has been determined. If the PWL is less than 71%, the pay factor for the lot used to complete the joint will be reduced by five (5) percentage points. This lot pay factor reduction will be incorporated and evaluated in accordance with paragraph 401-8.1.

d. **Grade.** The final finished surface of the pavement shall be surveyed to verify that the grade elevations and cross-sections shown on the plans do not deviate more than 1/2 inch (12 mm) vertically or 0.1 feet (30 mm) laterally.

Cross-sections of the pavement shall be taken at a minimum 50-foot (15-m) longitudinal spacing and at all longitudinal grade breaks. Minimum cross-section grade points shall include grade at centerline, ± 10 feet of centerline, and edge of pavement.

The survey and documentation shall be stamped and signed by a licensed surveyor. Payment for sublots that do not meet grade for over 25% of the subplot shall not be more than 95%.

e. **Profilograph roughness for QA Acceptance.** Not used.

401-6.3 PERCENTAGE OF MATERIAL WITHIN SPECIFICATION LIMITS (PWL). The PWL will be determined in accordance with procedures specified in Item C-110. The specification tolerance limits (L) for lower and (U) for upper are contained in Table 5.

Table 5. Acceptance Limits for Air Voids and Density

Test Property	Pavements Specification Tolerance Limits	
	L	U
Air Voids Total Mix (%)	2.0	5.0
Surface Course Mat Density (%)	92.8	-
Base Course Mat Density (%)	92.0	-
Joint density (%)	90.5	--

- a. **Outliers.** All individual tests for mat density and air voids will be checked for outliers (test criterion) in accordance with ASTM E178, at a significance level of 5%. Outliers will be discarded, and the PWL will be determined using the remaining test values. The criteria in Table 5 is based on production processes which have a variability with the following standard deviations: Surface Course Mat Density (%), 1.30; Base Course Mat Density (%), 1.55; Joint Density (%), 1.55.

The Contractor should note that (1) 90 PWL is achieved when consistently producing a surface course with an average mat density of at least 94.5% with 1.30% or less variability, (2) 90 PWL is achieved when consistently producing a base course with an average mat density of at least 94.0% with 1.55% or less variability, and (3) 90 PWL is achieved when consistently producing joints with an average joint density of at least 92.5% with 1.55% or less variability.

401-6.4 RESAMPLING PAVEMENT FOR MAT DENSITY.

- a. **General.** Resampling of a lot of pavement will only be allowed for mat density, and then, only if the Contractor requests same, in writing, within 48 hours after receiving the written test results from the RPR. A retest will consist of all the sampling and testing procedures contained in paragraphs 401-6.1d and 401-6.2b. Only one resampling per lot will be permitted.
- (1) A redefined PWL will be calculated for the resampled lot. The number of tests used to calculate the redefined PWL will include the initial tests made for that lot plus the retests.
 - (2) The cost for resampling and retesting shall be borne by the Contractor.
- b. **Payment for resampled lots.** The redefined PWL for a resampled lot will be used to calculate the payment for that lot in accordance with Table 6.
- c. **Outliers.** Check for outliers in accordance with ASTM E178, at a significance level of 5%.

METHOD OF MEASUREMENT

401-7.1 MEASUREMENT. Plant mix asphalt pavement shall be measured by the number of tons of HMA (aggregate plus binder) used in the accepted work. Recorded batch weights or truck scale weights will be used to determine the basis for the tonnage. The weight of bituminous material shall be calculated in accordance with the percentage of bitumen as determined in paragraph 401-5.3a.

The tonnage for payment shall be the total tonnage minus the asphalt cement (binder) tonnage as determined below.

The quantity of asphalt cement (binder) for payment, shall be calculated in accordance with the percentage of bitumen as determined in paragraph 401-5.3a. This percentage, applied on a lot basis, will then be utilized to calculate the quantity of asphalt cement (binder) per lot.

Any adjustments to pay would be applied to both the items, Bituminous Concrete Pavement and Asphalt Cement (Binder)."

Additional asphalt quantity placed that exceeds 3/4" above proposed grades shall not be measured and paid for by the sponsor and shall be borne by the Contractor."

BASIS OF PAYMENT

401-8.1 PAYMENT. Payment for a lot of asphalt meeting all acceptance criteria as specified in paragraph 401-6.2 shall be made based on results of tests for mat density and air voids. Payment for acceptable lots shall be adjusted according to paragraph 401-8.1c for mat density and air voids; and paragraph 401-6.2c for joint density, subject to the limitation that:

- a. The total project payment for plant mix asphalt pavement shall not exceed **100** percent of the product of the contract unit price and the total number of tons of asphalt used in the accepted work.
- b. The price shall be compensation for furnishing all materials, for all preparation, mixing, and placing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.
- c. **Basis of adjusted payment.** The pay factor for each individual lot shall be calculated in accordance with Table 6. A pay factor shall be calculated for both mat density and air voids. The lot pay factor shall be the higher of the two values when calculations for both mat density and air voids are 100% or higher. The lot pay factor shall be the product of the two values when only one of the calculations for either mat density or air voids is 100% or higher. The lot pay factor shall be the lower of the two values when calculations for both mat density and air voids are less than 100%. If PWL for joint density is less than 71% then the lot pay factor shall be reduced by 5% but be no higher than 95%.

For each lot accepted, the adjusted contract unit price shall be the product of the lot pay factor for the lot and the contract unit price. Payment shall be subject to the total project payment limitation specified in paragraph 401-8.1a. Payment in excess of 100% for accepted lots of asphalt shall be used to offset payment for accepted lots of asphalt pavement that achieve a lot pay factor less than 100%.

Payment for sublots which do not meet grade in accordance with paragraph 401-6.2d after correction for over 25% of the subplot shall be reduced by 5%.

Table 6. Price adjustment schedule¹

Percentage of material within specification limits (PWL)	Lot pay factor (percent of contract unit price)
96 – 100	106
90 – 95	PWL + 10
75 – 89	0.5 PWL + 55
55 – 74	1.4 PWL – 12
Below 55	Reject ²

¹ Although it is theoretically possible to achieve a pay factor of 106% for each lot, actual payment above 100% shall be subject to the total project payment limitation specified in paragraph 401-8.1a.

² The lot shall be removed and replaced. However, the RPR may decide to allow the rejected lot to remain. In that case, if the RPR and Contractor agree in writing that the lot shall not be removed, it shall be paid for at 50% of the contract unit price and the total project payment shall be reduced by the amount withheld for the rejected lot.

d. Profilograph Roughness. Not used.

Payment will be made under:

Item P-401a Asphalt Surface Course - per ton

Item P-401b Asphalt Binder - per ton

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C29 Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate

ASTM C88 Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate

ASTM C117 Standard Test Method for Materials Finer than 75-μm (No. 200) Sieve in Mineral Aggregates by Washing

ASTM C127 Standard Test Method for Density, Relative Density (Specific Gravity) and Absorption of Coarse Aggregate

ASTM C131 Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

ASTM C136 Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates

ASTM C142 Standard Test Method for Clay Lumps and Friable Particles in Aggregates

ASTM C566 Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying

749	ASTM D75	Standard Practice for Sampling Aggregates
750	ASTM D242	Standard Specification for Mineral Filler for Bituminous Paving Mixtures
751	ASTM D946	Standard Specification for Penetration-Graded Asphalt Cement for Use in
752		Pavement Construction
753	ASTM D979	Standard Practice for Sampling Asphalt Paving Mixtures
754	ASTM D1073	Standard Specification for Fine Aggregate for Asphalt Paving Mixtures
755	ASTM D1188	Standard Test Method for Bulk Specific Gravity and Density of Compacted
756		Bituminous Mixtures Using Coated Samples
757	ASTM D2172	Standard Test Method for Quantitative Extraction of Bitumen from
758		Asphalt Paving Mixtures
759	ASTM D1461	Standard Test Method for Moisture or Volatile Distillates in Asphalt Paving
760		Mixtures
761	ASTM D2041	Standard Test Method for Theoretical Maximum Specific Gravity and
762		Density of Bituminous Paving Mixtures
763	ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine
764		Aggregate
765	ASTM D2489	Standard Practice for Estimating Degree of Particle Coating of Bituminous-
766		Aggregate Mixtures
767	ASTM D2726	Standard Test Method for Bulk Specific Gravity and Density of Non-
768		Absorptive Compacted Bituminous Mixtures
769	ASTM D2950	Standard Test Method for Density of Bituminous Concrete in Place by
770		Nuclear Methods
771	ASTM D3203	Standard Test Method for Percent Air Voids in Compacted Dense and
772		Open Bituminous Paving Mixtures
773	ASTM D3381	Standard Specification for Viscosity-Graded Asphalt Cement for Use in
774		Pavement Construction
775	ASTM D3665	Standard Practice for Random Sampling of Construction Materials
776	ASTM D3666	Standard Specification for Minimum Requirements for Agencies Testing
777		and Inspecting Road and Paving Materials
778	ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index
779		of Soils
780	ASTM D4552	Standard Practice for Classifying Hot-Mix Recycling Agents
781	ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and
782		Elongated Particles in Coarse Aggregate
783	ASTM D4867	Standard Test Method for Effect of Moisture on Asphalt Concrete Paving
784		Mixtures
785	ASTM D5361	Standard Practice for Sampling Compacted Asphalt Mixtures for
786		Laboratory Testing
787	ASTM D5444	Standard Test Method for Mechanical Size Analysis of Extracted Aggregate
788	ASTM D5821	Standard Test Method for Determining the Percentage of Fractured
789		Particles in Coarse Aggregate

790	ASTM D6084	Standard Test Method for Elastic Recovery of Bituminous Materials by
791		Ductilometer
792	ASTM D6307	Standard Test Method for Asphalt Content of Hot Mix Asphalt by Ignition
793		Method
794	ASTM D6373	Standard Specification for Performance Graded Asphalt Binder
795	ASTM D6752	Standard Test Method for Bulk Specific Gravity and Density of Compacted
796		Bituminous Mixtures Using Automatic Vacuum Sealing Method
797	ASTM D6925	Standard Test Method for Preparation and Determination of the Relative
798		Density of Hot Mix Asphalt (HMA) Specimens by Means of the SuperPave
799		Gyratory Compactor.
800	ASTM D6926	Standard Practice for Preparation of Bituminous Specimens Using Marshall
801		Apparatus
802	ASTM D6927	Standard Test Method for Marshall Stability and Flow of Bituminous
803		Mixtures
804	ASTM D6995	Standard Test Method for Determining Field VMA based on the Maximum
805		Specific Gravity of the Mix (Gmm)
806	ASTM E11	Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves
807	ASTM E178	Standard Practice for Dealing with Outlying Observations
808	ASTM E1274	Standard Test Method for Measuring Pavement Roughness Using a
809		Profilograph
810	ASTM E950	Standard Test Method for Measuring the Longitudinal Profile of Traveled
811		Surfaces with an Accelerometer Established Inertial Profiling Reference
812	ASTM E2133	Standard Test Method for Using a Rolling Inclinator to Measure
813		Longitudinal and Transverse Profiles of a Traveled Surface
814		
815	AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS	
816	(AASHTO)	
817		
818	AASHTO M156	Standard Specification for Requirements for Mixing Plants for Hot-Mixed,
819		Hot-Laid Bituminous Paving Mixtures.
820	AASHTO T329	Standard Method of Test for Moisture Content of Hot Mix Asphalt (HMA)
821		by Oven Method
822	AASHTO T324	Standard Method of Test for Hamburg Wheel-Track Testing of Compacted
823		Asphalt Mixtures
824	AASHTO T 340	Standard Method of Test for Determining the Rutting Susceptibility of Hot
825		Mix Asphalt (APA) Using the Asphalt Pavement Analyzer (APA)
826		
827	ASPHALT INSTITUTE (AI)	
828		
829	Asphalt Institute Handbook MS-26, Asphalt Binder	
830	Asphalt Institute MS-2 Mix Design Manual, 7th Edition	
831	AI State Binder Specification Database	
832		

FEDERAL HIGHWAY ADMINISTRATION (FHWA)

Long Term Pavement Performance Binder Program

ADVISORY CIRCULARS (AC)

AC 150/5320-6 Airport Pavement Design and Evaluation

FAA ORDERS

5300.1 Modifications to Agency Airport Design, Construction, and Equipment Standards

SOFTWARE

FAARFIELD

****END OF ITEM P-401****

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ITEM P-603 EMULSIFIED ASPHALT TACK COAT

DESCRIPTION

603-1.1 This item shall consist of preparing and treating an asphalt or concrete surface with asphalt material in accordance with these specifications and in reasonably close conformity to the lines shown on the plans.

MATERIALS

603-2.1 ASPHALT MATERIALS. The asphalt material shall be an emulsified asphalt as specified in ASTM D3628 as an asphalt application for tack coat appropriate to local conditions. The emulsified asphalt shall not be diluted. The Contractor shall provide a copy of the manufacturer's Certificate of Analysis (COA) for the asphalt material to the Resident Project Representative (RPR) before the asphalt material is applied for review and acceptance. The furnishing of COA for the asphalt material shall not be interpreted as a basis for final acceptance. The manufacturer's COA may be subject to verification by testing the material delivered for use on the project.

CONSTRUCTION METHODS

603-3.1 WEATHER LIMITATIONS. The tack coat shall be applied only when the existing surface is dry and the atmospheric temperature is 50°F (10°C) or above; the temperature has not been below 35°F (2°C) for the 12 hours prior to application; and when the weather is not foggy or rainy. The temperature requirements may be waived when directed by the RPR.

603-3.2 EQUIPMENT. The Contractor shall provide equipment for heating and applying the emulsified asphalt material. The emulsion shall be applied with a manufacturer-approved computer rate-controlled asphalt distributor. The equipment shall be in good working order and contain no contaminants or diluents in the tank. Spray bar tips must be clean, free of burrs, and of a size to maintain an even distribution of the emulsion. Any type of tip or pressure source is suitable that will maintain predetermined flow rates and constant pressure during the application process with application speeds under eight (8) miles per hour (13 km per hour) or seven (700) feet per minute (213 m per minute).

The equipment will be tested under pressure for leaks and to ensure proper set-up before use to verify truck set-up (via a test-shot area), including but not limited to, nozzle tip size appropriate for application, spray-bar height and pressure and pump speed, evidence of triple-overlap spray pattern, lack of leaks, and any other factors relevant to ensure the truck is in good working order before use.

The distributor truck shall be equipped with a minimum 12-foot (3.7-m) spreader spray bar with individual nozzle control with computer-controlled application rates. The distributor truck shall have an easily accessible thermometer that constantly monitors the temperature of the emulsion, and have an operable mechanical tank gauge that can be used to cross-check the computer accuracy. If the distributor is not equipped with an operable quick shutoff valve, the prime operations shall be started and stopped on building paper.

The distributor truck shall be equipped to effectively heat and mix the material to the required temperature prior to application as required. Heating and mixing shall be done in accordance with the manufacturer's recommendations. Do not overheat or over mix the material.

The distributor shall be equipped with a hand sprayer.

Asphalt distributors must be calibrated annually in accordance with ASTM D2995. The Contractor must furnish a current calibration certification for the asphalt distributor truck from any State or other agency as approved by the RPR.

A power broom and/or power blower suitable for cleaning the surfaces to which the asphalt tack coat is to be applied shall be provided.

603-3.3 Application of emulsified asphalt material. The emulsified asphalt shall not be diluted. Immediately before applying the emulsified asphalt tack coat, the full width of surface to be treated shall be swept with a power broom and/or power blower to remove all loose dirt and other objectionable material.

The emulsified asphalt material shall be uniformly applied with an asphalt distributor at the rates appropriate for the conditions and surface specified in the table below. The type of asphalt material and application rate shall be approved by the RPR prior to application.

Emulsified Asphalt

Surface Type	Residual Rate, gal/SY (L/square meter)	Emulsion Application Bar Rate, gal/SY (L/square meter)
New asphalt	0.02-0.05 (0.09-0.23)	0.03-0.07 (0.13-0.32)
Existing asphalt	0.04-0.07 (0.18-0.32)	0.06-0.11 (0.27-0.50)
Milled Surface	0.04-0.08 (0.18-0.36)	.06-0.12 (0.27-0.54)
Concrete	0.03-0.05 (0.13-0.23)	0.05-0.08 (0.23-0.36)

After application of the tack coat, the surface shall be allowed to cure without being disturbed for the period of time necessary to permit drying and setting of the tack coat. This period shall be determined by the RPR. The Contractor shall protect the tack coat and maintain the surface until the next course has been placed. When the tack coat has been disturbed by the Contractor, tack coat shall be reapplied at the Contractor's expense.

603-3.4 FREIGHT AND WAYBILLS. The Contractor shall submit waybills and delivery tickets, during progress of the work. Before the final statement is allowed, file with the RPR certified waybills and certified delivery tickets for all emulsified asphalt materials used in the construction of the pavement covered by the contract. Do not remove emulsified asphalt material from storage until the initial outage and temperature measurements have been taken. The delivery or storage units will not be released until the final outage has been taken.

METHOD OF MEASUREMENT

603-4.1 The emulsified asphalt material for tack coat shall be measured by the gallon (liter). Volume shall be corrected to the volume at 60°F (16°C) in accordance with ASTM D1250. The emulsified asphalt material paid for will be the measured quantities used in the accepted work, provided that the measured quantities are not 10% over the specified application rate. Any amount of emulsified asphalt material more than 10% over the specified application rate for each application will be deducted from the measured quantities, except for irregular areas where hand spraying of the emulsified asphalt material is necessary. Water added to emulsified asphalt will not be measured for payment.

BASIS OF PAYMENT

603.5-1 Payment shall be made at the contract unit price per gallon (liter) of emulsified asphalt material. This price shall be full compensation for furnishing all materials, for all preparation, delivery, and application of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-603a Emulsified Asphalt Tack Coat - per gallon (liter)

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM D1250 Standard Guide for Use of the Petroleum Measurement Tables

ASTM D2995 Standard Practice for Estimating Application Rate and Residual Application Rate of Bituminous Distributors

ASTM D3628 Standard Practice for Selection and Use of Emulsified Asphalts

****END ITEM P-603****

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ITEM P-608 EMULSIFIED ASPHALT SEAL COAT

DESCRIPTION

608-1.1 This item shall consist of the application of a emulsified asphalt surface treatment composed of an emulsion of natural and refined asphalt materials, water and a polymer additive, for taxiways and runways with the application of a suitable aggregate to maintain adequate surface friction; and airfield secondary and tertiary pavements including low-speed taxiways, shoulders, overruns, roads, parking areas, and other general applications with or without aggregate applied as designated on the plans. The terms seal coat, asphalt sealer, and asphalt material are interchangeable throughout this specification. The term emulsified asphalt means an emulsion of natural and refined asphalt materials.

MATERIALS

608-2.1 AGGREGATE. The aggregate material shall be a dry, clean, dust and dirt free, sound, durable, angular shaped manufactured specialty sand, such as that used as an abrasive, with a Mohs hardness of 6 to 8. The Contractor shall submit the specialty sand manufacturer's technical data and a manufacturer's Certificate of Analysis (COA) indicating that the specialty sand meets the requirements of the specification to the RPR prior to start of construction. The sand must be approved for use by the RPR and shall meet the following gradation limits when tested in accordance with ASTM C136 and ASTM C117:

Aggregate Material Gradation Requirements¹

Sieve Designation (square openings)	Individual Percentage Retained by Weight
No. 10 (2.00 mm)	0
No. 14 (1.41 mm)	0-4
No. 16 (1.18 mm)	0-8
No. 20 (850 µm)	0-35
No. 30 (600 µm)	20-50
No. 40 (425 µm)	10-45
No. 50 (300 µm)	0-20
No. 70 (212 µm)	0-5
No. 100 (150 µm)	0-2
No. 200 (75 µm)	0-2

¹Locally available sand or abrasive material that is slightly outside of the gradation requirements may be approved by the RPR with concurrence by the seal coat manufacturer for the use of locally available sand or abrasive material. The RPR and manufacturer's field representative should verify acceptance during application of Control strips indicated under paragraph 608-3.2.

The Contractor shall provide a certification showing particle size analysis and properties of the material delivered for use on the project. The Contractor's certification may be subject to verification by testing the material delivered for use on the project.

08-2.2 ASPHALT EMULSION. The asphalt emulsion shall meet the properties in the following table:

Concentrated Asphalt Emulsion Properties

Properties	Specification	Limits
Viscosity, Saybolt Furol at 77°F (25°C)	ASTM D7496	20 – 100 seconds
Residue by Distillation or Evaporation	ASTM D6997 or ASTM D6934	57% minimum
Sieve Test	ASTM D6933	0.1% maximum
24-hour Stability	ASTM D6930	1% maximum
5-day Settlement Test	ASTM D6930	5.0% maximum
Particle Charge ¹	ASTM D7402	Positive 6.5 maximum pH

¹ pH may be used in lieu of the particle charge test which is sometimes inconclusive in slow setting, asphalt emulsions.

The asphalt material base residue shall contain not less than 20% gilsonite, or untaste and shall not contain any tall oil pitch or coal tar material and shall contain no less than one percent (1%) polymer.

Tests on Residue from Distillation or Evaporation

Properties	Specification	Limits
Viscosity at 275°F (135°C)	ASTM D4402	1750 cts maximum
Solubility in 1, 1, 1 trichloroethylene	ASTM D2042	97.5% minimum
Penetration	ASTM D5	50 dmm maximum
Asphaltenes	ASTM D2007	15% minimum
Saturates	ASTM D2007	15% maximum
Polar Compounds	ASTM D2007	25% minimum
Aromatics	ASTM D2007	15% minimum

The asphalt emulsion, when diluted in the volumetric proportion of one part concentrated asphalt material to one part hot water shall have the following properties:

One-to-One Dilution Emulsion Properties

Properties	Specification	Limits
In Ready-to-Apply Form, one part concentrate to one part water, by volume		
Viscosity, Saybolt Furol at 77°F (25°C)	ASTM D7496	5 – 50 seconds
Residue by Distillation or Evaporation	ASTM D6997 or ASTM D6934	28.5% minimum
Pumping Stability ¹		Pass

¹ Pumping stability is tested by pumping one pint (475 ml) of seal coat diluted one (1) part concentrate to one (1) part water, at 77°F (25°C), through a 1/4-inch (6 mm) gear pump operating 1750 rpm for 10 minutes with no significant separation or coagulation.

The Contractor shall provide a copy of the manufacturer's Certificate of Analysis (COA) for the emulsified asphalt delivered to the project. If the asphalt emulsion is diluted at other than the manufacturer's facility, the Contractor shall provide a supplemental COA from an independent laboratory verifying the asphalt emulsion properties.

The COA shall be provided to and approved by the RPR before the emulsified asphalt is applied. The furnishing of the vendor's certified test report for the asphalt material shall not be interpreted as a basis for final acceptance. The manufacturer's COA may be subject to verification by testing the material delivered for use on the project.

The asphalt material storage and handling temperature shall be between 50°F - 160°F (10°C - 70°C) and the material shall be protected from freezing, or whenever outside temperature drops below 40°F (4°C) for prolonged time periods.

Contractor shall provide a list of airport pavement projects, exposed to similar climate conditions, where this product has been successfully applied within at least 5 years of the project.

608-2.3 WATER. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use. Water used in making and diluting the emulsion shall be potable, with a maximum hardness of 90ppm calcium and 15ppm magnesium; deleterious iron, sulfates, and phosphates maximum 7ppm, and less than 1ppm of organic byproducts. Water shall be a minimum of 140°F (60°C) prior to adding to emulsion.

608-2.4 POLYMER. The polymer shall meet the properties in the following table:

Polymer Properties

Properties	Limits
Solids Content	47% to 65%, Percent by Weight
Weight	8.0 to 9.0 pounds/gallon (1.07 to 1.17 kg/L)
pH	3.0 to 8.0
Particle Charge	Nonionic/Cationic
Mechanical Stability	Excellent
Film Forming Temperature, °C	+5°C, minimum
Tg, °C	22°C, maximum

The manufacturer shall provide a copy of the Certificate of Analysis (COA) for the polymer used in the seal coat; and the Contractor shall include the COA with the emulsified asphalt COA when submitting to the RPR.

608-2.5 SEAL COAT WITH AGGREGATE. The Contractor shall submit friction test data from no less than one of the airport projects identified under 608-2.2. The test data must be from the same project and include technical details on application rates, aggregate rates, and point of contact at the airport to confirm use and success of sealer with aggregate.

Friction test data in accordance with AC 150/5320-12, at 40 or 60 mph (65 or 95 km/h) wet, must include as a minimum; the friction value prior to sealant application; two values, between 24 and 96 hours after application, with a minimum of 24 hours between tests; and one value between 180 days and 360 days after the application.

The results of the tests between 24 and 96 hours shall indicate friction is increasing at a rate to obtain similar friction value of the pavement surface prior to application, and the long-term test shall indicate no apparent adverse effect with time relative to friction values and existing pavement surface.

Seal coat material submittal without required friction performance will not be approved. Friction tests performed on this project cannot be used as a substitute of this requirement.

COMPOSITION AND APPLICATION RATE

608-3.1 APPLICATION RATE. The approximate amounts of materials per square yard (square meter) for the asphalt surface treatment shall be as provided in the table for the treatment area(s) at the specified dilution rate(s) as noted on the plans. The actual application rates will vary within the range specified to suit field conditions and will be recommended by the manufacturer's representative and approved by the RPR from the test area/sections evaluation.

Application Rate		
Dilution Rate	Quantity of Emulsion gal/yd ² (l/m ²)	Quantity of Aggregate lb/yd ² (kg/m ²)
1:1	0.10-0.17 (0.45-0.77)	0.20-0.50 (0.11-0.27)

608-3.2 CONTROL AREAS AND CONTROL STRIPS. Prior to full application, the control strip must be accepted by the RPR. The surface preparation, personnel, equipment, and method of operation used on the test area(s) and control strip(s) shall be the same as used on the remainder of the work.

A qualified manufacturer's representative shall be present in the field to assist the Contractor in applying control areas and/or control strips to determine the appropriate application rate of both emulsion and aggregate to be approved by the RPR.

A test area(s) and control strip(s) shall be applied for each differing asphalt pavement surface identified in the project. The test area(s) and control strip(s) shall be used to determine the material application rate(s) of both emulsion and sand prior to full production.

- a. **For taxiway, taxilane and apron surfaces.** Prior to full application, the Contractor shall place test areas at varying application rates as recommended by the Contractor's manufacturer's representative to determine appropriate application rate(s). The test areas will be located on representative section(s) of the pavement to receive the asphalt surface treatment designated by the RPR.

- b. **For runway and high-speed exit taxiway surfaces.** Not Used.

If the control strip should prove to be unsatisfactory, necessary adjustments to the application rate, placement operations, and equipment shall be made. Additional control strips shall be placed and additional skid resistance tests performed and evaluated. Full production shall not begin without the RPR's approval of an appropriate application rate(s).

CONSTRUCTION METHODS

608-4.1 WORKER SAFETY. The Contractor shall obtain a Safety Data Sheet (SDS) for both the asphalt emulsion product and sand and require workmen to follow the manufacturer's recommended safety precautions.

608-4.2 WEATHER LIMITATIONS. The asphalt emulsion shall be applied only when the existing pavement surface is dry and when the weather is not foggy, rainy, or when the wind velocity will prevent the uniform application of the material. No material shall be applied in strong winds that interfere with the uniform application of the material(s), or when dust or sand is blowing or when rain is anticipated within eight (8) hours of application completion. The atmospheric temperature and the pavement surface temperature shall both be at, or above 60°F (16°C) and rising. Seal coat shall not be applied when pavement temperatures are expected to exceed 130°F within the subsequent 72 hours if traffic will be opened on pavement within those 72 hours. During application, account for wind drift. Cover existing buildings, structures, runway edge lights, taxiway edge lights, informational signs, retro-reflective marking and in-pavement duct markers as necessary to protect against overspray before applying the emulsion. Should emulsion get on any light or marker fixture, promptly clean the fixture. If cleaning is not satisfactory to the RPR, the Contractor shall replace any light, sign or marker with equivalent equipment at no cost to the Owner.

608-4.3 EQUIPMENT AND TOOLS. The Contractor shall furnish all equipment, tools, and machinery necessary for the performance of the work.

- a. **Pressure distributor.** The emulsion shall be applied with a manufacturer-approved computer rate-controlled asphalt distributor. The equipment shall be in good working order and contain no contaminants or diluents in the tank. Spray bar tips must be clean, free of burrs, and of a size to maintain an even distribution of the emulsion. Any type of tip or pressure source is suitable that will maintain predetermined flow rates and constant pressure during the application process with application speeds under eight (8) miles per hour (13 km per hour) or seven hundred (700) feet per minute (213 m per minute). The equipment will be tested under pressure for leaks and to ensure proper set-up before use. The Contractor will provide verification of truck set-up (via a test-shot area), including but not limited to, nozzle tip size appropriate for application per nozzle manufacturer, spray-bar height and pressure and pump speed appropriate for the viscosity and temperature of sealer material, evidence of triple-overlap spray pattern, lack of leaks, and any other factors relevant to ensure the truck is in good working order before use.

The distributor truck shall be equipped with a 12-foot (3.7-m), minimum, spray bar with individual nozzle control. The distributor truck shall be capable of specific application rates in the range of 0.05 to 0.25 gallons per square yard (0.15 to 0.80 liters per square meter). These rates shall be computer-controlled rather than mechanical. The distributor truck shall have an easily accessible thermometer that constantly monitors the temperature of the emulsion, and have an operable mechanical tank gauge that can be used to cross-check the computer accuracy.

The distributor truck shall effectively heat and mix the material to the required temperature prior to application in accordance with the manufacturer's recommendations.

The distributor shall be equipped with a hand sprayer to spray the emulsion in areas not accessible to the distributor truck.

- b. **Aggregate spreader.** The asphalt distributor truck will be equipped with an aggregate spreader mounted to the distributor truck that can apply sand to the emulsion in a single pass operation without driving through wet emulsion. The aggregate spreader shall be equipped with a variable control system capable of uniformly distributing the sand at the specified rate at varying application widths and speeds.

The aggregate spreader must be adjusted to produce an even and accurate application of specified aggregate. Prior to any seal coat application, the aggregate spreader will be calibrated onsite to ensure acceptable uniformity of spread. The RPR will observe the calibration and verify the results. The aggregate spreader will be re-calibrated each time the aggregate rate is changed either during the application of test strips or production. The Contractor may consult the seal coat manufacturer representative for procedure and guidance. The sander shall have a minimum hopper capacity of 3,000 pounds (1361 kg) of sand. Push-type hand sanders will be allowed for use around lights, signs and other obstructions, if necessary.

c. **Power broom/blower.** A power broom and/or blower shall be provided for removing loose material from the surface to be treated.

d. **Equipment calibration.** Asphalt distributors must be calibrated within the same construction season in accordance with ASTM D2995. The Contractor must furnish a current calibration certification for the asphalt distributor truck from any State or other agency as approved by the RPR.

608-4.4 PREPARATION OF ASPHALT PAVEMENT SURFACES. Clean pavement surface immediately prior to placing the seal coat so that it is free of dust, dirt, grease, vegetation, oil or any type of objectionable surface film. Remove oil or grease from the asphalt pavement by scrubbing with a detergent, washing thoroughly with clean water, and then treat these areas with a spot primer. Any additional surface preparation, such as crack repair, shall be in accordance with Item P-101, paragraph 101-3.6.

a. **NEW ASPHALT PAVEMENT SURFACES.** Allow new asphalt pavement surfaces to cure so that there is no concentration of oils on the surface.

Perform a water-break-free test to confirm that the surface oils have degraded and dissipated. (Cast approximately one gallon (4 liters) of clean water out over the surface. The water should sheet out and wet the surface uniformly without crawling or showing oil rings.) If signs of crawling or oil rings are apparent on the pavement surface, additional time must be allowed for additional curing and retesting of the pavement surface prior to treatment.

608-4.5 EMULSION MIXING. The application emulsion shall be obtained by blending asphalt material concentrate, water and polymer, if specified. Always add heated water to the asphalt material concentrate, never add asphalt material concentrate to heated water. Mix one part heated water to one part asphalt material concentrate, by volume.

Add 1% polymer, by volume, to the emulsion mix. If the polymer is added to the emulsion mix at the plant, submit weight scale tickets to the RPR. As an option, the polymer may be added to the emulsion mix at the job site provided the polymer is added slowly while the asphalt distributor truck circulating pump is running. The mix must be agitated for a minimum of 15 minutes or until the polymer is mixed to the satisfaction of the RPR.

608-4.6 APPLICATION OF ASPHALT EMULSION. The asphalt emulsion shall be applied using a pressure distributor upon the properly prepared, clean and dry surface at the application rate recommended by the manufacturer's representative and approved by the RPR from the test area/sections evaluation for each designated treatment area. The asphalt emulsion should be applied at a temperature between 130°F (54°C) and 160°F (70°C) or in accordance with the manufacturer's recommendation.

If low spots and depressions greater than 1/2 inch (12 mm) in depth in the pavement surface cause ponding or puddling of the applied materials, the pavement surface shall be lightly broomed with a broom or brush type squeegee until the pavement surface is free of any pools of excess material.

During all applications, the surfaces of adjacent structures shall be protected to prevent their being spattered or marred.

608-4.7 APPLICATION OF AGGREGATE MATERIAL. Immediately following the application of the asphalt emulsion, friction sand at the rate recommended by the manufacturer's representative and approved by the RPR from the test area/sections evaluation for each designated application area, shall be spread uniformly over the asphalt emulsion in a single-pass operation simultaneous with the sealer application. The aggregate shall be spread to the same width of application as the asphalt material and shall not be applied in such thickness as to cause blanketing.

Sprinkling of additional aggregate material, and spraying additional asphalt material over areas that show up having insufficient cover or bitumen, shall be done by hand whenever necessary. In areas where hand work is necessitated, the sand shall be applied before the sealant begins to break.

Minimize aggregate from being broadcast and accumulating on the untreated pavement adjacent to an application pass. Prior to the next application pass, the Contractor shall clean areas of excess or loose aggregate and remove from project site.

QUALITY CONTROL (QC)

608-5.1 MANUFACTURER'S REPRESENTATION. The manufacturer's representative knowledgeable of the material, procedures, and equipment described in the specification is responsible to assist the Contractor and RPR in determining the appropriate application rates of the emulsion and aggregate, as well as recommendations for proper preparation and start-up of seal coat application. Documentation of the manufacturer representative's experience and knowledge for applying the seal coat product shall be furnished to the RPR a minimum of 10 work days prior to placement of the control strips. The cost of the manufacturer's representative shall be included in the Contractor's bid price.

608-5.2 CONTRACTOR QUALIFICATIONS. The Contractor shall provide documentation to the RPR that the seal coat Contractor is qualified to apply the seal coat, including personnel, and equipment, and has made at least three (3) applications similar to this project in the past two (2) years.

MATERIAL ACCEPTANCE

608-6.1 APPLICATION RATE. The rate of application of the asphalt emulsion shall be verified at least twice per day.

608-6.2 FRICTION TESTS. Friction tests in accordance with AC 150/5320-12, Measurement, Construction, and Maintenance of Skid-Resistant Airport Pavement Surfaces, shall be performed on all runway and high-speed taxiways that received a seal coat. Each test includes performing friction tests at 40 mph and 60 mph (65 or 95 km/h) both wet, 15 feet (4.5 m) to each side of runway centerline with approved continuous friction measuring equipment (CFME). The Contractor shall coordinate testing with the RPR and provide the RPR a written report of friction test results. The RPR shall be present for testing.

METHOD OF MEASUREMENT

608-7.1 ASPHALT SURFACE TREATMENT. The quantity of asphalt surface treatment shall not be measured separately. For areas subject to grinding as specified under 401-4.16 or for similar repair work allowed under other specifications, the costs for such work shall be borne by the Contractor.

BASIS OF PAYMENT

608-8.1 Payment shall not be made for work under this specification. **The only anticipated uses for this specification on this project are for repair work as allowed under other specifications. All costs for such repair work shall be borne by the Contractor.**

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C117	Standard Test Method for Materials Finer than 75- μ m (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D5	Standard Test Method for Penetration of Asphalt Materials
ASTM D244	Standard Test Methods and Practices for Emulsified Asphalts
ASTM D2007	Standard Test Method for Characteristic Groups in Rubber Extender and Processing Oils and Other Petroleum-Derived Oils by the Clay-Gel Absorption Chromatographic Method
ASTM D2042	Standard Test Method for Solubility of Asphalt Materials in Trichloroethylene
ASTM D2995	Standard Practice for Estimating Application Rate of Bituminous Distributors
ASTM D4402	Standard Test Method for Viscosity Determination of Asphalt at Elevated Temperatures Using a Rotational Viscometer
ASTM D5340	Standard Test Method for Airport Pavement Condition Index Surveys

Advisory Circulars (AC)

AC 150/5320-12	Measurement, Construction, and Maintenance of Skid-Resistant Airport Pavement Surfaces
AC 150/5320-17	Airfield Pavement Surface Evaluation and Rating (PASER) Manuals
AC 150/5380-6	Guidelines and Procedures for Maintenance of Airport Pavements

****END ITEM P-608****

ITEM P-620 RUNWAY AND TAXIWAY MARKING

DESCRIPTION

620-1.1 This item shall consist of the preparation and painting of numbers, markings, and stripes on the surface of runways, taxiways, and aprons, in accordance with these specifications and at the locations shown on the plans, or as directed by the Resident Project Representative (RPR). The terms “paint” and “marking material” as well as “painting” and “application of markings” are interchangeable throughout this specification.

MATERIALS

620-2.1 MATERIALS ACCEPTANCE. The Contractor shall furnish manufacturer’s certified test reports, for materials shipped to the project. The certified test reports shall include a statement that the materials meet the specification requirements. This certification along with a copy of the paint manufacturer’s surface preparation; marking materials, including adhesion, flow promoting and/or floatation additive; and application requirements must be submitted and approved by the Resident Project Representative (RPR) prior to the initial application of markings. The reports can be used for material acceptance or the RPR may perform verification testing. The reports shall not be interpreted as a basis for payment. The Contractor shall notify the RPR upon arrival of a shipment of materials to the site. All material shall arrive in sealed containers that are easily quantifiable for inspection by the RPR.

620-2.2 MARKING MATERIALS.

TABLE 1. MARKING MATERIALS

Paint ¹				Glass Beads ²	
Type	Color	Fed Std. 595 Number	Application Rate Maximum	Type	Application Rate Minimum
Waterborne, Type I	Yellow	33538 or 33655	115 ft ² /gal (2.8 m ² /l)	Type I, Gradation A	7 lb/gal (0.85 kg/l)
Waterborne, Type I	Black	37038	115 ft ² /gal (2.8 m ² /l)	none	N/A

¹See paragraph 620-2.2a

²See paragraph 620-2.2b

- a. Paint.** Paint shall be waterborne in accordance with the requirements of this paragraph. Paint colors shall comply with Federal Standard No. 595.

Waterborne. Paint shall meet the requirements of Federal Specification TT-P-1952F, Type I. If weather conditions would result in slower drying, Type II paint may be used, but the Contractor must be able to show proper bead embedment. The non-volatile portion of the vehicle for all paint types shall be composed of a 100% acrylic polymer as determined by infrared spectral analysis.

- b. Reflective media.** Glass beads for white and yellow paint shall meet the requirements for Federal Specification TT-B-1325D Type I, Gradation A.

Glass beads shall be treated with all compatible coupling agents recommended by the manufacturers of the paint and reflective media to ensure adhesion and embedment.

Glass beads shall not be used in black and green paint.

CONSTRUCTION METHODS

620-3.1 WEATHER LIMITATIONS. Painting shall only be performed when the surface is dry, and the ambient temperature and the pavement surface temperature meet the manufacturer's recommendations in accordance with paragraph 620-2.1. Painting operations shall be discontinued when the ambient or surface temperatures does not meet the manufacturer's recommendations. Markings shall not be applied when the wind speed exceeds 10 mph unless windscreens are used to shroud the material guns. Markings shall not be applied when weather conditions are forecast to not be within the manufacturers' recommendations for application and dry time.

620-3.2 EQUIPMENT. Equipment shall include the apparatus necessary to properly clean the existing surface, a mechanical marking machine, a bead dispensing machine, and such auxiliary hand-painting equipment as may be necessary to satisfactorily complete the job.

The mechanical marker shall be an atomizing spray-type or airless type marking machine with automatic glass bead dispensers suitable for application of traffic paint. It shall produce an even and uniform film thickness and appearance of both paint and glass beads at the required coverage and shall apply markings of uniform cross-sections and clear-cut edges without running or spattering and without over spray. The marking equipment for both paint and beads shall be calibrated daily.

620-3.3 PREPARATION OF SURFACES. Immediately before application of the paint, the surface shall be dry and free from dirt, grease, oil, laitance, or other contaminants that would reduce the bond between the paint and the pavement. Use of any chemicals or impact abrasives during surface preparation shall be approved in advance by the RPR. After the cleaning operations, sweeping, blowing, or rinsing with pressurized water shall be performed to ensure the surface is clean and free of grit or other debris left from the cleaning process.

a. Preparation of new pavement surfaces. The area to be painted shall be cleaned by broom, blower, water blasting, or by other methods approved by the RPR to remove all contaminants, including PCC curing compounds, minimizing damage to the pavement surface.

b. Preparation of pavement to remove existing markings. Existing pavement markings shall be removed by rotary grinding, water blasting, or by other methods approved by the RPR minimizing damage to the pavement surface. The removal area may need to be larger than the area of the markings to eliminate ghost markings. After removal of markings on asphalt pavements, apply a fog seal or seal coat to 'block out' the removal area to eliminate 'ghost' markings.

c. Preparation of pavement markings prior to remarking. Prior to remarking existing markings, loose existing markings must be removed minimizing damage to the pavement surface, with a method approved by the RPR. After removal, the surface shall be cleaned of all residue or debris.

Prior to the application of markings, the Contractor shall certify in writing that the surface is dry and free from dirt, grease, oil, laitance, or other foreign material that would prevent the bond of the paint to the pavement or existing markings. This certification along with a copy of the paint manufacturers application and surface preparation requirements must be submitted to the RPR prior to the initial application of markings.

620-3.4 LAYOUT OF MARKINGS. The proposed markings shall be laid out in advance of the paint application. The locations of markings to receive glass beads shall be shown on the plans.

620-3.5 APPLICATION. A period of **30** days shall elapse between placement of surface course or seal coat and application of the permanent paint markings. Paint shall be applied at the locations and to the dimensions and spacing shown on the plans. Paint shall not be applied until the layout and condition of the surface has been approved by the RPR.

The edges of the markings shall not vary from a straight line more than 1/2 inch (12 mm) in 50 feet (15 m), and marking dimensions and spacing shall be within the following tolerances:

MARKING DIMENSIONS AND SPACING TOLERANCE

Dimension and Spacing	Tolerance
36 inch (910 mm) or less	±1/2 inch (12 mm)
greater than 36 inch to 6 feet (910 mm to 1.85 m)	±1 inch (25 mm)
greater than 6 feet to 60 feet (1.85 m to 18.3 m)	±2 inch (50 mm)
greater than 60 feet (18.3 m)	±3 inch (76 mm)

The paint shall be mixed in accordance with the manufacturer's instructions and applied to the pavement with a marking machine at the rate shown in Table 1. The addition of thinner will not be permitted.

Glass beads shall be distributed upon the marked areas at the locations shown on the plans to receive glass beads immediately after application of the paint. A dispenser shall be furnished that is properly designed for attachment to the marking machine and suitable for dispensing glass beads. Glass beads shall be applied at the rate shown in Table 1. Glass beads shall not be applied to black paint or green paint. Glass beads shall adhere to the cured paint or all marking operations shall cease until corrections are made. Different bead types shall not be mixed. Regular monitoring of glass bead embedment and distribution should be performed.

620-3.6 APPLICATION--PREFORMED THERMOPLASTIC AIRPORT PAVEMENT MARKINGS. Preformed thermoplastic pavement markings not used.

620-3.7 CONTROL STRIP. Prior to the full application of airfield markings, the Contractor shall prepare a control strip in the presence of the RPR. The Contractor shall demonstrate the surface preparation method and all striping equipment to be used on the project. The marking equipment must achieve the prescribed application rate of paint and population of glass beads (per Table 1) that are properly embedded and evenly distributed across the full width of the marking. Prior to acceptance of the control strip, markings must be evaluated during darkness to ensure a uniform appearance.

620-3.8 RETRO-REFLECTANCE. Reflectance shall be measured by the Contractor in the presence of the RPR, with a portable retro-reflectometer meeting ASTM E1710 (or equivalent). A total of 6 readings shall be taken over a 6 square foot area with 3 readings taken from each direction. The average shall be equal to or above the minimum levels of all readings which are within 30% of each other.

MINIMUM RETRO-REFLECTANCE VALUES

Material	Retro-reflectance mcd/m ² /lux		
	White	Yellow	Red
Initial Type I	300	175	35
All materials, remark when less than ¹	100	75	10

¹ Prior to remarking determine if removal of contaminants on markings will restore retro-reflectance

620-3.9 PROTECTION AND CLEANUP. After application of the markings, all markings shall be protected from damage until dry. All surfaces shall be protected from excess moisture and/or rain and from disfiguration by spatter, splashes, spillage, or drippings. The Contractor shall remove from the work area all debris, waste, loose reflective media, and by-products generated by the surface preparation and application operations to the satisfaction of the RPR. The Contractor shall dispose of these wastes in strict compliance with all applicable state, local, and federal environmental statutes and regulations.

METHOD OF MEASUREMENT

620-4.1a The quantity of markings shall be paid for shall be measured by the number of square feet of painting, including the reflective media.

BASIS OF PAYMENT

620-5.1 This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item complete in place and accepted by the RPR in accordance with these specifications.

620-5.2a Payment for markings shall be made at the contract price for the number of square feet of painting including the reflective media.

Payment will be made under:

Item P-620a	Airport Pavement Marking - Temporary (Yellow) - per square foot
Item P-620b	Airport Pavement Marking – Permanent (Yellow) - per square foot
Item P-620c	Airport Pavement Marking (Black) – per square foot

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM D476	Standard Classification for Dry Pigmentary Titanium Dioxide Products
ASTM D968	Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM D1652	Standard Test Method for Epoxy Content of Epoxy Resins
ASTM D2074	Standard Test Method for Total, Primary, Secondary, and Tertiary Amine Values of Fatty Amines by Alternative Indicator Method
ASTM D2240	Standard Test Method for Rubber Property - Durometer Hardness
ASTM D7585	Standard Practice for Evaluating Retroreflective Pavement Markings Using Portable Hand-Operated Instruments
ASTM E303	Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester

182	ASTM E1710	Standard Test Method for Measurement of Retroreflective Pavement
183		Marking Materials with CEN-Prescribed Geometry Using a Portable
184		Retroreflectometer
185	ASTM E2302	Standard Test Method for Measurement of the Luminance Coefficient
186		Under Diffuse Illumination of Pavement Marking Materials Using a
187		Portable Reflectometer
188	ASTM G154	Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp
189		Apparatus for Exposure of Nonmetallic Materials
190		
191	Code of Federal Regulations (CFR)	
192		
193	40 CFR Part 60, Appendix A-7, Method 24	
194		Determination of volatile matter content, water content, density, volume
195		solids, and weight solids of surface coatings
196	29 CFR Part 1910.1200 Hazard Communication	
197		
198	Federal Specifications (FED SPEC)	
199		
200	FED SPEC TT-B-1325D	Beads (Glass Spheres) Retro-Reflective
201	FED SPEC TT-P-1952F	Paint, Traffic and Airfield Marking, Waterborne
202	FED STD 595	Colors used in Government Procurement
203		
204	Commercial Item Description	
205		
206	A-A-2886B	Paint, Traffic, Solvent Based
207		
208	Advisory Circulars (AC)	
209		
210	AC 150/5340-1	Standards for Airport Markings
211	AC 150/5320-12	Measurement, Construction, and Maintenance of Skid Resistant Airport
212		Pavement Surfaces
213		
214		
215		
224		

END OF ITEM P-620

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ITEM P-640 AIRCRAFT TIEDOWN ANCHORS

DESCRIPTION

640-1.1 GENERAL. This item covers the requirements for installing aircraft tiedown anchors in conformance with the design and dimensions shown on the plans. The construction shall include the foundation and the reinforced concrete steel anchor bars. All anchors shall be cast in place after the pavement has been placed.

MATERIALS

640-2.1 CONCRETE. Concrete shall conform to requirements for Class B (with air) concrete as specified in Section 501 "Concrete" of the "Missouri Standard Specifications for Highway Construction" effective October 1, 2019 and published by the Missouri Highways and Transportation Commission. These specifications are publicly available at no charge at www.modot.org. Any bidders needing assistance in locating these specifications shall contact the Engineer at least 5 days prior to the bid date.

640-2.2 REINFORCED CONCRETE STEEL ANCHOR BARS. Reinforced concrete steel anchor bars for the tiedown anchors shall be size No. 5, Grade 40 steel, conforming to the requirements of ASTM A615 or AASHTO M 31. The anchor bars shall be zinc-coated in accordance with ASTM A123 or AASHTO M 111.

CONSTRUCTION METHODS

640-3.1 GENERAL. The aircraft tiedown anchors shall be constructed in accordance with the details on the Plans and as specified herein using new materials. The pavement section shall be cored to the depth shown on the plans for installation of the tiedown anchors.

TESTING REQUIREMENTS

Slump, Air, and Compressive strength tests on the concrete, in accordance with the MoDOT specifications, shall be completed by the Contractor at a rate of one per day or as directed by the RPR. Gradation, deleterious, and thin and elongated tests shall be performed by the Contractor as necessary to maintain control of the materials.

METHOD OF MEASUREMENT

640-4.1 Aircraft tiedown anchors shall be measured by the unit of each, complete in place.

BASIS OF PAYMENT

640-5.1 Payment will be made at the contract unit price per each for the aircraft tiedown anchors. This price shall be full compensation for furnishing all materials and for preparation, excavation, placement of the steel and concrete, clean-up and disposal of excavated material, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-640a	Aircraft Tiedown Anchor – per each
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MATERIALS REQUIREMENTS

ASTM A123	Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A615	Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
AASHTO M 31	Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
AASHTO M 111	Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

****END ITEM P-640****

ITEM T-901 SEEDING

DESCRIPTION

901-1.1 This item shall consist of soil preparation, seeding and hydromulching the areas shown on the plans or as directed by the RPR in accordance with these specifications.

MATERIALS

901-2.1 SEED. The species and application rates of grass, legume, and cover-crop seed furnished shall be those stipulated herein. Seed shall conform to the requirements of Federal Specification JJJ-S-181, Federal Specification, Seeds, Agricultural.

Seed shall be furnished separately or in mixtures in standard containers labeled in conformance with the Agricultural Marketing Service (AMS) Seed Act and applicable state seed laws with the seed name, lot number, net weight, percentages of purity and of germination and hard seed, and percentage of maximum weed seed content clearly marked for each kind of seed. The Contractor shall furnish the RPR duplicate signed copies of a statement by the vendor certifying that each lot of seed has been tested by a recognized laboratory for seed testing within six (6) months of date of delivery. This statement shall include: name and address of laboratory, date of test, lot number for each kind of seed, and the results of tests as to name, percentages of purity and of germination, and percentage of weed content for each kind of seed furnished, and, in case of a mixture, the proportions of each kind of seed. Wet, moldy, or otherwise damaged seed will be rejected.

Seeds shall be applied as follows:

Seed Properties and Rate of Application

Seed	Minimum Seed Purity (Percent)	Minimum Germination (Percent)	Rate of Application lb/acre (or lb/1,000 S.F.)
Tall Fescue	97%	85%	25 lbs per acre
Kentucky Bluegrass	85%	80%	2 lbs per acre

901-2.2 LIME. Lime, if required to achieve adequate growth, shall be ground limestone containing not less than 85% of total carbonates, and shall be ground to such fineness that 90% will pass through a No. 20 (850 µm) mesh sieve and 50% will pass through a No. 100 (150 µm) mesh sieve. Coarser material will be acceptable, providing the rates of application are increased to provide not less than the minimum quantities and depth specified in the special provisions on the basis of the two sieve requirements above. Dolomitic lime or a high magnesium lime shall contain at least 10% of magnesium oxide. Lime shall be applied at the rate as determined by the Contractor, in consultation with the local agricultural cooperative extension office as needed. All liming materials shall conform to the requirements of ASTM C602.

901-2.3 FERTILIZER. Fertilizer shall be standard commercial fertilizers supplied separately or in mixtures containing the percentages of total nitrogen, available phosphoric acid, and water-soluble potash. They shall be applied at the rate and to the depth specified, and shall meet the requirements of applicable state laws. They shall be furnished in standard containers with name, weight, and guaranteed analysis of contents clearly marked thereon. No cyanamide compounds or hydrated lime shall be permitted in mixed fertilizers.

The fertilizers may be supplied in one of the following forms:

- a. A dry, free-flowing fertilizer suitable for application by a common fertilizer spreader;
- b. A finely-ground fertilizer soluble in water, suitable for application by power sprayers; or
- c. A granular or pellet form suitable for application by blower equipment.

Fertilizers shall be **10-10-10** commercial fertilizer and shall be spread at the rate of **400 pound per acre unless otherwise submitted by the Contractor and approved by the RPR.**

901-2.4 SOIL FOR REPAIRS. The soil for fill and topsoiling of areas to be repaired shall be at least of equal quality to that which exists in areas adjacent to the area to be repaired. The soil shall be relatively free from large stones, roots, stumps, or other materials that will interfere with subsequent sowing of seed, compacting, and establishing turf, and shall be approved by the RPR before being placed.

901-2.5 HYDROMULCH. The material for hydromulch shall be a virgin wood cellulose fiber that is thermally produced, air dried and conforming to the following:

Percent Moisture Content	10 + 3 percent
Percent Organic Matter	99.3% + .2%
Percent Ash Content	0.7 + 0.2 percent
pH Range	4.9 + 0.5
Percent Water Holding Capacity	1200-1600 grams H ₂ O per 100 grams fiber
Water Soluble Dye	Green

901-2.6 TACKIFIER. Inorganic tackifier and asphaltic materials will not be permitted. The organic tackifier shall be a free-flowing, noncorrosive powder produced from natural plant gum of *Plantago Insulares* (Desert Indian Wheat) applied as recommended by the manufacturer.

901-2.7 SUBMITTALS. Material submittals are required on seed, mulch, and tackifier. No material shall be ordered until the Engineer has received and approved the material submittals.

CONSTRUCTION METHODS

901-3.1 ADVANCE PREPARATION AND CLEANUP. After grading of areas has been completed and before applying fertilizer and ground limestone, areas to be seeded shall be raked or otherwise cleared of stones larger than 2 inches (50 mm) in any diameter, sticks, stumps, and other debris that might interfere with sowing of seed, growth of grasses, or subsequent maintenance of grass-covered areas. If any damage by erosion or other causes has occurred after the completion of grading and before beginning the application of fertilizer and ground limestone, the Contractor shall repair such damage include filling gullies, smoothing irregularities, and repairing other incidental damage.

An area to be seeded shall be considered a satisfactory seedbed without additional treatment if it has recently been thoroughly loosened and worked to a depth of not less than 5 inches (125 mm) as a result of grading operations and, if immediately prior to seeding, the top 3 inches (75 mm) of soil is loose, friable, reasonably free from large clods, rocks, large roots, or other undesirable matter, and if shaped to the required grade. When the area to be seeded is sparsely sodded, weedy, barren and unworked, or packed and hard, any grass and weeds shall first be cut or otherwise satisfactorily disposed of, and the soil then scarified or otherwise loosened to a depth not less than 5 inches (125 mm). Clods shall be broken and the top 3 inches (75 mm) of soil shall be worked into a satisfactory seedbed by discing, or by use of cultipackers, rollers, drags, harrows, or other appropriate means.

901-3.2 DRY APPLICATION METHOD.

- a. **Liming.** Lime, if required, shall be applied separately and prior to the application of any fertilizer or seed and only on seedbeds that have previously been prepared as described above. The lime shall then be worked into the top 3 inches (75 mm) of soil after which the seedbed shall again be properly graded and dressed to a smooth finish.
- b. **Fertilizing.** Following advance preparations and cleanup fertilizer shall be uniformly spread at the rate that will provide not less than the minimum quantity stated in paragraph 901-2.3.
- c. **Seeding.** Grass seed shall be sown at the rate specified in paragraph 901-2.1 immediately after fertilizing. The fertilizer and seed shall be raked within the depth range stated in the special provisions. Seeds of legumes, either alone or in mixtures, shall be inoculated before mixing or sowing, in accordance with the instructions of the manufacturer of the inoculant. When seeding is required at other than the seasons shown on the plans or in the special provisions, a cover crop shall be sown by the same methods required for grass and legume seeding.
- d. **Rolling.** After the seed has been properly covered, the seedbed shall be immediately compacted by means of an approved lawn roller, weighing 40 to 65 pounds per foot (60 to 97 kg per meter) of width for clay soil (or any soil having a tendency to pack), and weighing 150 to 200 pounds per foot (223 to 298 kg per meter) of width for sandy or light soils.

901-3.3 WET APPLICATION METHOD.

- a. **General.** The Contractor may elect to apply seed and fertilizer (and lime, if required) by spraying them on the previously prepared seedbed in the form of an aqueous mixture and by using the methods and equipment described herein. The rates of application shall be as specified in the special provisions.
- b. **Spraying equipment.** The spraying equipment shall have a container or water tank equipped with a liquid level gauge calibrated to read in increments not larger than 50 gallons (190 liters) over the entire range of the tank capacity, mounted so as to be visible to the nozzle operator. The container or tank shall also be equipped with a mechanical power-driven agitator capable of keeping all the solids in the mixture in complete suspension at all times until used.

The unit shall also be equipped with a pressure pump capable of delivering 100 gallons (380 liters) per minute at a pressure of 100 lb / sq inches (690 kPa). The pump shall be mounted in a line that will recirculate the mixture through the tank whenever it is not being sprayed from the nozzle. All pump passages and pipe lines shall be capable of providing clearance for 5/8 inch (16 mm) solids. The power unit for the pump and agitator shall have controls mounted so as to be accessible to the nozzle operator. There shall be an indicating pressure gauge connected and mounted immediately at the back of the nozzle.

The nozzle pipe shall be mounted on an elevated supporting stand in such a manner that it can be rotated through 360 degrees horizontally and inclined vertically from at least 20 degrees below to at least 60 degrees above the horizontal. There shall be a quick-acting, three-way control valve connecting the recirculating line to the nozzle pipe and mounted so that the nozzle operator can control and regulate the amount of flow of mixture delivered to the nozzle. At least three different types of nozzles shall be supplied so that mixtures may be properly sprayed over distance varying from 20 to 100 feet (6 to 30 m). One shall be a close-range ribbon nozzle, one a medium-range ribbon nozzle, and one a long-range jet nozzle. For case of removal and cleaning, all nozzles shall be connected to the nozzle pipe by means of quick-release couplings.

In order to reach areas inaccessible to the regular equipment, an extension hose at least 50 feet (15 m) in length shall be provided to which the nozzles may be connected.

- c. **Mixtures.** Lime, if required, shall be applied separately, in the quantity specified, prior to the fertilizing and seeding operations. Not more than 220 pounds (100 kg) of lime shall be added to and mixed with each 100 gallons (380 liters) of water. Seed and fertilizer shall be mixed together in the relative proportions specified, but not more than a total of 220 pounds (100 kg) of these combined solids shall be added to and mixed with each 100 gallons (380 liters) of water.

All water used shall be obtained from fresh water sources and shall be free from injurious chemicals and other toxic substances harmful to plant life. The Contractor shall identify to the RPR all sources of water at least two (2) weeks prior to use. The RPR may take samples of the water at the source or from the tank at any time and have a laboratory test the samples for chemical and saline content. The Contractor shall not use any water from any source that is disapproved by the RPR following such tests.

All mixtures shall be constantly agitated from the time they are mixed until they are finally applied to the seedbed. All such mixtures shall be used within two (2) hours from the time they were mixed or they shall be wasted and disposed of at approved locations.

- d. **Spraying.** Lime, if required, shall be sprayed only upon previously prepared seedbeds. After the applied lime mixture has dried, the lime shall be worked into the top 3 inches (75 mm), after which the seedbed shall again be properly graded and dressed to a smooth finish.

Mixtures of seed and fertilizer shall only be sprayed upon previously prepared seedbeds on which the lime, if required, shall already have been worked in. The mixtures shall be applied by means of a high-pressure spray that shall always be directed upward into the air so that the mixtures will fall to the ground like rain in a uniform spray. Nozzles or sprays shall never be directed toward the ground in such a manner as might produce erosion or runoff.

Particular care shall be exercised to ensure that the application is made uniformly and at the prescribed rate and to guard against misses and overlapped areas. Proper predetermined quantities of the mixture in accordance with specifications shall be used to cover specified sections of known area.

Checks on the rate and uniformity of application may be made by observing the degree of wetting of the ground or by distributing test sheets of paper or pans over the area at intervals and observing the quantity of material deposited thereon.

On surfaces that are to be mulched as indicated by the plans or designated by the RPR, seed and fertilizer applied by the spray method need not be raked into the soil or rolled. However, on surfaces on which mulch is not to be used, the raking and rolling operations will be required after the soil has dried.

901-3.4 MAINTENANCE OF SEEDED AREAS. The Contractor shall protect seeded areas against traffic or other use by warning signs or barricades, as approved by the RPR. Surfaces gullied or otherwise damaged following seeding shall be repaired by regrading and reseeding as directed. The Contractor shall mow, water as directed, and otherwise maintain seeded areas in a satisfactory condition until final inspection and acceptance of the work.

901-3.5 ACCEPTANCE. The performance standard shall be met before acceptance of the work. It will be required that the Contractor establish a good stand of grass of uniform color and density to the satisfaction of

the Engineer. A grass stand shall be considered adequate when bare spots are one square foot or less, randomly dispersed, and do not exceed 3% of the area seeded. Inspection for acceptance will be made within 60 days after seeding, excluding seeding dates that fall between September 30 and March 1. Seeding dates that fall between September 30 and March 1 will be evaluated no earlier than May 1. Payment for the unaccepted portions of the areas seeded out of season will be withheld until such time as the requirements specified herein have been satisfied.

No testing has been performed on the project soils to determine an ideal rate of fertilizer application. If, through soil analysis or prior experience with the project soils, the Contractor determines that any specified requirements for fertilizer are not best suited to growing a good stand of grass as defined above, revised quantities and/or types of fertilizer may be submitted for Engineer approval. Acceptance of pay items under this specification is established above and the Contractor shall be responsible for meeting these requirements. Any changes to meet the acceptance criteria will be at the Contractor's cost.

METHOD OF MEASUREMENT

901-4.1 The quantity of seeding to be paid for shall be the number of units (acre) measured on the ground surface, completed and accepted.

901-4.2 Lime, Fertilizer, Soil for Repairs, Hydromulch, and Tackifier will not be measured or paid separately, but shall be considered included in the seeding item.

BASIS OF PAYMENT

901-5.1 Payment shall be made at the contract unit price per acre or fraction thereof, which price and payment shall be full compensation for furnishing and placing all material and for all labor, equipment, tools, and incidentals necessary to complete the work prescribed in this item.

Payment will be made under:

Item T-901a	Seeding - per acre
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REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C602	Standard Specification for Agricultural Liming Materials
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Federal Specifications (FED SPEC)

FED SPEC	JJJ-S-181, Federal Specification, Seeds, Agricultural
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249 Advisory Circulars (AC)
250
251 AC 150/5200-33 Hazardous Wildlife Attractants on or Near Airports
252
253 FAA/United States Department of Agriculture
254
255 Wildlife Hazard Management at Airports, A Manual for Airport Personnel
256
257
258 ****END OF ITEM T-901****
259

ITEM L-110 AIRPORT UNDERGROUND ELECTRICAL DUCT BANKS AND CONDUITS

DESCRIPTION

110-1.1 This item shall consist of underground electrical conduits and duct banks (single or multiple conduits encased in concrete or buried in sand) installed per this specification at the locations and per the dimensions, designs, and details shown on the plans. This item shall include furnishing and installing of all underground electrical duct banks and individual and multiple underground conduits and removal of existing duct banks. It shall also include all turfing trenching, backfilling, removal, and restoration of any paved or turfed areas; concrete encasement, mandrelling, pulling lines, duct markers, plugging of conduits, and the testing of the installation as a completed system ready for installation of cables per the plans and specifications. This item shall also include furnishing and installing conduits and all incidentals for providing positive drainage of the system. Verification of existing ducts is incidental to the pay items provided in this specification.

EQUIPMENT AND MATERIALS

110-2.1 GENERAL.

- a. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the RPR
- b. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications and acceptable to the RPR. Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the RPR and replaced with materials, that comply with these specifications, at the Contractor's cost.
- c. All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in project that accrue directly or indirectly from late submissions or resubmissions of submittals.
- d. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be electronically submitted in pdf format, tabbed by specification section. The RPR reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes specified in this document.
- e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

110-2.2 STEEL CONDUIT. Rigid galvanized steel (RGS) conduit and fittings shall be hot dipped galvanized inside and out and conform to the requirements of Underwriters Laboratories Standards 6, 514B, and 1242. All RGS conduits or RGS elbows installed below grade, in concrete, permanently wet locations or other similar environments shall be painted with a 10-mil thick coat of asphaltum sealer or shall have a factory-bonded polyvinyl chloride (PVC) cover. Any exposed galvanizing or steel shall be coated with 10 mils of asphaltum sealer. When using PVC coated RGS conduit, care shall be exercised not to damage the factory PVC coating. Damaged PVC coating shall be repaired per the manufacturer's written instructions. In lieu of PVC coated RGS, corrosion wrap tape shall be permitted to be used where RGS is in contact with direct earth."

110-2.3 PLASTIC CONDUIT. Plastic conduit and fittings shall conform to the following requirements:

- UL 514B covers W-C-1094-Conduit fittings all types, classes 1 thru 3 and 6 thru 10. ^[11]~~SEP~~
- UL 514C covers W-C-1094- all types, Class 5 junction box and cover in plastic (PVC).
- UL 651 covers W-C-1094-Rigid PVC Conduit, types I and II, Class 4.
- UL 651A covers W-C-1094-Rigid PVC Conduit and high-density polyethylene (HDPE) Conduit type III and Class 4.

Underwriters Laboratories Standards UL-651 and Article 352 of the current National Electrical Code shall be one of the following, as shown on the plans:

- a. Type I—Schedule 40 and Schedule 80 PVC suitable for underground use either direct-buried or encased in concrete.
- b. Type II—Schedule 40 PVC suitable for either above ground or underground use.
- c. Type III – Schedule 80 PVC suitable for either above ground or underground use either direct-buried or encased in concrete.
- d. Type III –HDPE pipe, minimum standard dimensional ratio (SDR) 11, suitable for placement with directional boring under pavement.

The type of solvent cement shall be as recommended by the conduit/fitting manufacturer.

110-2.4 SPLIT CONDUIT. Split conduit shall be pre-manufactured for the intended purpose and shall be made of steel or plastic.

110-2.5 CONDUIT SPACERS. Conduit spacers shall be prefabricated interlocking units manufactured for the intended purpose. They shall be of double wall construction made of high grade, high density polyethylene complete with interlocking cap and base pads. They shall be designed to accept No. 4 reinforcing bars installed vertically.

110-2.6 CONCRETE. Concrete shall be proportioned, placed, and cured per state department of transportation structural concrete with minimum 25% Type F fly ash, and a minimum allowable compressive strength of 4,000 psi (28 MPa).

110-2.7 PRECAST CONCRETE STRUCTURES. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another RPR approved third party certification program. Precast concrete structures shall conform to ASTM C478.

110-2.8 FLOWABLE BACKFILL. Flowable material used to back fill conduit and duct bank trenches shall conform to the requirements of Item P-153, Controlled Low Strength Material.

110-2.9 DETECTABLE WARNING TAPE. Plastic, detectable, American Public Works Association (APWA) red (electrical power lines, cables, conduit and lighting cable), orange (telephone/fiber optic cabling) with continuous legend magnetic tape shall be polyethylene film with a metallized foil core and shall be 3-6 inches (75-150 mm) wide. Detectable tape is incidental to the respective bid item.

CONSTRUCTION METHODS

110-3.1 GENERAL. The Contractor shall install underground duct banks and conduits at the approximate locations indicated on the plans. The RPR shall indicate specific locations as the work progresses, if required to differ from the plans. Duct banks and conduits shall be of the size, material, and type indicated on the plans or specifications. Where no size is indicated on the plans or in the specifications, conduits shall be not less than 2 inches (50 mm) inside diameter or comply with the National Electrical Code based on cable to be installed, whichever is larger. All duct bank and conduit lines shall be laid so as to grade toward access points and duct or conduit ends for drainage. Unless shown otherwise on the plans, grades shall be at least 3 inches (75 mm) per 100 feet (30 m). On runs where it is not practicable to maintain the grade all one way, the duct bank and conduit lines shall be graded from the center in both directions toward access points or conduit ends, with a drain into the storm drainage system. Pockets or traps where moisture may accumulate shall be avoided. Under pavement, the top of the duct bank shall not be less than 18 inches (0.5 m) below the subgrade; in other locations, the top of the duct bank or underground conduit shall be not less than 18 inches (0.5 m) below finished grade.

The Contractor shall mandrel each individual conduit whether the conduit is direct-buried or part of a duct bank. An iron-shod mandrel, not more than 1/4 inch (6 mm) smaller than the bore of the conduit shall be pulled or pushed through each conduit. The mandrel shall have a leather or rubber gasket slightly larger than the conduit hole.

The Contractor shall swab out all conduits/ducts and clean base can, manhole, pull boxes, etc., interiors immediately prior to pulling cable. Once cleaned and swabbed the light bases, manholes, pull boxes, etc., and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, base cans, manholes, etc., is incidental to the pay item of the item being cleaned. All raceway systems left open, after initial cleaning, for any reason shall be recleaned at the Contractor's expense. All accessible points shall be kept closed when not installing cable. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the RPR of any blockage in the existing ducts.

For pulling the permanent wiring, each individual conduit, whether the conduit is direct-buried or part of a duct bank, shall be provided with a 200-pound (90 kg) test polypropylene pull rope. The ends shall be secured and sufficient length shall be left in access points to prevent it from slipping back into the conduit. Where spare conduits are installed, as indicated on the plans, the open ends shall be plugged with removable tapered plugs, designed for this purpose.

All conduits shall be securely fastened in place during construction and shall be plugged to prevent contaminants from entering the conduits. Any conduit section having a defective joint shall not be installed. Ducts shall be supported and spaced apart using approved spacers at intervals not to exceed 5 feet (1.5 m).

Unless otherwise shown on the plans, concrete encased duct banks shall be used when crossing under pavements expected to carry aircraft loads, such as runways, taxiways, taxilanes, ramps and aprons. When under

paved shoulders and other paved areas, conduit and duct banks shall be encased using flowable fill for protection.

All conduits within concrete encasement of the duct banks shall terminate with female ends for ease in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored.

Trenches for conduits and duct banks may be excavated manually or with mechanical trenching equipment unless in pavement, in which case they shall be excavated with mechanical trenching equipment. Walls of trenches shall be essentially vertical so that a minimum of shoulder surface is disturbed. Blades of graders shall not be used to excavate the trench.

When rock is encountered, the rock shall be removed to a depth of at least 3 inches (75 mm) below the required conduit or duct bank depth and it shall be replaced with bedding material of earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch (6.3 mm) sieve. Flowable backfill may alternatively be used

Underground electrical warning (Caution) tape shall be installed in the trench above all underground duct banks and conduits in unpaved areas. Contractor shall submit a sample of the proposed warning tape for approval by the RPR. If not shown on the plans, the warning tape shall be located 6 inches above the duct/conduit or the counterpoise wire if present.

Joints in plastic conduit shall be prepared per the manufacturer's recommendations for the particular type of conduit. Plastic conduit shall be prepared by application of a plastic cleaner and brushing a plastic solvent on the outside of the conduit ends and on the inside of the couplings. The conduit fitting shall then be slipped together with a quick one-quarter turn twist to set the joint tightly. Where more than one conduit is placed in a single trench, or in duct banks, joints in the conduit shall be staggered a minimum of 2 feet (60 cm).

Changes in direction of runs exceeding 10 degrees, either vertical or horizontal, shall be accomplished using manufactured sweep bends.

Whether or not specifically indicated on the drawings, where the soil encountered at established duct bank grade is an unsuitable material, as determined by the RPR, the unsuitable material shall be removed per Item P-152 and replaced with suitable material. Additional duct bank supports shall be installed, as approved by the RPR.

All excavation shall be unclassified and shall be considered incidental to Item L-110. Dewatering necessary for duct installation, and erosion per federal, state, and local requirements is incidental to Item L-110.

Unless otherwise specified, excavated materials that are deemed by the RPR to be unsuitable for use in backfill or embankments shall be removed and disposed of offsite.

Any excess excavation shall be filled with suitable material approved by the RPR and compacted per Item P-152.

It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Where existing active cables cross proposed installations, the Contractor shall ensure that these cables are adequately protected. Where crossings are unavoidable, no splices will be allowed in the existing cables, except as specified on the plans. Installation of new cable where such crossings must occur shall proceed as follows:

- a. Existing cables shall be located manually. Unearthed cables shall be inspected to assure absolutely no damage has occurred

- b. Trenching, etc., in cable areas shall then proceed with approval of the RPR, with care taken to minimize possible damage or disruption of existing cable, including careful backfilling in area of cable.

In the event that any previously identified cable is damaged during the course of construction, the Contractor shall be responsible for the complete repair.

110-3.2 DUCT BANKS. Unless otherwise shown in the plans, duct banks shall be installed so that the top of the concrete envelope is not less than 18 inches (0.5 m) below the bottom of the base or stabilized base course layers where installed under runways, taxiways, aprons, or other paved areas, and not less than 18 inches (0.5 m) below finished grade where installed in unpaved areas.

Unless otherwise shown on the plans, duct banks under paved areas shall extend at least 3 feet (1 m) beyond the edges of the pavement or 3 feet (1 m) beyond any under drains that may be installed alongside the paved area. Trenches for duct banks shall be opened the complete length before concrete is placed so that if any obstructions are encountered, provisions can be made to avoid them. Unless otherwise shown on the plans, all duct banks shall be placed on a layer of concrete not less than 3 inches (75 mm) thick prior to its initial set. The Contractor shall space the conduits not less than 3 inches (75 mm) apart (measured from outside wall to outside wall). All such multiple conduits shall be placed using conduit spacers applicable to the type of conduit. As the conduit laying progresses, concrete shall be placed around and on top of the conduits not less than 3 inches (75 mm) thick unless otherwise shown on the plans. All conduits shall terminate with female ends for ease of access in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

Conduits forming the duct bank shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches (150 mm) to anchor the assembly into the earth prior to placing the concrete encasement. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5-foot (1.5-m) intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the RPR for review prior to use.

When specified, the Contractor shall reinforce the bottom side and top of encasements with steel reinforcing mesh or fabric or other approved metal reinforcement. When directed, the Contractor shall supply additional supports where the ground is soft and boggy, where ducts cross under roadways, or where shown on the plans. Under such conditions, the complete duct structure shall be supported on reinforced concrete footings, piers, or piles located at approximately 5-foot (1.5-m) intervals.

All pavement surfaces that are to have ducts installed therein shall be neatly saw cut to form a vertical face. All excavation shall be included in the contract with price for the duct.

Install a plastic, detectable, color as noted, 3 to 6 inches (75 to 150 mm) wide tape, 8 inches (200 mm) minimum below grade above all underground conduit or duct lines not installed under pavement. Utilize the 3-inch (75-mm) wide tape only for single conduit runs. Utilize the 6-inch (150-mm) wide tape for multiple conduits and duct banks. For duct banks equal to or greater than 24 inches (600 mm) in width, utilize more than one tape for sufficient coverage and identification of the duct bank as required.

When existing cables are to be placed in split duct, encased in concrete, the cable shall be carefully located and exposed by hand tools. Prior to being placed in duct, the RPR shall be notified so that he may inspect the cable and determine that it is in good condition. Where required, split duct shall be installed as shown on the drawings or as required by the RPR.

110-3.3 CONDUITS WITHOUT CONCRETE ENCASEMENT. Trenches for single-conduit lines shall be not less than 6 inches (150 mm) nor more than 12 inches (300 mm) wide. The trench for 2 or more conduits installed at the same level shall be proportionately wider. Trench bottoms for conduits without concrete encasement shall be made to conform accurately to grade so as to provide uniform support for the conduit along its entire length.

Unless otherwise shown on the plans, a layer of fine earth material, at least 4 inches (100 mm) thick (loose measurement) shall be placed in the bottom of the trench as bedding for the conduit. The bedding material shall consist of soft dirt, sand or other fine fill, and it shall contain no particles that would be retained on a 1/4-inch (6.3 mm) sieve. The bedding material shall be tamped until firm. Flowable backfill may alternatively be used.

Unless otherwise shown on plans, conduits shall be installed so that the tops of all conduits within the Airport's secured area where trespassing is prohibited are at least 18 inches (0.5 m) below the finished grade. Conduits outside the Airport's secured area shall be installed so that the tops of the conduits are at least 24 inches (60 cm) below the finished grade per National Electric Code (NEC), Table 300.5.

When two or more individual conduits intended to carry conductors of equivalent voltage insulation rating are installed in the same trench without concrete encasement, they shall be spaced not less than 3 inches (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and not less than 6 inches (150 mm) apart in a vertical direction. Where two or more individual conduits intended to carry conductors of differing voltage insulation rating are installed in the same trench without concrete encasement, they shall be placed not less than 3 inches (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and not less than 6 inches (150 mm) apart in a vertical direction.

Trenches shall be opened the complete length between normal termination points before conduit is installed so that if any unforeseen obstructions are encountered, proper provisions can be made to avoid them.

Conduits shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches (150 mm) to anchor the assembly into the earth while backfilling. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5-foot (1.5-m) intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the RPR for review prior to use.

110-3.4 MARKERS. The location of each end and of each change of direction of conduits and duct banks shall be marked by a concrete slab marker 2 feet (60 cm) square and 4 - 6 inches (100 - 150 mm) thick extending approximately one inch (25 mm) above the surface. The markers shall also be located directly above the ends of all conduits or duct banks, except where they terminate in a junction/access structure or building. Each cable or duct run from a line of lights and signs to the equipment vault must be marked at approximately every 200 feet (61 m) along the cable or duct run, with an additional marker at each change of direction of cable or duct run.

The Contractor shall impress the word "DUCT" or "CONDUIT" on each marker slab. Impression of letters shall be done in a manner, approved by the RPR, for a neat, professional appearance. All letters and words must be neatly stenciled. After placement, all markers shall be given one coat of high-visibility orange paint, as approved by the RPR. The Contractor shall also impress on the slab the number and size of conduits beneath the marker along with all other necessary information as determined by the RPR. The letters shall be 4 inches (100 mm) high and 3 inches (75 mm) wide with width of stroke 1/2 inch (12 mm) and 1/4 inch (6 mm) deep or as large as the available space permits. Furnishing and installation of duct markers is incidental to the respective duct pay item.

110-3.5 BACKFILLING FOR CONDUITS. For conduits, 8 inches (200 mm) of sand, soft earth, or other fine fill (loose measurement) shall be placed around the conduits ducts and carefully tamped around and over

309 them with hand tampers. The remaining trench shall then be backfilled and compacted per Item P-152 except
310 that material used for back fill shall be select material not larger than 4 inches (100 mm) in diameter.

311
312 Flowable backfill may alternatively be used.

313
314 Trenches shall not contain pools of water during back filling operations.

315
316 The trench shall be completely backfilled and tamped level with the adjacent surface; except that, where sod is
317 to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be
318 used, with proper allowance for settlement.

319
320 Any excess excavated material shall be removed and disposed of per instructions issued by the RPR.

321
322 **110-3.6 BACKFILLING FOR DUCT BANKS.** After the concrete has cured, the remaining trench shall be
323 backfilled and compacted per Item P-152 "Excavation and Embankment" except that the material used for
324 backfill shall be select material not larger than 4 inches (100 mm) in diameter. In addition to the requirements
325 of Item P-152, where duct banks are installed under pavement, one moisture/density test per lift shall be made
326 for each 250 linear feet (76 m) of duct bank or one work period's construction, whichever is less.

327
328 Flowable backfill may alternatively be used.

329
330 Trenches shall not contain pools of water during backfilling operations.

331
332 The trench shall be completely backfilled and tamped level with the adjacent surface; except that, where sod is
333 to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be
334 used, with proper allowance for settlement.

335
336 Any excess excavated material shall be removed and disposed of per instructions issued by the RPR.

337
338 **110-3.7 RESTORATION.** Where sod has been removed, it shall be replaced as soon as possible after the
339 backfilling is completed. All areas disturbed by the work shall be restored to its original condition. The
340 restoration shall include seeding shown on the plans. The Contractor shall be held responsible for maintaining
341 all disturbed surfaces and replacements until final acceptance. All restoration shall be considered incidental to
342 the respective L-110 pay item. Following restoration of all trenching near airport movement surfaces, the
343 Contractor shall thoroughly visually inspect the area for foreign object debris (FOD), and remove any such
344 FOD that is found. This FOD inspection and removal shall be considered incidental to the pay item of which
345 it is a component part.

346
347 **110-3.8 OWNERSHIP OF REMOVED CABLE.** The Contractor shall remove all abandoned/unused
348 conductors contained in conduits in which new conductors will be installed. No abandoned conductors shall
349 be left in place at the completion of the job. All removed wire shall become the property of the Contractor and
350 the Contractor shall be held responsible for removing the wire off airport property. The removal of existing
351 conductors shall be considered incidental to the respective duct pay item and no separate payment will be made.

352 353 METHOD OF MEASUREMENT

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355
356 **110-4.1** Underground conduits and duct banks shall be measured by the linear feet (meter) of conduits and duct
357 banks installed, including encasement, locator tape, trenching and backfill with designated material, and
358 restoration, and for drain lines, the termination at the drainage structure, all measured in place, completed, and
359 accepted. Separate measurement shall be made for the various types and sizes.

BASIS OF PAYMENT

110-5.1 Payment will be made at the contract unit price per linear foot for each type and size of conduit and duct bank completed and accepted, including trench and backfill with the designated material, and, for drain lines, the termination at the drainage structure. This price shall be full compensation for removal and disposal of existing duct banks and conduits as shown on the plans, furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item per the provisions and intent of the plans and specifications.

Payment will be made under:

L-110a	Install 1-3" Schedule 40 PVC Conduit, Direct Earth Buried – Per Linear Foot
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REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circular (AC)

AC 150/5340-30	Design and Installation Details for Airport Visual Aids
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AC 150/5345-53	Airport Lighting Equipment Certification Program
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ASTM International (ASTM)

ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
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National Fire Protection Association (NFPA)

NFPA-70	National Electrical Code (NEC)
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Underwriters Laboratories (UL)

UL Standard 6	Electrical Rigid Metal Conduit - Steel
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UL Standard 514B	Conduit, Tubing, and Cable Fittings
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UL Standard 514C	Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
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UL Standard 1242	Electrical Intermediate Metal Conduit Steel
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UL Standard 651	Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
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UL Standard 651A	Type EB and A Rigid PVC Conduit and HDPE Conduit
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****END OF ITEM L-110****

ITEM L-115 ELECTRICAL MANHOLES AND JUNCTION STRUCTURES

DESCRIPTION

115-1.1 This item shall consist of electrical manholes and junction structures (hand holes, pull boxes, junction cans, etc.) installed per this specification, at the indicated locations and conforming to the lines, grades and dimensions shown on the plans or as required by the RPR. This item shall include the installation of each electrical manhole and/or junction structures with all associated excavation, backfilling, sheeting and bracing, concrete, reinforcing steel, ladders, appurtenances, testing, dewatering and restoration of surfaces to the satisfaction of the RPR including removal of existing manholes and junction structures as shown on the plans.

EQUIPMENT AND MATERIALS

115-2.1 GENERAL.

- a. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when so requested by the RPR.
- b. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications. Materials supplied and/or installed that do not comply with these specifications shall be removed (when directed by the RPR) and replaced with materials that comply with these specifications at the Contractor's cost.
- c. All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete any non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment to which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in the project that may accrue directly or indirectly from late submissions or resubmissions of submittals.
- d. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be electronically submitted in pdf format, tabbed by specification section. The RPR reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes, specified in this document.
- e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from the date of final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

115-2.2 CONCRETE STRUCTURES. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures. Cast-in-place concrete structures shall be as shown on the plans.

115-2.3 PRECAST CONCRETE STRUCTURES. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another engineer approved third party certification program. Provide precast concrete structures where shown on the plans.

Precast concrete structures shall be an approved standard design of the manufacturer. Precast units shall have mortar or bitumastic sealer placed between all joints to make them watertight. The structure shall be designed to withstand 100,000 lb aircraft loads, unless otherwise shown on the plans. Openings or knockouts shall be provided in the structure as detailed on the plans.

Threaded inserts and pulling eyes shall be cast in as shown on the plans.

If the Contractor chooses to propose a different structural design, signed and sealed shop drawings, design calculations, and other information requested by the RPR shall be submitted by the Contractor to allow for a full evaluation by the RPR. The RPR shall review per the process defined in the General Provisions.

115-2.4 JUNCTION BOXES. Junction boxes shall be L-867 Class 1 (non-load bearing) or L-868 Class 1 (load bearing) airport light bases that are encased in concrete. The light bases shall have a L-894 blank cover, gasket, and stainless steel hardware. All bolts, studs, nuts, lock washers, and other similar fasteners used for the light fixture assemblies must be fabricated from 316L (equivalent to EN 1.4404), 18-8, 410, or 416 stainless steel. If 18-8, 410, or 416 stainless steel is utilized it shall be passivated and be free from any discoloration. Covers shall be 3/8-inch (9-mm) thickness for L-867 and 3/4-inch (19-mm) thickness for L-868. All junction boxes shall be provided with both internal and external ground lugs.

115-2.5 MORTAR. The mortar shall be composed of one part of cement and two parts of mortar sand, by volume. The cement shall be per the requirements in ASTM C150, Type I. The sand shall be per the requirements in ASTM C144. Hydrated lime may be added to the mixture of sand and cement in an amount not to exceed 15% of the weight of cement used. The hydrated lime shall meet the requirements of ASTM C206. Water shall be potable, reasonably clean and free of oil, salt, acid, alkali, sugar, vegetable, or other substances injurious to the finished product.

115-2.6 CONCRETE. All concrete used in structures shall conform to the requirements of Item P-610, Concrete for Miscellaneous Structures.

115-2.7 FRAMES AND COVERS. The frames shall conform to one of the following requirements:

- | | | |
|----|--------------------|--|
| a. | ASTM A48 | Gray iron castings |
| b. | ASTM A47 | Malleable iron castings |
| c. | ASTM A27 | Steel castings |
| d. | ASTM A283, Grade D | Structural steel for grates and frames |
| e. | ASTM A536 | Ductile iron castings |
| f. | ASTM A897 | Austempered ductile iron castings |

All castings specified shall withstand a maximum tire pressure of 250 psi and maximum load of 100,000 lbs.

All castings or structural steel units shall conform to the dimensions shown on the plans and shall be designed to support the loadings specified.

Each frame and cover unit shall be provided with fastening members to prevent it from being dislodged by traffic, but which will allow easy removal for access to the structure.

All castings shall be thoroughly cleaned. After fabrication, structural steel units shall be galvanized to meet the requirements of ASTM A123.

Each cover shall have the word "ELECTRIC" or other approved designation cast on it. Each frame and cover shall be as shown on the plans or approved equivalent. No cable notches are required.

Each manhole shall be provided with a "DANGER -- PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER" safety warning sign as detailed in the Contract Documents and in accordance with OSHA 1910.146 (c)(2).

115-2.8 LADDERS. Ladders, if specified, shall be galvanized steel or as shown on the plans.

115-2.9 REINFORCING STEEL. All reinforcing steel shall be deformed bars of new billet steel meeting the requirements of ASTM A615, Grade 60.

115-2.10 BEDDING/SPECIAL BACKFILL. Bedding or special backfill shall be as shown on the plans.

115-2.11 FLOWABLE BACKFILL. Flowable material used to backfill shall conform to the requirements of Item P-153, Controlled Low Strength Material.

115-2.12 CABLE TRAYS. Cable trays shall be of galvanized steel. Cable trays shall be located as shown on the plans.

115-2.13 PLASTIC CONDUIT. Plastic conduit shall comply with Item L-110, Airport Underground Electrical Duct Banks and Conduits.

115-2.14 CONDUIT TERMINATORS. Conduit terminators shall be pre-manufactured for the specific purpose and sized as required or as shown on the plans.

115-2.15 PULLING-IN IRONS. Pulling-in irons shall be manufactured with 7/8-inch (22 mm) diameter hot-dipped galvanized steel or stress-relieved carbon steel roping designed for concrete applications (7 strand, 1/2-inch (12 mm) diameter with an ultimate strength of 270,000 psi (1862 MPa)). Where stress-relieved carbon steel roping is used, a rustproof sleeve shall be installed at the hooking point and all exposed surfaces shall be encapsulated with a polyester coating to prevent corrosion.

115-2.16 GROUND RODS. Ground rods shall be one piece, copper clad steel. The ground rods shall be of the length and diameter specified on the plans, but in no case shall they be less than 10 feet (2.4 m) long nor less than 3/4 inch (16 mm) in diameter.

CONSTRUCTION METHODS

115-3.1 UNCLASSIFIED EXCAVATION. It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Damage to utility lines, through lack of care in excavating, shall be repaired or replaced to the satisfaction of the RPR without additional expense to the Owner.

The Contractor shall perform excavation for structures and structure footings to the lines and grades or elevations shown on the plans or as staked by the RPR. The excavation shall be of sufficient size to permit the placing of the full width and length of the structure or structure footings shown.

All excavation shall be unclassified and shall be considered incidental to Item L-115. Dewatering necessary for structure installation and erosion per federal, state, and local requirements is incidental to Item L-115.

Boulders, logs and all other objectionable material encountered in excavation shall be removed. All rock and other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped or serrated, as directed by the RPR. All seams, crevices, disintegrated rock and thin strata shall be removed. When concrete is to rest on a surface other than rock, special care shall be taken not to disturb the bottom of the excavation. Excavation to final grade shall not be made until just before the concrete or reinforcing is to be placed.

The Contractor shall provide all bracing, sheeting and shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheeting and shoring shall be included in the unit price bid for the structure.

Unless otherwise provided, bracing, sheeting and shoring involved in the construction of this item shall be removed by the Contractor after the completion of the structure. Removal shall be effected in a manner that will not disturb or mar finished masonry. The cost of removal shall be included in the unit price bid for the structure.

After each excavation is completed, the Contractor shall notify the RPR. Structures shall be placed after the RPR has approved the depth of the excavation and the suitability of the foundation material.

Prior to installation the Contractor shall provide a minimum of 6 inches (150 mm) of sand or a material approved by the RPR as a suitable base to receive the structure. The base material shall be compacted and graded level and at proper elevation to receive the structure in proper relation to the conduit grade or ground cover requirements, as indicated on the plans.

115-3.2 CONCRETE STRUCTURES. Concrete structures shall be built on prepared foundations conforming to the dimensions and form indicated on the plans. The concrete and construction methods shall conform to the requirements specified in Item P-610. Any reinforcement required shall be placed as indicated on the plans and shall be approved by the RPR before the concrete is placed.

115-3.3 PRECAST UNIT INSTALLATIONS. Precast units shall be installed plumb and true. Joints shall be made watertight by use of sealant at each tongue-and-groove joint and at roof of manhole. Excess sealant shall be removed and severe surface projections on exterior of neck shall be removed.

115-3.4 PLACEMENT AND TREATMENT OF CASTINGS, FRAMES AND FITTINGS. All castings, frames and fittings shall be placed in the positions indicated on the Plans or as directed by the RPR and shall be set true to line and to correct elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place and position before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has set.

Field connections shall be made with bolts, unless indicated otherwise. Welding will not be permitted unless shown otherwise on the approved shop drawings and written approval is granted by the casting manufacturer. Erection equipment shall be suitable and safe for the workman. Errors in shop fabrication or deformation resulting from handling and transportation that prevent the proper assembly and fitting of parts shall be reported immediately to the RPR and approval of the method of correction shall be obtained. Approved corrections shall be made at Contractor's expense.

Anchor bolts and anchors shall be properly located and built into connection work. Bolts and anchors shall be preset by the use of templates or such other methods as may be required to locate the anchors and anchor bolts accurately.

Pulling-in irons shall be located opposite all conduit entrances into structures to provide a strong, convenient attachment for pulling-in blocks when installing cables. Pulling-in irons shall be set directly into the concrete walls of the structure.

115-3.5 INSTALLATION OF LADDERS. Ladders shall be installed such that they may be removed if necessary. Mounting brackets shall be supplied top and bottom and shall be cast in place during fabrication of the structure or drilled and grouted in place after erection of the structure.

115-3.6 REMOVAL OF SHEETING AND BRACING. In general, all sheeting and bracing used to support the sides of trenches or other open excavations shall be withdrawn as the trenches or other open excavations are being refilled. That portion of the sheeting extending below the top of a structure shall be withdrawn, unless otherwise directed, before more than 6 inches (150 mm) of material is placed above the top of the structure and before any bracing is removed. Voids left by the sheeting shall be carefully refilled with selected material and rammed tight with tools especially adapted for the purpose or otherwise as may be approved.

The RPR may direct the Contractor to delay the removal of sheeting and bracing if, in his judgment, the installed work has not attained the necessary strength to permit placing of backfill.

115-3.7 BACKFILLING. After a structure has been completed, the area around it shall be backfilled in horizontal layers not to exceed 6 inches (150 mm) in thickness measured after compaction to the density requirements in Item P-152. Each layer shall be deposited all around the structure to approximately the same elevation. The top of the fill shall meet the elevation shown on the plans or as directed by the RPR.

Backfill shall not be placed against any structure until approval is given by the RPR. In the case of concrete, such approval shall not be given until tests made by the laboratory under supervision of the RPR establish that the concrete has attained sufficient strength to provide a factor of safety against damage or strain in withstanding any pressure created by the backfill or the methods used in placing it.

Where required, the RPR may direct the Contractor to add, at his own expense, sufficient water during compaction to assure a complete consolidation of the backfill. The Contractor shall be responsible for all damage or injury done to conduits, duct banks, structures, property or persons due to improper placing or compacting of backfill.

115-3.8 CONNECTION OF DUCT BANKS. To relieve stress of joint between concrete-encased duct banks and structure walls, reinforcement rods shall be placed in the structure wall and shall be formed and tied into duct bank reinforcement at the time the duct bank is installed.

115-3.9 GROUNDING. A ground rod shall be installed in the floor of all concrete structures so that the top of rod extends 6 inches (150 mm) above the floor. The ground rod shall be installed within one foot (30 cm) of a corner of the concrete structure. Ground rods shall be installed prior to casting the bottom slab. Where the soil condition does not permit driving the ground rod into the earth without damage to the ground rod, the Contractor shall drill a 4-inch (100 mm) diameter hole into the earth to receive the ground rod. The hole around the ground rod shall be filled throughout its length, below slab, with Portland cement grout. Ground rods shall be installed in precast bottom slab of structures by drilling a hole through bottom slab and installing the ground rod. Bottom slab penetration shall be sealed watertight with Portland cement grout around the ground rod.

A grounding bus of 4/0 bare stranded copper shall be exothermically bonded to the ground rod and loop the concrete structure walls. The ground bus shall be a minimum of one foot (30 cm) above the floor of the structure and separate from other cables. No. 2 American wire gauge (AWG) bare copper pigtails shall bond the grounding bus to all cable trays and other metal hardware within the concrete structure. Connections to the grounding bus shall be exothermic. If an exothermic weld is not possible, connections to the grounding bus

shall be made by using connectors approved for direct burial in soil or concrete per UL 467. Hardware connections may be mechanical, using a lug designed for that purpose.

115-3.10 CLEANUP AND REPAIR. After erection of all galvanized items, damaged areas shall be repaired by applying a liquid cold-galvanizing compound per MIL-P-21035. Surfaces shall be prepared and compound applied per the manufacturer's recommendations.

Prior to acceptance, the entire structure shall be cleaned of all dirt and debris.

115-3.11 RESTORATION. After the backfill is completed, the Contractor shall dispose of all surplus material, dirt and rubbish from the site. The Contractor shall restore all disturbed areas equivalent to or better than their original condition. All sodding, grading and restoration shall be considered incidental to the respective Item L-115 pay item.

The Contractor shall grade around structures as required to provide positive drainage away from the structure.

Areas with special surface treatment, such as roads, sidewalks, or other paved areas shall have backfill compacted to match surrounding areas, and surfaces shall be repaired using materials comparable to original materials.

Following restoration of all trenching near airport movement surfaces, the Contractor shall thoroughly visually inspect the area for foreign object debris (FOD), and remove any such FOD that is found. This FOD inspection and removal shall be considered incidental to the pay item of which it is a component part.

After all work is completed, the Contractor shall remove all tools and other equipment, leaving the entire site free, clear and in good condition.

115-3.12 INSPECTION. Prior to final approval, the electrical structures shall be thoroughly inspected for conformance with the plans and this specification. Any indication of defects in materials or workmanship shall be further investigated and corrected. The earth resistance to ground of each ground rod shall not exceed 25 ohms. Each ground rod shall be tested using the fall-of-potential ground impedance test per American National Standards Institute / Institute of Electrical and Electronic Engineers (ANSI/IEEE) Standard 81. This test shall be performed prior to establishing connections to other ground electrodes.

115-3.13 MANHOLE ELEVATION ADJUSTMENTS. The Contractor shall adjust the tops of existing manholes in areas designated in the Contract Documents to the new elevations shown. The Contractor shall be responsible for determining the exact height adjustment required to raise or lower the top of each manhole to the new elevations. The existing top elevation of each manhole to be adjusted shall be determined in the field and subtracted/added from the proposed top elevation.

The Contractor shall remove/extend the existing top section or ring and cover on the manhole structure or manhole access. The Contractor shall install precast concrete sections or grade rings of the required dimensions to adjust the manhole top to the new proposed elevation or shall cut the existing manhole walls to shorten the existing structure, as required by final grades. The Contractor shall reinstall the manhole top section or ring and cover on top and check the new top elevation.

The Contractor shall construct a concrete slab around the top of adjusted structures located in graded areas that are not to be paved. The concrete slab shall conform to the dimensions shown on the plans.

115-3.14 DUCT EXTENSION TO EXISTING DUCTS. Where existing concrete encased ducts are to be extended, the duct extension shall be concrete encased plastic conduit. The fittings to connect the ducts

together shall be standard manufactured connectors designed and approved for the purpose. The duct extensions shall be installed according to the concrete encased duct detail and as shown on the plans.

METHOD OF MEASUREMENT

115-4.1 Electrical manholes and junction structures shall be measured by each unit completed in place and accepted. The following items shall be included in the price of each unit: All required excavation and dewatering; sheeting and bracing; all required backfilling with on-site materials; restoration of all surfaces and finished grading and turfing; all required connections; temporary cables and connections; and ground rod testing

115-4.2 Manhole elevation adjustments shall be measured by the completed unit installed, in place, completed, and accepted. Separate measurement shall not be made for the various types and sizes.

BASIS OF PAYMENT

115-5.1 The accepted quantity of electrical manholes and junction structures will be paid for at the Contract unit price per each, complete and in place. This price shall be full compensation for furnishing all materials and for all preparation, excavation, backfilling and placing of the materials, furnishing and installation of appurtenances and connections to duct banks and other structures as may be required to complete the item as shown on the plans and for all labor, equipment, tools and incidentals necessary to complete the structure.

115-5.2 Payment shall be made at the contract unit price for manhole elevation adjustments. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary, including but not limited to, spacers, concrete, rebar, dewatering, excavating, backfill, topsoil, sodding and pavement restoration, where required, to complete this item as shown in the plans and to the satisfaction of the RPR.

Payment will be made under:

Item L-115a	Install Electrical Handhole – Per Each
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REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

American National Standards Institute / Insulated Cable Engineers Association (ANSI/ICEA)

ANSI/IEEE STD 81	IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System
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Advisory Circular (AC)

AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
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AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
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362	AC 150/5345-42	Specification for Airport Light Bases, Transformer Housings, Junction
363		Boxes, and Accessories
364	AC 150/5340-30	Design and Installation Details for Airport Visual Aids
365	AC 150/5345-53	Airport Lighting Equipment Certification Program
366		
367	Commercial Item Description (CID)	
368		
369	A-A 59544	Cable and Wire, Electrical (Power, Fixed Installation)
370		
371	ASTM International (ASTM)	
372		
373	ASTM A27	Standard Specification for Steel Castings, Carbon, for General Application
374	ASTM A47	Standard Specification for Ferritic Malleable Iron Castings
375	ASTM A48	Standard Specification for Gray Iron Castings
376	ASTM A123	Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and
377		Steel Products
378	ASTM A283	Standard Specification for Low and Intermediate Tensile Strength Carbon
379		Steel Plates
380	ASTM A536	Standard Specification for Ductile Iron Castings
381	ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for
382		Concrete Reinforcement
383	ASTM A897	Standard Specification for Austempered Ductile Iron Castings
384	ASTM C144	Standard Specification for Aggregate for Masonry Mortar
385	ASTM C150	Standard Specification for Portland Cement
386	ASTM C206	Standard Specification for Finishing Hydrated Lime
387		
388	FAA Engineering Brief (EB)	
389		
390	EB #83	In Pavement Light Fixture Bolts
391		
392	Mil Spec	
393		
394	MIL-P-21035	Paint High Zinc Dust Content, Galvanizing Repair
395		
396	National Fire Protection Association (NFPA)	
397		
398	NFPA-70	National Electrical Code (NEC)
399		
400		
401	**END OF ITEM L-115**	

ITEM L-126 INSTALLATION OF RETROREFLECTIVE MARKERS

DESCRIPTION

126-1.1 This item shall consist of retroreflective markers removed, reinstalled and/or furnished new and installed in accordance with this specification. The markers shall be installed at the locations and in accordance with the dimensions and details shown on the plans. This item shall include the furnishing of all equipment, materials, services and incidentals necessary to install markers as completed units to the satisfaction of the Engineer.

EQUIPMENT AND MATERIALS

126-2.1 GENERAL.

- a. Airport lighting equipment and materials covered by FAA specifications shall have the prior approval of the Federal Aviation Administration, Airports Service, Washington, D.C. 20590, and shall be listed in Advisory Circular 150/5345-53 (current edition), Airport Lighting Equipment Certification Program, Appendix 3.
- b. Advisory Circulars for the FAA specification equipment to be supplied are as follows:

CITED FAA SPECIFICATION

AC 150/5345-39B

EQUIPMENT NAME

Specification for L-853 Runway and Taxiway Retroreflective Markers

126-2.2 RETROREFLECTIVE MARKERS. Taxiway edge markers shall be cylindrical, 24 inch overall height and be designed so that it will not cause damage to an aircraft if struck. The marker shall either be flexible or be mounted with a frangible coupling. The retroreflective material shall be high intensity blue with a vertical dimension of twelve or more inches. The combined length of blue bands may be used to meet the twelve-inch requirement. The tube shall be a light color and may be retroreflective to provide contrast. The marker shall be mounted on an angle iron stake or pipe support at least 18-inches long when installed in soil. Markers installed on pavement or on L-867 lids shall have a flat mounting plate to be secured by an adhesive.

126-2.3 ADHESIVE. When markers are installed on pavement or steel cover plates, the adhesive shall be compatible with the pavement and shall adhere to the metal base of the marker. The adhesive shall be two components and be durable for all weather extremes.

One product which has been used successfully is Hysol (#608 or #907) manufactured by Dexter. It is compatible with both concrete and asphalt pavements.

CONSTRUCTION METHODS

126-3.1 RETROREFLECTIVE MARKER INSTALLATION. The retroreflective markers shall be installed at the locations shown on the plans or as directed by the Engineer and in accordance with the manufacturer's instructions. When the markers are to be installed in the vicinity of existing utilities, the Contractor shall locate all cable and ducts in the area prior to installation of the marker supports. Any damage to existing cables, ducts or lights shall be repaired at no cost to the Owner and in compliance with the specifications for the total project.

The markers shall normally be installed 10-feet from the theoretical edge of the pavement based on a straight line measured from centerline. Installation shall be similar to stake mounted lights except that no concrete anchor is required. The marker shall be plumb within one degree. The marker support shall not be damaged by the installation procedures.

126-3.2 INSTALLATION OF MARKERS ON PAVEMENT OR COVER PLATES. The retroreflective markers shall be located as shown on the plans.

- a. The prepared surface shall be clean, free of oil, grease and water. Better bonds result when surfaces are roughened with emery or sand paper.
- b. Mix equal parts of epoxy per the manufacturer's instructions on a clean, dry surface that is discardable. A mixing gun which applies both components may be used.
- c. Apply an even coating of adhesive to the entire bottom plate at least 1/8" thick.
- d. Set reflector in place and press down firmly making sure the marker is plumb and aligned. Allow the epoxy to set and cure as recommended by the manufacturer. During cold weather, cure times increase significantly.

126-3.3 RETROREFLECTIVE MARKER REMOVAL. Markers designated on the plans to be removed and/or relocated shall be carefully removed and delivered to the airport. Any damage caused by the contractor's work shall be repaired or replacement made to the satisfaction of the Engineer.

METHOD OF MEASUREMENT

126-4.1 The quantity of retroreflective markers to be paid for under this item shall be the number of each type installed, relocated or removed as completed units in place, ready for operation and accepted by the Engineer.

BASIS OF PAYMENT

126-5.1 Payment will be made at the contract unit price for each complete unit installed in place, relocated or removed by the Contractor and accepted by the Engineer. This price shall be full compensation for furnishing all materials and for all preparation, assembly and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

Item L-126a	Retroreflective Marker – per each
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****END OF ITEM L-126****

SECTION 26 0519**LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- a. Wire and cable for 600 volts and less.
- b. Wiring connectors and connections.

PART 2 PRODUCTS**2.01 WIRING REQUIREMENTS**

- a. Concealed Dry Interior Locations: Use only building wire in raceway or metal clad cable.
- b. Exposed Dry Interior Locations: Use only building wire in raceway.
- c. Above Accessible Ceilings: Use only building wire in raceway or metal clad cable.
- d. Wet or Damp Interior Locations: Use only building wire in raceway.
- e. Exterior Locations: Use only building wire in raceway.
- f. Underground Installations: Use only building wire in raceway.
- g. Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 100 feet.
- h. Conductor sizes are based on copper unless indicated as aluminum or "AL".

2.02 BUILDING WIRE

- a. Description: Single conductor insulated wire.
- b. Conductor: Copper unless indicated as aluminum or "AL".
- c. Insulation Voltage Rating: 600 volts.
- d. Insulation: NFPA 70 Type THHN/THWN or Type XHHW.

2.03 METAL CLAD CABLE

- a. Description: NFPA 70, Type MC.
- b. Conductor: Copper.
- c. Insulation Voltage Rating: 600 volts.

d. Insulation Temperature Rating: 90 degrees C.

e. Armor Material: Steel or Aluminum.

PART 3 EXECUTION

3.01 EXAMINATION

- a. Verify that interior of building has been protected from weather.
- b. Verify that mechanical work likely to damage wire and cable has been completed.
- c. Verify that raceway installation is complete and supported.
- d. Verify that field measurements are as indicated.

3.02 INSTALLATION

- a. Install wire and cable securely, in a neat and workmanlike manner, as specified in NECA 1.
- b. Route wire and cable as required to meet project conditions.
 - 1. Wire and cable routing indicated is approximate unless dimensioned.
 - 2. Where wire and cable destination is indicated and routing is not shown, determine exact routing and lengths required.
- c. Use wiring methods indicated.
- d. Pull all conductors into raceway at same time.
- e. Use suitable wire pulling lubricant for building wire 4 AWG and larger.
- f. Protect exposed cable from damage.
- g. Support cables above accessible ceiling, using spring metal clips or metal cable ties to support cables from structure or ceiling suspension system. Do not rest cable on ceiling panels.
- h. Use suitable cable fittings and connectors.
- i. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- j. Clean conductor surfaces before installing lugs and connectors.
- k. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
 - 1. Terminate aluminum conductors with tin-plated aluminum-bodied compression connectors only.
- m. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.

PART 4 BASIS OF PAYMENT

Payment will be made under the various lump sum pay items. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item in accordance with the provisions and intent of the plans and specifications. No separate measurement will be made for work performed under this section.

Payment will be made under:

DIV-26a	T-Hangar Building Electrical	Lump Sum
DIV-26b	Install 3/0 AWG, XHHW, 600V Insulated, Copper Wire	Linear Foot
DIV-26c	Install #6 AWG, XHHW, 600V Insulated, Copper Wire	Linear Foot

****END OF SECTION****

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SECTION 26 0526**GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- a. Grounding and bonding components.
- b. Provide all components necessary to complete the grounding system(s) consisting of:
 - 1. Metal underground water pipe.
 - 2. Concrete-encased electrode.
 - 3. Rod electrodes.

PART 2 PRODUCTS**2.01 ELECTRODES**

- a. Rod Electrodes: Copper-clad steel.
 - 1. Diameter: 3/4 inch.
 - 2. Length: 10 feet.

2.02 CONNECTORS AND ACCESSORIES

- a. Mechanical Connectors: Bronze.
- b. Wire: Stranded or solid copper.
- c. Grounding Electrode Conductor: Size to meet NFPA 70 requirements.

PART 3 EXECUTION**3.01 EXAMINATION**

- a. Verify existing conditions prior to beginning work.
- b. Verify that final backfill and compaction has been completed before driving rod electrodes.

3.02 INSTALLATION

- a. Install ground electrodes at locations indicated.

- b. Provide grounding electrode conductor and connect to reinforcing steel in foundation footing
Bond steel together.

PART 4 BASIS OF PAYMENT

Payment will be made under the various lump sum pay items. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item in accordance with the provisions and intent of the plans and specifications. No separate measurement will be made for work performed under this section.

Payment will be made under:

DIV-26a	T-Hangar Building Electrical	Lump Sum
DIV-26b	Install 3/0 AWG, XHHW, 600V Insulated, Copper Wire	Linear Foot
DIV-26c	Install #6 AWG, XHHW, 600V Insulated, Copper Wire	Linear Foot

****END OF SECTION****

SECTION 26 0529**HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- a. Conduit and equipment supports.
- b. Anchors and fasteners.

PART 2 PRODUCTS**2.01 MATERIALS**

- a. Hangers, Supports, Anchors, and Fasteners - General: Corrosion-resistant materials of size and type adequate to carry the loads of equipment and conduit, including weight of wire in conduit.
- b. Supports: Fabricated of structural steel or formed steel members.
- c. Anchors and Fasteners:
 - 1. Obtain permission from Engineer before using powder-actuated anchors.
 - 2. Concrete Structural Elements: Use precast inserts or expansion anchors.
 - 3. Steel Structural Elements: Use beam clamps steel spring clips or welded fasteners.
 - 4. Concrete Surfaces: Use self-drilling anchors or expansion anchors.
 - 5. Hollow Masonry, Plaster, and Gypsum Board Partitions: Use toggle bolts.
 - 6. Solid Masonry Walls: Use expansion anchors or preset inserts.
 - 7. Sheet Metal: Use sheet metal screws.
 - 8. Wood Elements: Use wood screws.
- d. Fastener Types:
 - 1. Concrete Wedge Expansion Anchors: Complying with ICC-ES AC193.
 - 2. Masonry Wedge Expansion Anchors: Complying with ICC-ES AC01.
 - 3. Concrete Screw Type Anchors: Complying with ICC-ES AC193.

4. Masonry Screw Type Anchors: Complying with ICC-ES AC106.
5. Concrete Adhesive Type Anchors: Complying with ICC-ES AC308.
6. Other Types: As required.

PART 3 EXECUTION

3.01 INSTALLATION

- a. Install hangers and supports as required to adequately and securely support electrical system components, in a neat and workmanlike manner, as specified in NECA 1.
 1. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.
 2. Do not drill or cut structural members.
- b. Install surface-mounted cabinets and panelboards with minimum of four anchors.
- c. In wet and damp locations use steel channel supports to stand cabinets and panelboards 1 inch off wall.
- d. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

PART 4 BASIS OF PAYMENT

Payment will be made under the various lump sum pay items. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item in accordance with the provisions and intent of the plans and specifications. No separate measurement will be made for work performed under this section.

Payment will be made under:

DIV-26a	T-Hangar Building Electrical	Lump Sum
DIV-26b	Install 3/0 AWG, XHHW, 600V Insulated, Copper Wire	Linear Foot
DIV-26c	Install #6 AWG, XHHW, 600V Insulated, Copper Wire	Linear Foot

****END OF SECTION****

SECTION 26 0534**CONDUIT****PART 1 GENERAL****1.01 SECTION INCLUDES**

- a. Conduit, fittings, and conduit bodies.

PART 2 PRODUCTS**2.01 CONDUIT REQUIREMENTS**

- a. Conduit Size: Comply with NFPA 70.
 - 1. Minimum Size: 1/2 inch unless otherwise specified.
- b. Underground Installations:
 - 1. More than 5 Feet from Foundation Wall: Use nonmetallic conduit.
 - 2. Within 5 Feet from Foundation Wall: Use PVC coated rigid steel conduit.
 - 3. Minimum Size: 1 inch.
 - 4. Refer to Specification L-110 for installation requirements for underground conduit.
- c. Outdoor Locations Above Grade: Use rigid steel conduit.
- d. In Slab Above Grade:
 - 1. Not Permitted
- e. Wet and Damp Locations: Use rigid steel conduit.
- f. Dry Locations:
 - 1. Concealed: Use electrical metallic tubing.
 - 2. Exposed: Use electrical metallic tubing.

2.02 METAL CONDUIT

- a. Rigid Steel Conduit: ANSI C80.1.
- b. Fittings and Conduit Bodies: NEMA FB 1; material to match conduit.

2.03 PVC COATED RIGID STEEL CONDUIT

- a. Description: NEMA RN 1; rigid steel conduit with external PVC coating.
- b. Fittings and Conduit Bodies: NEMA FB 1; steel fittings with external PVC coating to match conduit.

2.04 FLEXIBLE METAL CONDUIT

- a. Description: Interlocked steel or aluminum construction.
- b. Fittings: NEMA FB 1.

2.05 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

- a. Description: Interlocked steel or aluminum construction with PVC jacket.
- b. Fittings: NEMA FB 1.

2.06 ELECTRICAL METALLIC TUBING (EMT)

- a. Description: ANSI C80.3; galvanized tubing.
- b. Fittings and Conduit Bodies: NEMA FB 1; steel type.

2.07 NONMETALLIC CONDUIT

- a. Description: NEMA TC 2; Schedule 40 PVC.
- b. Fittings and Conduit Bodies: NEMA TC 3.

PART 3 EXECUTION**3.01 EXAMINATION**

- a. Verify that field measurements are as shown on drawings.
- b. Verify routing and termination locations of conduit prior to rough-in.
- c. Conduit routing is shown on drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

3.02 INSTALLATION

- a. Conduit may be exposed in utility areas, such as mechanical and electrical rooms. Conduit and cables shall be concealed in all other areas.
- b. Install conduit securely, in a neat and workmanlike manner, as specified in NECA 1.
- c. Arrange supports to prevent misalignment during wiring installation.

- d. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.
- e. Do not attach conduit to ceiling support wires.
- f. Arrange conduit to maintain headroom and present neat appearance.
- g. Route exposed conduit parallel and perpendicular to walls.
- h. Maintain adequate clearance between conduit and piping.
- i. Cut conduit square using saw or pipecutter; de-burr cut ends.
- j. Bring conduit to shoulder of fittings; fasten securely.
- k. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.
- l. Use conduit hubs to fasten conduit to sheet metal boxes in damp and wet locations; to cast boxes.
- m. Provide suitable fittings to accommodate expansion and deflection where conduit crosses expansion joints.
- n. Provide suitable pull string in each empty conduit except sleeves and nipples.
- o. Use suitable caps to protect installed conduit against entrance of dirt and moisture.
- p. Ground and bond conduit under provisions of Section 26 0526.
- q. Identify conduit under provisions of Section 26 0553.
- r. Use flexible conduit only for connections to equipment requiring flexibility, such as transformers, air conditioning condensing units, and ventilation fans.

PART 4 BASIS OF PAYMENT

Payment will be made under the various lump sum pay items. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item in accordance with the provisions and intent of the plans and specifications. No separate measurement will be made for work performed under this section.

Payment will be made under:

DIV-26a	T-Hangar Building Electrical	Lump Sum
DIV-26b	Install 3/0 AWG, XHHW, 600V Insulated, Copper Wire	Linear Foot
DIV-26c	Install #6 AWG, XHHW, 600V Insulated, Copper Wire	Linear Foot

****END OF SECTION****

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SECTION 26 0537**BOXES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- a. Wall and ceiling outlet boxes.
- b. Floor boxes.
- c. Pull and junction boxes.

PART 2 PRODUCTS**2.01 OUTLET BOXES**

- a. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.
- b. Cast Boxes: NEMA FB 1, Type FD. Provide threaded hubs.
- c. Wall Plates for Finished Areas: As specified in Section 26 2726.

2.02 PULL AND JUNCTION BOXES

- a. Sheet Metal Boxes: NEMA OS 1, galvanized steel.
- b. Hinged Enclosures: As specified in Section 26 2716.

PART 3 EXECUTION**3.01 EXAMINATION**

- a. Verify locations of outlets in offices and work areas prior to rough-in.

3.02 INSTALLATION

- a. Install boxes securely, in a neat and workmanlike manner, as specified in NECA 1.
- b. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections, and as required by NFPA 70.
- c. Coordinate installation of outlet boxes for equipment connected under Section 26 2717.
- d. Set wall mounted boxes at elevations to accommodate mounting heights specified in section for outlet device.

- e. Electrical boxes are shown on Drawings in approximate locations unless dimensioned.
 - 1. Adjust box locations up to 5 feet if required to accommodate intended purpose.
- f. Maintain headroom and present neat mechanical appearance.
- g. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
- h. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 12 inches from ceiling access panel or from removable recessed luminaire.
- i. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
- j. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan.
- k. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.
- l. Use flush mounting outlet box in finished areas.
- m. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.
- n. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.
- o. Locate outlet boxes so that wall plates do not span different building finishes.
- p. Do not fasten boxes to ceiling support wires.
- q. Use cast outlet box in exterior locations exposed to the weather.
- r. Large Pull Boxes: Use hinged enclosure in interior dry locations, surface-mounted cast metal box in other locations.

3.03 ADJUSTING

- a. Adjust flush-mounting outlets to make front flush with finished wall material.

3.04 CLEANING

- a. Clean interior of boxes to remove dust, debris, and other material.
- b. Clean exposed surfaces and restore finish.

PART 4 BASIS OF PAYMENT

Payment will be made under the various lump sum pay items. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item in accordance with the provisions and intent of the plans and specifications. No separate measurement will be made for work performed under this section.

101 Payment will be made under:

102

103 DIV-26a T-Hangar Building Electrical Lump Sum

104 DIV-26b Install 3/0 AWG, XHHW, 600V Insulated, Copper Wire Linear Foot

105 DIV-26c Install #6 AWG, XHHW, 600V Insulated, Copper Wire Linear Foot

106

107

108 ****END OF SECTION****

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SECTION 26 0553**IDENTIFICATION FOR ELECTRICAL SYSTEMS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- a. Nameplates and labels.
- b. Wire and cable markers.
- c. Conduit markers.

PART 2 PRODUCTS**2.01 IDENTIFICATION APPLICATIONS**

- a. Communication Cabinets: Nameplates.
- b. Control Device Stations: Labels.
- c. Electrical Distribution and Control Equipment Enclosures: Nameplates.
- d. Junction Box Load Connections: Wire markers.
- e. Outlet Box Load Connections: Wire markers.
- f. Panel Gutter Load Connections: Wire markers.
- g. Pull Box Load Connections: Wire markers.

2.02 NAMEPLATES AND LABELS

- a. Nameplates: Engraved three-layer laminated plastic, black letters on white background.
- b. Letter Size:
 - 1. Use 1/8 inch letters for identifying individual equipment and loads.
 - 2. Use 1/4 inch letters for identifying grouped equipment and loads.

2.03 WIRE MARKERS

- a. Description: Tape; Split sleeve or Nylon type self-adhesive, snap-around, or sleeve wire markers.
- b. Legend:
 - 1. Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings.

PART 3 EXECUTION

3.01 PREPARATION

- a. Degrease and clean surfaces to receive nameplates and labels.

3.02 INSTALLATION

- a. Install nameplates and labels parallel to equipment lines.
- b. Secure nameplates to equipment front using screws or rivets.
- c. Secure nameplates to inside surface of door on panelboard that is recessed in finished locations.

PART 4 BASIS OF PAYMENT

Payment will be made under the various lump sum pay items. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item in accordance with the provisions and intent of the plans and specifications. No separate measurement will be made for work performed under this section.

Payment will be made under:

DIV-26a	T-Hangar Building Electrical	Lump Sum
DIV-26b	Install 3/0 AWG, XHHW, 600V Insulated, Copper Wire	Linear Foot
DIV-26c	Install #6 AWG, XHHW, 600V Insulated, Copper Wire	Linear Foot

****END OF SECTION****

SECTION 26 2416**PANELBOARDS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- a. Lighting and appliance panelboards.
- b. Overcurrent protective devices for panelboards.

PART 2 PRODUCTS**2.01 ALL PANELBOARDS**

- a. Provide products listed and labeled by testing firm acceptable to the authority having jurisdiction as suitable for the purpose indicated.
- b. Short Circuit Current Rating:
 - 1. Provide panelboards with listed short circuit current rating as indicated on the drawings.
 - 2. Listed series ratings are acceptable, except where not permitted by motor contribution according to NFPA 70.
 - 3. Label equipment utilizing series ratings as required by NFPA 70.
- c. Panelboards Used for Service Entrance: Listed and labeled as suitable for use as service equipment according to UL 869A.
- d. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.
- e. Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.
- f. Bussing: Sized in accordance with UL 67 temperature rise requirements.
 - 1. Provide fully rated neutral bus with a suitable lug for each feeder or branch circuit requiring a neutral connection.
 - 2. Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.
- g. Conductor Terminations: Suitable for use with the conductors to be installed.
- h. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
 - 1. Environment Type per NEMA 250: As indicated on the drawings and required for the environment installed.

2. Boxes: Galvanized steel unless otherwise indicated.
- a. Provide wiring gutters sized to accommodate the conductors to be installed.
3. Fronts:
 - a. Fronts for Surface-Mounted Enclosures: Same dimensions as boxes.
 - b. Fronts for Flush-Mounted Enclosures: Overlap boxes on all sides to conceal rough opening.
 - c. Finish for Painted Steel Fronts: Manufacturer's standard grey.
4. Lockable Doors: All locks keyed alike unless otherwise indicated.
- i. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.
- j. Surge Protective Devices: Where factory-installed, internally mounted surge protective devices are provided in accordance with Section 26 4300.

2.03 LIGHTING AND APPLIANCE PANELBOARDS

- a. Description: Panelboards complying with NEMA PB 1, lighting and appliance branch circuit type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.
- b. Conductor Terminations:
 1. Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
 2. Main and Neutral Lug Type: Mechanical.
- c. Bussing:
 1. Phase Bus Connections: Arranged for sequential phasing of overcurrent protective devices.
 2. Phase and Neutral Bus Material: Aluminum or Copper.
 3. Ground Bus Material: Aluminum or Copper.
- d. Circuit Breakers: Thermal magnetic plug-in type.
- e. Enclosures:
 1. Provide surface-mounted enclosures unless otherwise indicated.
 2. Fronts: Provide hinged door with concealed hinges for access to overcurrent protective device handles without exposing live parts.
 3. Provide clear plastic circuit directory holder mounted on inside of door.

2.04 OVERCURRENT PROTECTIVE DEVICES

a. Molded Case Circuit Breakers:

1. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489 ratings, configurations, and features as indicated on the drawings.
2. Interrupting Capacity:
 - a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated.
 - b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.
 - c. Series Rated Systems: Provide circuit breakers listed in combination with upstream devices to provide interrupting rating not less than the short circuit current rating indicated.
3. Conductor Terminations:
 - a. Provide mechanical lugs unless otherwise indicated.
 - b. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
4. Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.
5. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.
6. Provide the following circuit breaker types where indicated:
 - a. Ground Fault Circuit Interrupter (GFCI) Circuit Breakers: Listed as complying with UL 943, class A for protection of personnel.
7. Do not use tandem circuit breakers.
8. Provide multi-pole circuit breakers; or circuit breaker handle-ties for multi-wire branch circuits as required by NFPA 70.

PART 3 EXECUTION

3.01 EXAMINATION

- a. Verify that field measurements are as shown on the drawings.
- b. Verify that the ratings and configurations of the panelboards and associated components are consistent with the indicated requirements.

- c. Verify that mounting surfaces are ready to receive panelboards.
- d. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- a. Install products in accordance with manufacturer's instructions.
- b. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- c. Provide required supports in accordance with Section 26 0529.
- d. Install panelboards plumb.
- e. Install flush-mounted panelboards so that trims fit completely flush to wall with no gaps and rough opening completely covered.
- f. Multi-Wire Branch Circuits: Group grounded and ungrounded conductors together in the panelboard as required by NFPA 70.
- g. Provide filler plates to cover unused spaces in panelboards.
- h. Provide computer-generated circuit directory for each lighting and appliance panelboard; clearly and specifically indicating the loads served. Identify spares and spaces.
- i. Provide identification nameplate for each panelboard in accordance with Section 26 0553.

PART 4 BASIS OF PAYMENT

Payment will be made under the various lump sum pay items. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item in accordance with the provisions and intent of the plans and specifications. No separate measurement will be made for work performed under this section.

Payment will be made under:

DIV-26a	T-Hangar Building Electrical	Lump Sum
DIV-26b	Install 3/0 AWG, XHHW, 600V Insulated, Copper Wire	Linear Foot
DIV-26c	Install #6 AWG, XHHW, 600V Insulated, Copper Wire	Linear Foot

****END OF SECTION****

SECTION 26 2726**WIRING DEVICES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- a. Wall switches.
- b. Receptacles.
- c. Wall plates.

PART 2 PRODUCTS**2.01 APPLICATIONS**

- a. Provide wiring devices suitable for intended use and with ratings adequate for load served.
- b. Provide weather resistant GFCI receptacles with specified weatherproof covers for all receptacles installed outdoors or in damp or wet locations.
- c. Unless noted otherwise, do not use combination switch/receptacle devices.

2.02 ALL WIRING DEVICES

- a. Provide products listed and classified by testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.
- b. Finishes:
 - 1. Wiring Devices Installed in Finished Spaces; White with white nylon wall plate unless otherwise indicated.
 - 2. Wiring Devices Installed in Unfinished Spaces; Gray with galvanized steel wall plate unless otherwise indicated.
 - 3. Wiring Devices Installed in Wet or Damp Locations: Gray with specified weatherproof cover unless otherwise indicated.

2.03 WALL SWITCHES

- a. All Wall Switches: AC only, quiet operating, general-use snap switches with silver alloy contacts, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 20.
 - 1. Wiring Provisions: Terminal screws for side wiring screw actuated binding clamp for back wiring.

- b. Standard Wall Switches: Commercial specification grade; 15A, 120V, with standard toggle type switch actuator and maintained contacts.

2.04 RECEPTACLES

- a. All Receptacles: Complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498 types as indicated on the drawings.
1. Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring.
 2. NEMA configurations specified are according to NEMA WD 6.
- b. Convenience Receptacles:
1. Standard Convenience Receptacles: Commercial specification grade; 20A, 125V, NEMA 5-20R; single or duplex as indicated on the drawing.
 2. Weather Resistant Convenience Receptacles: Commercial specification grade; 20A, 125V, NEMA 5-20R; listed and labeled as weather resistant type complying with UL 498 Supplement SE suitable for installation in damp or wet locations; single or duplex as indicated on the drawings.
- c. GFCI Receptacles:
1. All GFCI Receptacles: Provide with feed-through protection, light to indicate ground fault tripped condition and loss of protection, and list as complying with UL 943, class A. Provide test and reset buttons of same color as device.
 2. Standard GFCI Receptacles: Commercial specification grade; duplex, 20A, 125V, NEMA 5-20R.
 3. Weather Resistant GFCI Receptacles: Commercial specification grade; duplex, 20A, 125V, NEMA 5-20R; listed and labeled as weather resistant type complying with UL 498 Supplement SE suitable for installation in damp or wet locations.

2.05 WALL PLATES

- a. All Wall Plates: Comply with UL 514D.
1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
 2. Size: Standard.
 3. Screws: Metal with slotted heads finished to match wall plate finish.
- b. Nylon Wall Plates: Smooth finish, high-impact thermoplastic.
- c. Galvanized Steel Wall Plates: Rounded corners and edges, with corrosion resistant screws.

- d. Weatherproof Covers for Damp Locations: Gasketed, cast aluminum with self-closing hinged cover and corrosion-resistant screws; listed as suitable for use in wet locations with cover closed.
- e. Weatherproof Covers for Wet Locations: Gasketed, cast aluminum; with hinged lockable cover and corrosion-resistant screws; listed as suitable for use in wet locations while in use with attachment plugs connected.

PART 3 EXECUTION

3.01 EXAMINATION

- a. Verify that field measurements are as shown on the drawings.
- b. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.
- c. Verify that wall openings are neatly cut and will be completely covered by wall plates.
- d. Verify that final surface finishes are complete.
- e. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.
- f. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

- a. Provide extension rings to bring outlet boxes flush with finished surface.
- b. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION

- a. Coordinate locations of outlet boxes provided under Section 26 0537 as required for installation of wiring devices provided under this section.
 - 1. Mounting Heights: Unless otherwise indicated, as follows.
 - a. Wall Switches: 48 inches above finished floor.
 - b. Receptacles: 18 inches above finished floor or 6 inches above counter.
 - 2. Orient outlet boxes for vertical installation of wiring devices unless otherwise indicated.
 - 3. Where multiple receptacles or wall switches are installed at the same location and at the same mounting height, gang devices together under a common wall plate.
- b. Provide GFCI receptacles with integral GFCI protection at each location indicated. Do not use feed-through wiring to protect downstream devices.
- c. Install wiring devices plumb and level with mounting yoke held rigidly in place.

- d. Install wall switches with OFF position down.
- e. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.

3.04 CLEANING

- a. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

PART 4 BASIS OF PAYMENT

Payment will be made under the various lump sum pay items. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item in accordance with the provisions and intent of the plans and specifications. No separate measurement will be made for work performed under this section.

Payment will be made under:

DIV-26a	T-Hangar Building Electrical	Lump Sum
DIV-26b	Install 3/0 AWG, XHHW, 600V Insulated, Copper Wire	Linear Foot
DIV-26c	Install #6 AWG, XHHW, 600V Insulated, Copper Wire	Linear Foot

****END OF SECTION****

SECTION 01 1000

ARCHITECTURAL GENERAL CONDITIONS

PART 1 GENERAL

1.01 PROJECT COORDINATION - GENERAL

- A. Project Coordinator: Contractor.
- B. Comply with requirements specified in Section 01 3114.
- C. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for site access, traffic, and parking facilities.
- D. During construction, coordinate use of site and facilities through the Project Coordinator.
- E. Comply with Project Coordinator's procedures for communications within the construction team; for submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- F. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities.
- G. Coordinate field engineering and layout work under instructions of the Project Coordinator.
- H. Make the following types of submittals to Architect/Engineer through the Project Coordinator:
 - 1. Requests for interpretation.
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.
 - 5. Design data, if applicable.
 - 6. Manufacturer's instructions and field reports.
 - 7. Applications for payment and change order requests.
 - 8. Progress schedules.
 - 9. Coordination drawings.
 - 10. Closeout submittals.
 - 11. Other specified submittals.

1.02 DELEGATED DESIGN WORK

- A. Design of building systems, or components of systems, specified to be provided by Contractor; refer to applicable Sections:
 - 1. Foundation Design (Stamped Engineered Drawings) for Pre-Engineered Metal Building.
 - 2. Pre-Engineered Metal Building Structural Design (Stamped Engineered Drawings).

- B. Contractor's Responsibilities:
1. Comply with specified design requirements for each applicable product or system.
 2. Coordinate design and space requirements with other affected work and Architect/Engineer.
 3. Review applicable submittals and coordinate selections with Architect/Engineer.
 4. Receive and unload products and systems at the site; inspect for completeness and for damage.
 5. Handle, store, install, and finish products and systems.
 6. Repair or replace damaged, defective, or missing items.
 7. Arrange for manufacturer's warranties, inspections, and service.
 8. Coordinate delegated design work with other elements of the project to provide a complete final product.

1.03 REGULATORY REQUIREMENTS

- A. Obtain and pay for required permits, fees, licenses, and inspections.
- B. Arrange for required regulatory inspections and approvals.
- C. Verify applicable codes and regulations.
- D. Comply with applicable codes and regulations.
- E. Listing of applicable Codes and regulations in this Section is not to be considered complete and all-inclusive; listing refers to primary applicable Codes and regulations only.

1.04 APPLICABLE CODES AND REGULATIONS

- A. Federal Regulations (Including but not limited to):
 1. 36 CFR 1191 - Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities; Final Rule; 2010; (ADA Standards for Accessible Design).
- B. Houston and State of Missouri Regulations (Including but not limited to):
 1. Zoning Code: Local jurisdiction.
 2. Fire Protection District: Local jurisdiction.
 3. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; Edition cited in applicable building code.
 4. ICC (IFC) - ICC International Fire Code, 2012.
 5. ICC (IBC) - ICC International Building Code, 2012.
 6. ICC (IPC) - ICC International Plumbing Code, 2012.
 7. ICC (IMC) - ICC International Mechanical Code, 2012.
 8. ICC (IFGC) - ICC International Fuel Gas Code, 2012.
 9. ICC (IECC) - ICC International Energy Conservation Code, 2012.
 10. NFPA 70 - National Electrical Code, 2014.
 11. Erosion and Sedimentation Control Regulations: Local jurisdiction.

1.05 SPECIAL INSPECTIONS

- A. Applicable Building Code: 2012 Edition of the International Building Code and, more specifically, Chapter 17 - Structural Tests and Inspections, of same.
- B. Authority Having Jurisdiction (AHJ): Agency or individual officially empowered to enforce the building, fire and life safety code requirements of the permitting jurisdiction in which the Project is located.

- C. Special Inspection and Testing:
1. Special inspections are inspections and testing of materials, installation, fabrication, erection or placement of components and connections mandated by the AHJ that also require special expertise to ensure compliance with the approved contract documents and the referenced standards.
 2. All required inspections and testing will be paid for by the engineer, and performed by an approved independent testing agency. All required testing to be coordinated by the contractor.
 3. Frequency of Special Inspections and Testing: Special Inspections are indicated as continuous or periodic as required by the AHJ.
 4. Reference Standards:
 - A. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.
 - B. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
 - C. ASTM C172/C172M - Standard Practice for Sampling Freshly Mixed Concrete.
 - D. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection and/or Testing.
 - E. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing.
 - F. AWS D1.4/D1.4M - Structural Welding Code - Reinforcing Steel.

1.06 SPECIAL INSPECTIONS FOR CONCRETE CONSTRUCTION

- A. Reinforcing Steel, Including Pre-stressing of Tendons and Placement: Verify compliance with approved contract documents and ACI 318, 3.5 and 7.1 through 7.7; periodic.
- B. Reinforcing Steel Welding: Verify compliance with AWS D1.4 and ACI 318, 3.5.2; periodic.
- C. Bolts Installed in Concrete: Where allowable loads have been increased or where strength design is used, verify compliance with approved contract documents and ACI 318, 8.1.3 and 21.2.8 prior to and during placement of concrete; continuous.
- D. Anchors Installed in Hardened Concrete: Verify compliance with ACI 318, 3.8.6, 8.1.3 and 21.2.8; periodic.
- E. Design Mix: Verify plastic concrete complies with the design mix in approved contract documents and with ACI 318, Chapter 4 and 5.2; periodic.
- F. Concrete Sampling Concurrent with Strength Test Sampling: Each time fresh concrete is sampled for strength tests, verify compliance with ASTM C172, ASTM C31 and ACI 318, 5.6 and 5.8 and record the following, continuous:
 1. Slump.
 2. Air content.
 3. Temperature of concrete.

- G. Concrete Placement: Verify application techniques comply with approved contract documents and ACI 318, 5.9 and 5.10; continuous.
- H. Specified Curing Temperature and Techniques: Verify compliance with approved contract documents and ACI 318, 5.11 through 5.13; periodic.
- I. Concrete Strength - In Place: Verify concrete strength complies with approved contract documents and ACI 318, 6.2, for the following.
- J. Formwork Shape, Location and Dimensions: Verify compliance with approved contract documents and ACI 318, 6.1.1; periodic.

1.07 SPECIAL INSPECTION AND TESTING AGENCY DUTIES AND RESPONSIBILITIES

- A. Special Inspection and Testing Agency is required to:
 - 1. Verify samples submitted by Contractor comply with the referenced standards and the approved contract documents.
 - 2. Provide qualified personnel at site. Cooperate with Architect/Engineer and Contractor in performance of services.
 - 3. Perform specified sampling and testing of products in accordance with specified reference standards.
 - 4. Ascertain compliance of materials and products with requirements of Contract Documents.
 - 5. Promptly notify Architect/Engineer and Contractor of observed irregularities or non-conformance of work or products.
 - 6. Perform additional tests and inspections required by Architect/Engineer.
 - 7. Submit reports of all tests or inspections specified.
- B. Limits on Special Inspection and Testing Agency Authority:
 - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. Agency may not approve or accept any portion of the work.
 - 3. Agency may not assume any duties of Contractor.
 - 4. Agency has no authority to stop the work.

1.08 CONTRACTOR DUTIES AND RESPONSIBILITIES

- A. Contractor Responsibilities - General:
 - 1. Deliver to agency at designated location, adequate samples of materials for special inspections that require material verification.
 - 2. Cooperate with agency and laboratory personnel; provide access to the work, to manufacturers' facilities, and to fabricators' facilities.
 - 3. Provide incidental labor and facilities:
 - a. To provide access to work to be tested or inspected.
 - b. To obtain and handle samples at the site or at source of Products to be tested or inspected.
 - c. To facilitate tests or inspections.
 - d. To provide storage and curing of test samples.

4. Notify Architect/Engineer and laboratory 24 hours prior to expected time for operations requiring testing or inspection services.
5. Re-testing: Performed by same agency if required because of failing test results/non-conformance to specified requirements, on instructions from Architect/Engineer.
 - a. Paid by Contractor if required because of non-conformance to specified requirements.

1.09 TEMPORARY UTILITIES

- A. Provide and pay for all electrical power, lighting, water, heating and cooling, and ventilation required for construction purposes.
- B. Use trigger-operated nozzles for water hoses, to avoid waste of water.
- C. Temporary Sanitary Facilities: Provide and maintain required facilities and enclosures. Provide at time of project mobilization. Maintain daily in clean and sanitary condition.
- D. Temporary Water, Electrical and Heating:
 1. Water from the Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions as required for construction operations.
 2. Electrical Power Service from Existing System: Contractor may utilize owner's existing electrical system available on site – coordinate with owner. Contractor may install temporary electrical service which shall comply with NECA, NEMA, and UL Standards and regulations for temporary electrical service and with requirements of NFPA 70.
 3. Temporary Heating: The contractor shall be responsible for installing all items according to the specified acceptable temperature ranges. It shall be the responsibility of the contractor to provide temporary heaters, fuel, and blanketing if necessary for construction.
 4. Dewatering: Comply with the requirements of the authorities having jurisdiction. Contractor shall maintain the project site, excavations, and construction free of water. Dispose of rainwater in a lawful manner that will not result in flooding the project or adjoining properties or affect the permanent work.
- E. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection. Regrade site as necessary. Clean and repair damage caused by installation or use of temporary work.

PART 2 PRODUCTS

2.01 NEW PRODUCTS - GENERAL

- A. Provide new products unless specifically required or permitted by the Contract Documents.
- B. Provide interchangeable components of the same manufacture for components being replaced.
- C. Do not use products having any of the following characteristics:
 1. Made outside the United States.

2.02 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, or an equivalent product approved by the architect/engineer.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.
- D. Products Specified by Naming a Basis of Design Manufacturer or Product with a Provision for Substitutions: Submit a request for substitution for any other manufacturer listed under Other Acceptable Manufacturers, or for a manufacturer not named.
 - 1. Refer to Section 01 4000 for basis of design specifications requirements.

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

- A. Architect/Engineer will schedule a meeting after Notice of Award.
- B. Attendance Required:
 - 1. Owner.
 - 2. Architect/Engineer.
 - 3. Contractor.
 - 4. Other invited participants.
- C. Minimum Agenda:
 - 1. Airport Safety and CSPP/SPCD.
 - 2. Execution of Owner- Contractor Agreement.
 - 3. Submission of executed bonds and insurance certificates.
 - 4. Distribution of Contract Documents.
 - 5. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
 - 6. Designation of personnel representing the parties to Contract, including Contractor, Owner, and Architect.
 - 7. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 - 8. Scheduling.
- D. Record minutes and distribute electronically within two days after meeting to participants, with copies to Architect/Engineer, Owner, participants, and those affected by decisions made.

3.02 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at maximum bi-monthly intervals. When required in individual specification Sections, convene a pre-installation meeting at the site prior to commencing work of the Section.
- B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendance Required: Job superintendent, major Subcontractors and suppliers as necessary, Owner, Architect/Engineer, as appropriate to agenda topics for each meeting.
- D. Minimum Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of Work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Review of RFI log and status of RFI's.
 - 5. Identification of problems that impede, or will impede, planned progress.
 - 6. Review of submittals schedule and status of submittals.
 - 7. Modification (Change Order) status.
 - 8. Review of off-site fabrication and delivery schedules.
 - 9. Maintenance of progress schedule.
 - 10. Corrective measures to regain projected schedules.
 - 11. Planned progress during succeeding work period.
 - 12. Coordination of projected progress.
 - 13. Maintenance of quality and work standards.
 - 14. Effect of proposed changes on progress schedule and coordination.
 - 15. Other business relating to Work.
 - 16. Safety.
- E. Record minutes and distribute electronically within two days after meeting to participants, with copies to Architect/Engineer, Owner, participants, and those affected by decisions made.

3.03 CONSTRUCTION PROGRESS SCHEDULE

- A. Within 10 days after date established in Notice to Proceed, submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 10 days after joint review, submit complete schedule.
- E. Submit updated schedule with each Application for Payment.

3.04 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual Sections, submit them for review:
 - 1. Product data.
 - 2. Shop drawings.
 - 3. Samples for selection.
 - 4. Samples for verification.
 - 5. Special Inspection and Testing Agency Qualifications.
- B. Submit to Architect/Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents. All submittals shall allow 15 days for Architect/Engineer to review.
- C. Samples will be reviewed only for aesthetic, color, or finish selection as applicable.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES articles below, and for record documents purposes.

3.05 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual Sections, submit them for information:
 - 1. Design data.
 - 2. Certificates.
 - 3. Test reports.
 - 4. Inspection reports.
 - 5. Manufacturer's instructions.
 - 6. Manufacturer's field reports.
 - 7. Other types specified.
- B. Submit for Architect/Engineer's knowledge as contract administrator or for Owner. No action will be taken.

3.06 SUBMITTALS FOR PROJECT CLOSEOUT

- A. When the following are specified in individual Sections, submit them at project closeout:
 - 1. Project record documents.
 - 2. Operation and maintenance data.
 - 3. Warranties.
 - 4. Bonds.
 - 5. Other types specified.
- B. Submit for Owner's benefit during and after project completion.
- C. See section 90 and 01 7800 for additional project closeout requirements.

3.07 NUMBER OF COPIES OF SUBMITTALS

- A. Submittals for Review and Information: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
- B. Samples: Submit the number specified in individual specification Sections; one of which will be retained by Architect/Engineer.
 - 1. After review, produce duplicates.
 - 2. Retained samples will not be returned to Contractor unless specifically so stated.

3.08 SUBMITTAL PROCEDURES - GENERAL

- A. Transmit each submittal with a copy of approved submittal form.
 - 1. Submittal Format: Electronic only.
- B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
 - 1. Submittal Log: Establish and maintain a submittal log, numbering each submittal by corresponding CSI Section number using Architect's project number as a prefix.
 - a. Number multiple submittals within each Section sequentially as a suffix, starting with 001.
 - b. Identify revised submittals for each product/system using a capital letter sequentially as a suffix, starting with 001A.
- C. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification Section number, as appropriate on each copy.
- D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
 - 1. Submittals not bearing Contractor's review stamp, indicating both review and approval, will not be reviewed and be returned for required review.
- E. Deliver sample and non-electronic submittals to Architect/Engineer at business address.
- F. Schedule submittals to expedite the Project, and coordinate submission of related items.
- G. For each submittal for review, allow minimum 15 calendar days for review, excluding delivery time from and back to Contractor.
- H. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.
- I. Provide space for Contractor and Architect/Engineer review stamps.
- J. When revised for resubmission, identify all changes made since previous submission.
 - 1. Make resubmissions under procedures specified for initial submittals; identify changes made since previous submittal.

- K. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- L. Submittals not requested will not be recognized or processed.
- M. Submittals not reviewed by Contractor will be rejected, and will not be reviewed by Architect/Engineer. Claims for delay as the result of submittals not reviewed by Contractor will not be allowed.

3.09 ARCHITECT'S ACTION

- A. Architect/Engineer will review each submittal, mark it with appropriate "action," and return it to Contractor within specified time allowance; except when it must be held for coordination, and Contractor is so advised.
- B. Where submittals include materials, products, systems, or manufacturers not specified, approved by Addendum prior to execution of the Contract, or approved in writing in conjunction with the proposed products list submittal specified, Architect/Engineer reserves the right to exceed the specified time allowance to allow sufficient time to determine the acceptability of such items, and no claim for delay by Contractor will be allowed.
- C. Where submittals include a material, product, system, or manufacturer substitution which has not been previously accepted or approved in writing, Architect/Engineer reserves the right to reject such submittal and require a compliant submittal, or may direct that other action be taken by Contractor to achieve compliance with Contract Documents, and no claim for delay by Contractor will be allowed.
- D. Architect/Engineer's review is for general conformance only and does not relieve Contractor from full compliance with the Contract Documents. Refer to General Provisions, Special Provisions, and General Requirements.

3.10 TRANSPORTATION AND HANDLING OF MATERIALS

- A. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- B. Transport and handle products in accordance with manufacturer's instructions.
- C. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- D. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- E. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.
- F. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.11 STORAGE AND PROTECTION OF MATERIALS

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.
- G. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- H. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- I. Prevent contact with material that may cause corrosion, discoloration, or staining.
- J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

3.12 LAYING OUT THE WORK

- A. Refer to Section 50-06.
- B. Verify locations of survey control points prior to starting work.
- C. Promptly notify Architect/Engineer of any discrepancies discovered.
- D. Locate and protect survey control and reference points.
- E. Control datum for survey is that indicated on Drawings.
- F. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- G. Promptly report to Architect/Engineer the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

- H. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect/Engineer.
- I. Utilize recognized engineering survey practices.
- J. Establish a minimum of two permanent bench marks on site, referenced to established control points. Record locations, with horizontal and vertical data, on project record documents.
- K. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
 - 1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
 - 2. Grid or axis for structures.
 - 3. Building foundation, column locations, ground floor elevations.
- L. Periodically verify layouts by same means.
- M. Maintain a complete and accurate log of control and survey work as it progresses.

3.13 GENERAL INSTALLATION REQUIREMENTS

- A. In addition to compliance with regulatory requirements, conduct construction operations in compliance with NFPA 241, including applicable recommendations in the geotechnical investigation.
- B. Install products as specified in individual Sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- C. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- D. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- E. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- F. Make neat transitions between different surfaces, maintaining texture and appearance.

3.14 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. Perform whatever cutting and patching is necessary to:
 - 1. Complete the work.
 - 2. Fit products together to integrate with other work.
 - 3. Provide openings for penetration of mechanical, electrical, and other services.
 - 4. Match work that has been cut to adjacent work.
 - 5. Repair areas adjacent to cuts to required condition.
 - 6. Repair new work damaged by subsequent work.
 - 7. Remove samples of installed work for testing when requested.
 - 8. Remove and replace defective and non-conforming work.

- C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- D. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- E. Cut rigid materials, resulting in clean and neat edges, using masonry saw or core drill. Cutting rigid materials using chisels, impact or pneumatic tools is not allowed without prior approval.
- F. Restore work with new products in accordance with requirements of Contract Documents.
- G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- H. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material, to full thickness of the penetrated element.
- I. Patching:
 - 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 - 2. Match color, texture, and appearance.
 - 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.15 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from wall cavities, pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site weekly and dispose off-site; do not burn or bury.

3.16 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification Sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

END OF SECTION

SECTION 01 3114

FACILITY SERVICES COORDINATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Coordination of facility services construction.
- B. Services of a coordinator for facility services construction.
- C. Coordination documents.

1.02 MECHANICAL AND ELECTRICAL COORDINATOR

- A. Provide staff dedicated to this Project who are technically qualified and administratively experienced in field coordination of the type of work required to be coordinated, for the duration of the Work.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Submit coordination drawings and schedules prior to submitting shop drawings, product data, and samples.
- C. Submit coordination drawings in a timely manner to facilitate proper coordination with the construction schedule, and to avoid adverse impacts on progress of construction.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 COORDINATION REQUIRED

- A. See Drawings and Specifications for mechanical/electrical coordination schedules which define responsibilities for providing, setting, and final connecting of applicable devices and equipment items.
- B. Coordinate the work listed below:
 - 1. Electrical: Division 26.
 - 2. All facility construction work affected by work included in this project.
- C. Coordinate work with the local utility provider.
- D. Coordinate progress schedules, including dates for submittals and for delivery of products.
- E. Conduct meetings among subcontractors and others concerned, to establish and maintain coordination and schedules, and to resolve coordination matters in dispute.
- F. Participate in progress meetings. Report on progress of work to be adjusted under coordination requirements, and any required changes in schedules. Transmit minutes of meetings and reports to concerned parties.

3.02 COORDINATION DOCUMENTS

- A. Prepare coordination drawings to organize installation of products for efficient use of available space, for proper sequence of installation, and to identify potential conflicts.
- B. Prepare a master schedule identifying responsibilities for activities that directly relate to this work, including submittals and temporary utilities; organize by specification Section.
- C. Identify electrical power characteristics and control wiring required for each item of equipment.
- D. Maintain documents for the duration of the work, recording changes due to site instructions, modifications or adjustments.

3.03 COORDINATION OF SUBMITTALS

- A. Review shop drawings, product data, and samples for compliance with Contract Documents and for coordination with related work. Transmit copies of reviewed documents to Architect/Engineer.
- B. Check field dimensions and clearances and relationship to available space and anchors.
- C. Check compatibility with equipment and work of other Sections, electrical characteristics, and operational control requirements.
- D. Check motor voltages and control characteristics.
- E. Coordinate controls, interlocks, wiring of switches, and relays.
- F. Coordinate wiring and control diagrams.
- G. When changes in the work are made, review their effect on other work.
- H. Verify information and coordinate maintenance of record documents.

3.04 COORDINATION OF SUBSTITUTIONS AND MODIFICATIONS

- A. Review proposals and requests for substitution prior to submission to Architect/Engineer.

3.05 INSPECTION OF WORK

- A. Inspect work for compliance with Contract Documents.
- B. Maintain a list of observed deficiencies and defects; promptly submit to Architect/Engineer.

3.06 DOCUMENTATION

- A. Observe and maintain a record of tests. Record:
 - 1. Specification Section number and product name.
 - 2. Name of Contractor, subcontractor, and installer if applicable.
 - 3. Name of testing agency and name of inspector.
 - 4. Name of manufacturer's representative present.
 - 5. Date, time, and duration of tests.
 - 6. Type of test, and results.
 - 7. Retesting required.
- B. Assemble background documentation and retain in the event that dispute resolution becomes necessary.

3.07 EQUIPMENT START-UP

- A. Verify utilities, connections, and controls are complete and equipment is in operable condition.
- B. Observe start-up and adjustments, test run, record time and date of start-up, and results.

- C. Observe equipment demonstrations made to Owner; record times and additional information required for operation and maintenance manuals.

3.08 INSPECTION AND ACCEPTANCE OF EQUIPMENT

- A. Prior to inspection, verify that equipment is tested, operational, clean, and ready for operation.

END OF SECTION

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SECTION 01 4000

QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Quality assurance submittals.
- B. Control of installation.
- C. Tolerances.
- D. Testing and inspection services.
- E. Manufacturers' field services.
- F. Basis of design specifications.
- G. Delegated design requirements.

1.02 SUBMITTALS

- A. See Section 01 1000 for submittal procedures.
- B. Testing Agency Qualifications:
 - 1. Prior to start of Work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
 - 2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
- C. Design Data: Submit for Architect/Engineer's knowledge as contract administrator or for the Owner, for information for the limited purpose of assessing conformance with information given and the design concept expressed in the Contract Documents.
 - 1. Provide additional copies of design data for Architect/Engineer 's design consultants, including but not limited to structural engineer, mechanical engineer, plumbing engineer, and electrical engineer; transmit to each design consultant's address concurrently, if requested by Architect/Engineer.
- D. Test Reports: After each test or inspection, testing agency will promptly submit electronic copies of report to Architect/Engineer and to Contractor.
 - 1. Transmit one copy of each report to Owner, if requested.
 - 2. Provide additional copies of each test/inspection report for Architect/Engineer's design consultants, including but not limited to electrical engineer and special consultant; transmit to each design consultant's address concurrently, if requested by Architect/Engineer.
 - 3. Include in content of reports:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of inspector.
 - d. Date and time of sampling or inspection.
 - e. Identification of product and specifications Section.
 - f. Location in the Project.
 - g. Type of test/inspection.
 - h. Date of test/inspection.

- i. Results of test/inspection.
 - j. Conformance with Contract Documents.
 - k. When requested by Architect/Engineer, provide interpretation of results.
- 4. Test reports are submitted for Architect/Engineer's knowledge as contract administrator or for the Owner, for information for the limited purpose of assessing conformance with information given and the design concept expressed in the Contract Documents.
- E. Certificates: When specified in individual specification Sections, submit certification by the manufacturer and Architect/Engineer or installation/application subcontractor to Architect/Engineer, in quantities specified for Product Data.
 - 1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 - 2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect/Engineer.
- F. Subcontractor, Trade Contractor and Installer Qualifications: When specified in individual specification Sections, submit qualifications data substantiating specified qualifications; three copies, one of which will be reviewed and returned to Contractor indicating action taken.
- G. Manufacturer's Instructions: When specified in individual specification Sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- H. Manufacturer's Field Reports: Submit reports for Architect/Engineer's benefit as contract administrator or for Owner.
 - 1. Submit report in duplicate within 30 days of observation to Architect/Engineer for information.
 - 2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the Contract Documents.

1.03 REFERENCE STANDARDS

- A. Obtain copies of standards where required by product specification Sections.

1.04 QUALITY CONTROL - GENERAL

- A. Maintain quality control over subcontractors, suppliers, manufacturers, products, services, site conditions, and workmanship to produce Work of specified quality according to the requirements of the Contract Documents (See Section 100).
- B. Special Testing and Inspection: It is recognized that specified special testing and inspection program is intended to assist Contractor, Owner, Architect/Engineer, and jurisdictional authorities in nominal determination of probable compliance with specified requirements for certain elements of the Work. This program is not intended to limit Contractor's standard quality control program (See Section 100).

1.05 TESTING AND INSPECTION AGENCIES

- A. The Engineer/Architect will employ and pay for services of an independent testing agency to perform specified quality control and quality acceptance testing and inspection.

1.06 BASIS OF DESIGN SPECIFICATIONS

- A. Individual specification Sections may include a Basis of Design Manufacturer or Product, which forms the basis of the specifications, Drawing details, and other requirements of the Contract Documents. The specified Basis of Design Manufacturer or Product is not intended to exclude other

manufacturers, products, or systems which comply with the requirements of the Contract Documents, subject to the provisions and requirements specified in individual specification Sections.

- B. Comply with the administrative requirements for substitutions specified in Section 01 1000 for proposed products or systems other than the specified Basis of Design Manufacturer or Product.

1.07 DELEGATED DESIGN REQUIREMENTS

- A. Performance and Design Requirements: Where professional design services or certifications by a licensed design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with performance and design requirements specified in individual specification Sections.
- B. If specified performance or design requirements are not sufficiently complete to perform required services or provide required certifications, submit a written request for additional information to Architect/Engineer.
- C. Refer to Section 01 1000 for a listing of specification Sections that include delegated design requirements.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
 - 1. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- C. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- D. Have Work performed by persons qualified to produce required and specified quality.
- E. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- F. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

3.03 TESTING AND INSPECTION

- A. See individual specification Sections and structural Drawings for testing and inspection required.
- B. Testing Agency Duties (by Engineer/Architect):

1. Test samples of mixes submitted by Contractor.
 2. Provide qualified personnel at site. Cooperate with Architect/Engineer and Contractor in performance of services.
 3. Perform specified sampling and testing of products in accordance with specified standards.
 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 5. Promptly notify Architect/Engineer and Contractor of observed irregularities or non-conformance of Work or products.
 6. Perform additional tests and inspections required by Architect/Engineer.
 7. Submit reports of all tests/inspections specified.
- C. Limits on Testing/Inspection Agency Authority:
1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 2. Agency may not approve or accept any portion of the Work.
 3. Agency may not assume any duties of Contractor.
 4. Agency has no authority to stop the Work.
- D. Contractor Responsibilities:
1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
 2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
 3. Provide incidental labor and facilities:
 - a. To provide access to Work to be tested/inspected.
 - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
 - c. To facilitate tests/inspections.
 - d. To provide storage and curing of test samples.
 4. Re-testing: Performed by same agency if required because of non-conformance to specified requirements, on instructions from Architect/Engineer.
 - a. Paid for by Contractor if required because of non-conformance with specified requirements.

3.04 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification Sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment, and inspection of surfaces to receive waterproofing systems as applicable, and to initiate instructions when necessary.
 1. Manufacturer's field representative will be required to submit daily reports as specified in this Section, when daily observations and inspections are specified in individual Sections.
- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.05 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not conforming to specified requirements.
- B. If, in the opinion of Architect/Engineer, it is not practical to remove and replace the Work, Architect/Engineer will direct an appropriate remedy or adjust payment, with Owner's consent.

END OF SECTION

SECTION 01 7800

ARCHITECTURE CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Project record documents.
- B. Operation and maintenance data.
- C. Warranties and bonds.

1.02 SUBMITTALS

- A. See Section 01 1000 - Administrative Requirements, for submittal procedures.
- B. Project Record Documents: Submit documents to Architect/Engineer with claim for final Application for Payment.
- C. Operation and Maintenance Data:
 - 1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect/Engineer will review draft and return one copy with comments.
 - 2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
 - 3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect/Engineer comments. Revise content of all document sets as required prior to final submission.
 - 4. Submit two sets of revised final documents in final form within 10 days after final inspection.
- D. Warranties and Bonds:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
 - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.
- E. See section 90 for additional closeout requirements.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed shop drawings, product data, and samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
 - 7. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting the Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product Section description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured depths of foundations in relation to finish first floor datum.
 - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - 4. Field changes of dimension and detail.
 - 5. Details not on original Contract Drawings.

3.02 OPERATION AND MAINTENANCE DATA

- A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:
 - 1. Product data, with catalog number, size, composition, and color and texture designations.
 - 2. Information for re-ordering custom manufactured products, if any.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Additional information as specified in individual product specification Sections.
- D. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. For Each Item of Equipment and Each System:
 - 1. Description of unit or system, and component parts.
 - 2. Identify function, normal operating characteristics, and limiting conditions.
 - 3. Include performance curves, with engineering data and tests.
 - 4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- D. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- E. Provide servicing and lubrication schedule, and list of lubricants required.
- F. Include manufacturer's printed operation and maintenance instructions.
- G. Include sequence of operation by controls manufacturer.
- H. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- I. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- J. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

- K. Include test and balancing reports.
- L. Additional Requirements: As specified in individual product specification Sections.

3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

- A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- B. Where systems involve more than one specification Section, provide separate tabbed divider for each system.
- C. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2-inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect/Engineer, Consultants, Contractor and subcontractors, with names of responsible parties.
- F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- H. Text: Manufacturer's printed data, or typewritten data on minimum 20pound paper.
- I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- J. Arrangement of Contents: Organize each volume in parts as follows:
 - 1. Project Directory.
 - 2. Table of Contents, of all volumes, and of this volume.
 - 3. Operation and Maintenance Data: Arranged by system, then by product category.
 - a. Source data.
 - b. Product data, shop drawings, and other submittals.
 - c. Operation and maintenance data.
 - d. Field quality control data.
 - e. Photocopies of warranties and bonds.
 - 4. Design Data: To allow for addition of design data furnished by Architect/Engineer or others, provide a tab labeled "Design Data" and provide a binder large enough to allow for insertion of at least 20 pages of typed text.
- K. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.

- L. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect/Engineer, Consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

3.06 WARRANTIES AND BONDS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.
 - 1. Warranties must clearly state that warranty commences on Date of Substantial Completion, and the actual Date of Substantial Completion according to the Contract must be clearly stated on the warranty form.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.
- E. Include photocopies of each in operation and maintenance manuals, indexed separately on Table of Contents.
- F. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification Section in which specified, and the name of product or work item.
- G. See section 90-10 for additional warranty requirements.

END OF SECTION

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SECTION 03 3000

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concrete forming and accessories.
- B. Concrete foundations and anchor bolts, floors and slabs on grade.
- C. Concrete reinforcing.
- D. Joint devices associated with concrete work.
- E. Miscellaneous concrete elements, including equipment pads, light pole bases, thrust blocks, and similar items.
- F. Concrete curing.

1.02 REFERENCE STANDARDS

- A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International.
- B. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International.
- C. ACI 302.1R - Guide for Concrete Floor and Slab Construction; American Concrete Institute International.
- D. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International.
- E. ACI 305R - Hot Weather Concreting; American Concrete Institute International.
- F. ACI 306R - Cold Weather Concreting; American Concrete Institute International.
- G. ACI 308R - Guide to Curing Concrete; American Concrete Institute International.
- H. ACI 309R - Guide for Consolidation of Concrete.
- I. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute International.
- J. ASTM C33/C33M - Standard Specification for Concrete Aggregates.
- K. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
- L. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
- M. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete.
- N. ASTM C150/C150M - Standard Specification for Portland Cement.
- O. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete.
- P. ASTM C230/C230M - Flow Table for Use in Tests of Hydraulic Cement.

- Q. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
- R. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
- S. ASTM C330 - Standard Specification for Lightweight Aggregates for Structural Concrete.
- T. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
- U. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing.
- V. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
- W. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.
- X. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
- Y. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2012.
- Z. ASTM C1567 - Standard Test Method for Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)
- AA. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
- AB. ASTM D2103 - Standard Specification for Polyethylene Film and Sheeting.
- AC. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials.
- AD. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the installation of grade beams with size, location and installation of underground service utilities.
 - 2. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.
 - 3. Coordinate the use and application of specified curing methods for slabs and floor surfaces with accepted flooring system manufacturers.
- B. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this Section.
 - 1. Convene under general provisions of Section 01 1000.
 - 2. Attendance: Architect, structural engineer, independent testing agency, and all affected trades including reinforcing subcontractor and concrete supplier.
 - 3. Discuss construction document requirements, required clarifications to construction documents, construction schedule, and coordination of affected trades.

1.04 SUBMITTALS

- A. See Section 01 1000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.

1. For curing compounds, provide data on method of removal in the event of incompatibility with floor covering adhesives.
- C. Samples: Submit samples of underslab vapor retarder to be used.
- D. Manufacturer's Certificate: Provide written certification for each admixture actually used that admixtures contain no thiocyanates, and admixtures do not exceed 0.05 percent chloride ions.
- E. Mix Designs: Submit proposed mix design for each class of concrete specified. Include proportions of ingredients, aggregate analysis, cement brand and type, slump, water/cement ratio, and strength test reports for 7 and 28 day strengths.
 1. Prepare in accordance with ACI 301.
 2. Provide specific aggregate analysis for recycled aggregates proposed for use in concrete mixes. Aggregate shall pass ASR reactivity testing according to ASTM C1567.
 3. For mixes specifying a maximum allowed drying shrinkage, submit data according to ASTM C157/C157M substantiating conformance with specified requirements.
 4. Fly-Ash Content Submittal: If any fly ash or ground granulated blast furnace slag is used in mix designs to replace Portland cement, submit the total volume of concrete cast in place, mix design(s) used showing the quantity of Portland cement replaced, reports showing successful cylinder testing, and temperature on day of pour if cold weather mix is used.
- F. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

1.05 QUALITY ASSURANCE

- A. Perform work of this Section in accordance with ACI 301 and ACI 318.
- B. Follow recommendations of ACI 305R when concreting during hot weather.
- C. Follow recommendations of ACI 306R when concreting during cold weather.

PART 2 PRODUCTS

2.01 FORMING

- A. Formwork Design and Construction: Comply with guidelines of ACI 347 to provide formwork that will produce concrete complying with tolerances of ACI 117.
- B. Forming Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
 1. Earth Cuts: **Do not** use earth cuts as forms for vertical surfaces. Natural rock formations that maintain a stable vertical edge may be used as side forms.
 2. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.
 3. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches of concrete surface.
- C. Void Forms: Moisture resistant treated paper faces, biodegradable, structurally sufficient to support weight of wet concrete mix until initial set; thickness and location to be determined by structural engineer.

2.02 REINFORCING

- A. Reinforcing Steel: ASTM A615/A615M Grade 60 (420).
 1. Type: Deformed billet-steel bars.
 2. Finish: Unfinished.
- B. Steel Welded Wire Reinforcement: ASTM A185/A185M, plain type.
 1. Form: Flat Sheets.

2. Mesh Size and Wire Gage: As indicated on Drawings.

C. Reinforcement Accessories:

1. Tie Wire: Annealed, minimum 16 gage.
2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

2.03 CONCRETE MATERIALS

A. Portland Cement: ASTM C150, Type I / II

1. Acquire all cement for entire project from same source.

B. Fine and Coarse Aggregates: ASTM C33.

1. Acquire all aggregates for entire project from same source.

C. Fly Ash: ASTM C618, Class F.

1. Limit use to 20 percent of cement content, by weight, unless otherwise specified.

D. Water: ASTM C1602/C1602M; clean and not detrimental to concrete.

2.04 ADMIXTURES

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

1. Use of calcium chloride is not permitted.

B. Use of admixtures will not relax cold weather placement requirements.

C. Admixtures:

1. Air Entrainment Admixture: ASTM C260.
2. High Range Water Reducing and Retarding Admixture: ASTM C494/C494M Type G.
3. High Range Water Reducing Admixture: ASTM C494/C494M Type F.
4. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.
5. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.
6. Accelerating Admixture: ASTM C494/C494M Type C.
7. Retarding Admixture: ASTM C494/C494M Type B.
8. Water Reducing Admixture: ASTM C494/C494M Type A.

2.05 ACCESSORY MATERIALS

- A. Non-Shrink Grout: ASTM C1107/C1107M, Grade B; pre-mixed compound consisting of non-metallic aggregate, cement, and manufacturer's specified water reducing and plasticizing agents; non-staining, non-gas-forming, containing no chlorides; plastic consistency as measured according to ASTM C230; capable of developing minimum compressive strength of 10,000 psi in 28 days.

2.06 BONDING AND JOINTING PRODUCTS

- A. Bonding Agent: Polyvinyl acetate or acrylic base, re-wettable type.

- B. Latex Bonding Agent: Non-redispersible acrylic latex, complying with ASTM C1059 Type II.

- C. Epoxy Bonding System: Complying with ASTM C881/C881M and of Type required for specific application.

1. Acceptable Products:

- a. W.R. Meadows, Inc.; Rezi-Weld Gel Paste, Rezi-Weld Gel Paste State, Rezi-Weld 1000, or Rezi-Weld 1000 State: www.wrmeadows.com.
- b. Substitutions: See Section 01 6000 - Product Requirements.

- D. Epoxy Filler: Two-part liquid, 100 percent solids epoxy resin, gray color.

- E. Epoxy Resin: Two-part, pourable or injection-applied epoxy resin, honey gray color.
- F. Slab Isolation Joint Filler: 1/2-inch-thick, height equal to slab thickness, with removable top section that will form 1/2-inch-deep sealant pocket after removal.
 - 1. Material: ASTM D1751, cellulose fiber.
- G. Slab Contraction Joint Device: Preformed linear strip intended for pressing into wet concrete to provide straight route for shrinkage cracking.
- H. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel, with minimum 1-inch diameter holes for conduit or rebar to pass through at 6 inches on center; ribbed steel stakes for setting.
 - 1. Provide removable plastic cap strip that forms wedge-shaped joint for sealant installation.
 - 2. Height: To suit slab thickness.
- I. Sealant and Primer: As specified in Section 07 9005.

2.07 CURING MATERIALS

- A. Curing Compound, Naturally Dissipating: Clear, water-based, liquid membrane-forming compound, that dissipates within 3 to 5 weeks; complying with ASTM C309.
 - 1. Application: Use at interior slabs on grade.
- B. Moisture-Retaining Sheet: ASTM C171.
 - 1. Polyethylene film, white opaque, minimum nominal thickness of 0.0060 in.
 - 2. White-burlap-polyethylene sheet, weighing not less than 10 oz/per linear yd, 40 inches wide.
- C. Polyethylene Film: ASTM D2103, 4 mil thick, clear.
- D. Water: Potable, not detrimental to concrete.

2.08 CONCRETE MIX DESIGN - GENERAL

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Concrete Strength: Establish required average-c strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
 - 1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.
- C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.
- D. Adjustment to Concrete Mixes: Mix design adjustments may be requested when characteristics of materials, project conditions, weather, test results, or other circumstances indicate necessary adjustments, at no additional cost to the Owner, and as accepted by the Architect/Engineer. Laboratory test data for revised mix design and strength results must be submitted to Architect/Engineer and accepted before use of revised mix designs in the Work.

2.09 CONCRETE MIXES

- A. Per concrete mix design schedule on structural drawings to be submitted by contractor.

2.10 MIXING

- A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.
- B. Transit Mixers: Comply with ASTM C94/C94M.
 - 1. Deliver concrete and discharge entire load within 1-1/2 hours, or before drum has turned 300 revolutions, whichever occurs first, after introduction of mixing water.

2. During cold weather (below 45 degrees F), use heated water and aggregates if necessary to maintain concrete temperature between 60 degrees F and 90 degrees F.
- C. Add water in accordance with ACI 304R, add at one time only, not more than 2 gal/cu yd of concrete, and provided the increase in slump does not exceed one inch.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify lines, levels, and dimensions before proceeding with work of this Section.

3.02 PREPARATION

- A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.
- B. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
 1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.
 2. Use latex bonding agent only for non-load-bearing applications.
- C. Verify that forms are clean and free of rust before applying release agent.
- D. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and bond with acrylic or epoxy bonding agent.

3.03 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS

- A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.
- B. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.
- C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

3.04 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304R.
- B. Place concrete for floor slabs in accordance with ACI 302.1R.
- C. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- D. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.
- E. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.
- F. Consolidate concrete placed in forms by mechanical vibrating equipment supplemented by hand spading, rodding, and tamping according to ACI 309R. Vibration of forms and reinforcing is not permitted.
- G. Finish floors level and flat, unless otherwise indicated, within the tolerances specified in this Section.

3.05 SLAB JOINTING

- A. Locate joints as indicated on Structural drawings provided by the contractor and on Civil drawings.
- B. Anchor joint fillers and devices to prevent movement during concrete placement.
- C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
 - 1. Install wherever necessary to separate slab from other building members, including columns, walls, equipment foundations, footings, stairs, manholes, sumps, and drains.
 - 2. Separate piping, conduit, and similar penetrations through slabs on grade to allow free vertical movement of slab or penetrating element.
- D. Load Transfer Construction and Contraction Joints: Install load transfer devices as indicated; saw cut joint at surface as indicated for contraction joints.
- E. Saw Cut Contraction Joints: Saw cut joints before concrete begins to cool, within 4 to 12 hours after placing; use 3/16-inch-thick blade and cut at least 1-inch-deep but not less than one quarter (1/4) the depth of the slab.
- F. Contraction Joint Devices: Use preformed joint device, with top set flush with top of slab.
- G. Construction Joints: Where not otherwise indicated, use metal combination screed and key form, with removable top section for joint sealant.

3.06 FLOOR FLATNESS AND LEVELNESS TOLERANCES

- A. Maximum Variation of Surface Flatness:
 - 1. Exposed Concrete Floors: 3/16 inch in 10 ft.
- B. Continuous intermediate screed strips set prior to concrete placement are required. Set screeds and adjust as necessary to achieve proper slab elevation and thickness.
- C. Corrective Measures:
 - 1. Correct the slab surface if tolerances are less than specified.
 - 2. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.07 CONCRETE FINISHING

- A. Repair surface defects, including tie holes, immediately after removing formwork.
- B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.
- C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
 - 1. Smooth Rubbed Finish: Wet concrete and rub with Carborundum brick or other abrasive, not more than 24 hours after form removal.
 - 2. Grout Cleaned Finish: Wet areas to be cleaned and apply grout mixture by brush or spray; scrub immediately to remove excess grout. After drying, rub vigorously with clean burlap, and keep moist for 36 hours.
 - 3. Cork Floated Finish: Immediately after form removal, apply grout with trowel or firm rubber float; compress grout with low-speed grinder, and apply final texture with cork float.
- D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
 - 1. Surfaces to Be Left Exposed: "Steel trowel" as described in ACI 302.1R, minimizing burnish marks and other appearance defects.

3.08 CURING AND PROTECTION

- A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
 - 1. Normal Concrete: Not less than 7 days.
- C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.
- D. Surfaces Not in Contact with Forms:
 - 1. Slabs and Floors to Receive Adhesive-Applied Flooring: Curing compounds and other surface coatings are usually considered unacceptable by flooring and adhesive manufacturers. If such materials must be used, either obtain the approval of the flooring and adhesive manufacturers prior to use or remove the surface coating after curing to flooring manufacturer's satisfaction.
 - 2. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-fog spray, or saturated burlap.
 - a. Ponding: Maintain 100 percent coverage of water over floor slab areas, continuously for 7 days.
 - b. Spraying: Spray water over floor slab areas and maintain wet.
 - c. Saturated Burlap: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place.
 - 3. Final Curing: Begin after initial curing but before surface is dry.
 - a. Moisture-Retaining Sheet: Lap strips not less than 6 inches and seal with waterproof tape or adhesive; secure at edges.
 - b. Curing Compound: Apply in two coats at right angles, using application rate recommended by manufacturer.

3.09 FIELD QUALITY CONTROL

- A. Provide free access to concrete operations at project site and cooperate with appointed firm.
- B. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
- C. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.
- D. Compressive Strength Tests: ASTM C39/C39M. For each test, mold and cure four concrete test cylinders. Obtain test samples for every 50 cu yd or less of each class of concrete placed.
- E. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
- F. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.
- G. Sample concrete used for each set of test cylinders for air content, temperature, and unit weight.
- H. Reinforcing: Inspected by testing agency prior to closing formwork or placing concrete.
- I. Special inspection is required for post-installed anchors.

3.10 DEFECTIVE CONCRETE

- A. Test Results: The testing agency shall report test results in writing to Architect, engineer, and Contractor within 24 hours of test.

- B. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified. The contractor shall remove and replace concrete that cannot be repaired and patched to the Architect's approval.
- D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.
- E. Repair interior and exterior slab and wall cracks, holes, and voids exceeding 1/16-inch-wide by grinding crack to 1/8-inch-wide and fill with epoxy bonding system. Grind smooth and flush with adjacent surface.
 - 1. Holes and Voids: Epoxy resin.
 - 2. Cracks: Epoxy filler.

3.11 PROTECTION

- A. Do not permit traffic over unprotected concrete floor surface until fully cured.

END OF SECTION

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SECTION 05 1200

STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes the following:
 - 1. Structural steel.
 - 2. Prefabricated Building elements.
 - 3. Grout.
- B. Related Sections include the following:
 - 1. Division 01 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.
 - 2. Division 09 painting Sections for surface preparation and priming requirements.
 - 3. Division 13 Section "Metal Building Systems" for structural steel.

1.03 DEFINITIONS

- A. Structural Steel: Elements of structural-steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges," that support design loads.

1.04 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication of structural-steel components.
 - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 - 2. Include embedment drawings.
 - 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
 - 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretension and slip-critical high-strength bolted connections.
- C. Welding certificates.
- D. Qualification Data.
- E. Source quality-control test reports. Installer, fabricator, professional engineer, testing agency.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE. The erector shall submit the following items:
 - 1. Erection Plan
 - 2. Safety Plan, including temporary construction and bracing
 - 3. Plan to monitor compliance with required welding and bolting procedures
- B. Shop-Painting Applicators: Qualified according to AISC's Sophisticated Paint Endorsement P1 or SSPC-QP3, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators."
- C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."
- D. Comply with applicable provisions of the following specifications and documents:
 - 1. AISC's "Code of Standard Practice for Steel Buildings and Bridges."
 - 2. AISC's "Seismic Provisions for Structural Steel Buildings" and "Supplement No.2."
 - 3. AISC's Load and Resistance Factor Design Specification for Structural Steel Buildings."
 - 4. AISC's "Specification for the Design of Steel Hollow Structural Sections."
 - 5. RCSC's "Specification for Structural Joints Using ASTM A325 or A490 Bolts."
- E. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off-ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from erosion and deterioration.
 - 1. Store fasteners in a protected place. Clean and re-lubricate bolts and nuts that become dry or rusty before use.
 - 2. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.07 COORDINATION

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings.
- B. Coordinate installation of anchorages for metal fabrications. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- C. Coordinate installation of steel weld plates and angles for casting into concrete that are specified in this Section but required for work of another Section. Deliver such items to Project site in time for installation.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Metal Requirements:
 - 1. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
 - 2. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 304 or 316L.
 - 3. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304 or 316L.
 - 4. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
 - 5. Rolled-Stainless-Steel Floor Plate: ASTM A 793.
 - 6. Steel Tubing: ASTM A 500, cold-formed steel tubing.
 - 7. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.
 - 8. Welding Electrodes: Comply with AWS requirements.

2.02 BOLTS, CONNECTORS, AND ANCHORS

- A. High-Strength Bolts, Nuts, and Washers: ASTM A325(ASTM A325M), Type 1, heavy hex steel structural bolts; ASTM A563(ASTM A563M) heavy hex carbon-steel nuts; and ASTM F436(ASTM F436M) hardened carbon-steel washers.
 - 1. Finish: Plain coating
- B. Threaded Rods: ASTM A307, Grade A (ASTM F568M, Property Class 4.6).
 - 1. Nuts: ASTM A563 (ASTM A563M) heavy hex carbon steel.
 - 2. Washers: ASTM F436 (ASTM F436M) hardened ASTM A36/A36M carbon steel.
 - 3. Finish: Plain coating
- C. Cast-in-Place Anchors in Concrete: Anchors capable of sustaining, without failure, a load equal to four times the load imposed, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
- D. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Material for Anchors in Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
 - 2. Material for Anchors in Exterior Locations: Alloy Group 1 (A1) or 2 (A4) stainless-steel bolts complying with ASTM F 593 (ASTM F 738M) and nuts complying with ASTM F 594 (ASTM F 836M).
- E. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153/A 153M.

2.03 PRIMER

- A. Primer: Fabricator's standard lead-and chromate-free, non-asphaltic, rust-inhibiting primer.

2.04 GROUT

- A. Cement Grout: Portland cement, ASTM C150, Type I; and clean, natural sand, ASTM C404, Size No. 2. Mix at ratio of 1-part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- B. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, non-staining, mixed with water to consistency suitable for application and a 30-minute working time.

2.05 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's Load and Resistance Factor Design Specification for Structural Steel Buildings." Cut, drill and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp edges or rough areas on exposed surfaces.
 - 1. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Bolt Holes: Cut, drill or punch standard bolt holes perpendicular to metal surfaces.
- C. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- D. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP1, "Solvent Cleaning"
- E. Welded Door Frames, if applicable per door/hangar manufacturer: Build up welded door frames attached to structural steel. Weld exposed joints continuously and grind smooth. Plug-weld fixed steel bar stops to frames and continuously weld exposed joints. Secure removable stops to frames with countersunk, cross-recessed head machine screws, uniformly spaced not more than 10 inches (250 mm) O.C., unless otherwise indicated. Reinforce frames and drill and tap as necessary to accept hardware where applicable. Extend bottom of frames to floor elevation indicated with steel angles welded to frames for anchoring frame to floor with expansion shields and bolts.
- F. Holes: Provide holes required for securing other work to structural steel and for passage of other work through steel framing members.
 - 1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 - 2. Base-Plate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
 - 3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.06 SHOP PRIMING

- A. Shop prime steel surfaces except the following:
 - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (50 mm).
 - 2. Surfaces to be field welded.
 - 3. Surfaces to be high-strength bolted with slip-critical connections.
 - 4. Surfaces to receive sprayed fire-resistive materials.

5. Galvanized surfaces.

- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards.

1. SSPC-SP2, "Hand Tool Cleaning."

- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2. Apply two coats of shop paint to inaccessible surfaces after assembly or erection. Change color of second coat to distinguish it from first.

- D. Painting: Apply a 1-coat, non-asphaltic primer complying with SSPC-PSGuide7.00, "Painting System Guide7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils (0.038 mm).

2.07 SOURCE QUALITY CONTROL

- A. Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.

1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.

- B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

- C. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A325 or A490 Bolts."

- D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1 and the following inspection procedures, at testing agency's option:

1. Liquid Penetrant Inspection: ASTM E165.

2. Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.

3. Ultrasonic Inspection: ASTM E164. 4. Radiographic Inspection: ASTM E94.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify elevations of concrete-and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedment, with steel erector present, for compliance with requirements.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place, unless otherwise indicated.

1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.03 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and Load and Resistance Factor Design Specification for Structural Steel Buildings."
- B. Base and Bearing Plates: Clean concrete-and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates.
- C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 1. Level and plumb individual members of structure.
 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- E. Remove erection bolts on welded, architecturally exposed structural steel; fill holes with plug welds; and grind smooth at exposed surfaces.
- F. Do not use thermal cutting during erection
- G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.04 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A325 or A490 Bolts" for type of bolt and type of joint specified.
 1. Joint Type: Snug tightened or pre-tensioned.
- B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.
 1. Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Load and Resistance Factor Design Specification for Structural Steel Buildings" for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
 2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
 3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.
 4. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent weld show-through on exposed steel surfaces.
 - a. Grind butt welds flush.

b. Grind or fill exposed fillet welds to smooth profile. Dress exposed welds.

3.05 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.
- B. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A325 or A490 Bolts."
- C. Welded Connections: Field welds will be visually inspected according to AWS D1.1.
- D. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

3.06 REPAIRS AND PROTECTION

- A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A780 and manufacturer's written instructions.
- B. Touchup Painting: After installation promptly clean, prepare, and prime or re-prime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories, bearing plates, and abutting structural steel.
 - 1. Clean and prepare surfaces by SSPC-SP2 hand-tool cleaning or SSPC-SP3 power-tool cleaning.
 - 2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.
- C. Touchup Painting: Cleaning and touchup painting are specified in Division 09 painting Sections.

END OF SECTION 05 1200

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SECTION 07 2100

THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Building insulation.

1.02 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.03 SUBMITTALS

- A. See Section 01 1000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.04 QUALITY ASSURANCE

- A. Comply with fire resistance and flammability ratings as shown and specified.
- B. Thicknesses specified are for the thermal conductivity (k-value at 75 degrees F) specified for each material. Provide adjusted thicknesses for approved use of substituted materials with different thermal conductivity ratings. Where insulation is specified to have a specific "R" value, furnish manufacturer's standard thickness required to equal or exceed the specified value.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Do not allow insulation materials to become wet, soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage, and protection during installation.
- B. Protect plastic insulation from exposure to direct sunlight.
- C. Do not deliver plastic insulation materials to the project site ahead of time of installation. Protect at all times against ignition. Complete the installation and concealment of plastic materials as soon as possible in each area of work.

1.06 FIELD CONDITIONS

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.01 GLASS-FIBER BLANKET INSULATION

- A. Manufacturers:
 - 1. CertainTeed Corporation.
 - 2. Guardian Fiberglass, Inc.
 - 3. Johns Manville.
 - 4. Knauf Fiber Glass.
 - 5. Owens Corning.
 - 6. See Section 01 1000 for Substitution Requests.

- B. Glass-Fiber Blanket Insulation. To include white vinyl film facing, 0.02 perm max. per ASTM E 96, where exposed. Retainer strips: 0.019-inch thick, formed, galvanized steel or PVC retainer slips to match insulation facing. While vinyl facing not required for insulation behind metal liner panels.
- C. Provide in the required thickness to meet the R-Value indicated as follows:
 - 1. Walls to be R-13 min.
 - 2. Roof to be R-13 min.
 - 3. OH Doors to be R-13 min.

2.04 ACCESSORIES

- A. Insulation Fasteners: Impaling clip of galvanized steel with washer retainer and clips, to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.
- B. Adhesive: Type recommended by insulation manufacturer for indicated applications.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation and adhesive.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.02 GENERAL INSTALLATION

- A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice, rain, and snow.
- C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. For preformed insulating units, provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.03 BATT INSTALLATION FOR BUILDINGS

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Seal and fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.
- C. Set vapor-retarder-faced units with vapor retarder to warm-in-winter side of construction, unless otherwise indicated.
 - 1. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.
- D. Over-framing installation: Extend insulation and vinyl vapor retarder over and perpendicular to top flange of secondary framing members. Hold in place by metal roof panels and exterior wall panels

fastened to secondary framing. Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.

- E. Stuff glass-fiber loose-fill insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).

3.04 PROTECTION

- A. Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION

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SECTION 08 3600

BIFOLD HANGAR DOORS

PART 1 - GENERAL

1.01 REFERENCES

- A. AISI SG-973 Cold Form Design Manual
- B. ASTM A366/A 36M Commercial Steel Sheet, Carbon Cold Rolled
- C. ASTM A569/A 569M Commercial Steel Sheet and strip Hot Rolled
- D. ASTM A36 36M Carbon Structural Steel
- E. NEMA ICS 1 Industrial Control and Systems
- F. NEMA ICS 6 Industrial Controls and Systems Enclosures
- G. NFPA 70 National Electric Code
- H. SSPC Primers and paint, Gray and Red Oxide primers

1.02 DESIGN REQUIREMENTS

- A. Hangar Door / Bifold Door System: The design of the Bifold Hangar Doors shall be designed to operate as specified and not interfere with the structure or associated trim components. The door shall fit tightly and be built without warping or sagging of members. It shall include an integrated 3'-0" wide steel man door, 26 gage trim package, weather stripping, lockset and master keyed.
- B. The bifold hangar doors shall be designed to the same loading requirements for live, dead and windloads as the hangar building as specified in **Section 13 3419**. The doors shall be engineered to resist all anticipated loads without sagging, bowing or conflicting with its smooth and efficient operation.
- C. Hangar door with door in up position, shall have a the maximum clear opening width permitted by the pre-engineered metal building layout, and a minimum clear height of 12'-0" above finished floor elevation.
- D. The design shall be furnished, approved and sealed by a professional engineer registered in the state where the project is located. The building header shall be designed to accommodate horizontal and vertical building deflections to support the bifold door in all positions (with the proper lateral bracing)
- E. The building's door columns shall be framed of the proper design and size to reinforce the opening (with lateral bracing) and to carry all loads and vibrations imposed thereon.
- F. The bifold door should have solid footing with sill directly underneath the doorframe and extending outward from the door to provide a base for the door's weather seal. This also prevents flow of water into, or under, the door installation.

- G. The finished floor of the building should be designed to prevent flow of water under the door installation. Sills shall have a slight slope outward of the bifold door to prevent water flow under the door installation.
- H. Deflection
Hangar Door systems shall be designed with maximum deflections:
Positive upward deflection of 1"
Negative downward deflection of 1"
Design of the structure shall allow for the weight of the door system.
- I. Cold Form Members
Cold Form members shall be used in locations on the door framing as required. Cold form will typically be comprised of angles and flat bar only.
- J. Hardware
Fastening hardware shall conform to domestic hardware and provide markings to the grade of hardware on the head of the fastener for visual identification.
- K. Single-Source Responsibility:
Provide doors, tracks, motors, and accessories from one manufacturer for each type of door. Provide secondary components from source acceptable to manufacturer of primary components.
- L. All electrical controls and devices shall conform to the requirements of the current National Electrical Code 513, NEMA, and be UL approved.
- M. The operator is furnished complete details, consisting of a single-phase motor and factory-wired control panels consisting of main-fused disconnect switch, magnetic reversing starters, limit switches and pushbutton controls, control circuit transformers, relays, timing devices, and warning devices.
- N. The building contractor shall furnish and install a prewired electrical door operating mechanism to control each bifold door.
- O. The contractor is responsible and required to completely install the prewired electrical door operating mechanism, push button controls, devices and electrical conduit and wiring to the door operating controls.
- P. Control panel with up/down/off switch pre-wired to motor, and over-ride controls with the required number of adequately sized insulated electrical conductors.

1.03 SUBMITTALS

- A. Shop Drawings. Approval of the shop drawings is required prior to fabrication of the bifold hangar door systems.
 - a. Hangar Door operation and general maintenance manuals.
 - b. Fabrication drawings showing detailed construction of the bifold hangar door framing including top and side rail framing, door locks, top hinge assemblies, door locations and framing, stiles, top and bottom frames, and mounting clips.
 - i. Details in shop drawings shall denote weld identifications and connection hardware locations

- c. Wiring schematics information including field wiring, location of junction boxes, physical locations of devices.
- B. Design Data
 - a. Submit design data structural, mechanical, and electrical calculations
 - b. Miscellaneous weather seals and accessories
 - c. Coordinate with the hangar manufacturer to ensure design compatibility

1.04 QUALITY ASSURANCES

A. Manufacturer's Qualifications:

The bifold hangar Door manufacture shall be one who is regularly engaged in the production of bifold hangar doors of the type and size associated for the project. The manufacture shall have experience with the installation and have qualified representatives that can field visit the site if issues arise. The Manufacturer shall a certification program for installers to attend to receive training for the correct installation of the hangar door and the operator systems.

B. Installers Qualifications:

Installers shall have experience in installing bifold hangar doors and the knowledge and equipment to handle the members safely without warping or bending the materials during installation.

Installer must be aware that the structure may have a greater deflection and the building will need to be "pre-loaded" prior to the permanent attachment to the building.

C. Delivery, Storage and Handling

All materials that are not shop installed shall be placed in dry storage. Structural steel shall be stored on blocking above the earth pavement to prevent damage.

Hangar door materials to be checked off on the bill of lading sign off and accepted or noted as missing or damaged.

PART 2 – PRODUCT SCOPE

2.0 MANUFACTURERS

- A. Pre-Engineered Metal Building Manufacturer, whenever possible.
- B. Wellbilt
- C. AeroDoor
- D. High-Fold Door
- E. Schweiss Doors
- F. Or Approved Equal.

2.01 BIFOLD HANGAR DOORS

Bifold Hangar Door split panel and frame shall be manufactured in accordance with the shop drawings and specifications and options denoted by the owner or architect.

- A. Door Manufacture to provide trained personnel to oversee the fabrication of the bifold hangar door system. The supervision will insure that the door system is manufactured in strict accordance with the approved shop drawings.
- B. Hardware (Mounting)
Provide hangar door hardware that meets the design criteria and the actual loads including dead load and wind loads as specified for the project.
Motor devices shall be of sufficient size and design to carry the load with a safety factor built into the design.
- C. Weather Stripping (Top & Bottom) and Flashing
Provide weather stripping that is easily replaceable on the horizontal bottom and vertical edges of the door. Material shall be EPDM with cloth insertion and be attached 12" O.C. The installer will insure that the top weather seal is installed properly per the manufactures instruction. Flashing shall be installed at the header to prevent water intrusion.
- D. Primer:
Red Oxide, Gray industrial primer, SSPC 25 over prepared surface by means of blasting or surface wire wheel depending on the quality of steel.
- E. Electric Operators of Bifold Hangar Doors:
 - 1. Electrical Distribution: Contractor shall supply power to the electric motor control enclosure.
 - 2. Enclosures: Control panels shall be enclosed a NEMA 4 boxes to allow for water tight enclosure; installers of the electrical connections shall note to not drill into the top of the enclosure to prevent water infiltration. All conduit runs should come from the bottom of the enclosure when practical.
 - 3. Contactors and Controls: Each system to be designed for the application and size of the bifold hangar door system. Systems shall include reversing contactors, operation control buttons that open, close and stop the system. System will allow for contactors to be interlocked with limit switches for opening limits and closing limits. Interlocks for personnel door when applicable.
 - 4. Motors: Electric Motors will be sized according and power systems requirements shall match the architects phasing of the electrical system. Fusing of the system will be at the discretion of the design professional.

2.02 MANUFACTURING & ASSEMBLY

- A. Bifold Hangar Door Panels & Frames:
 - 1. Door Panel to be manufacture from square and rectangular tubing. Panel framing shall be shop welded and assembled fully in the shop to insure the door can be assembled in the field. Door panel shall be designed to have exterior panel connection no less than 5 feet from any horizontal member.
 - 2. Exterior truss system shall be fully welded to prevent water intrusion. Truss shall be designed as a welded member with the door panel and factory welded.

3. Door Frames shall consist of a minimum of 1/4" square or rectangular tubing. Header system of the frame may be spliced material depending on the width of the door system. The side of the frame will consist of full pieces not spliced unless the length required exceeds the available material. Splices shall be made in the field of the material using a socket system to insure proper fit and finish by installers.
4. Wind and Locking Pins
 - a. Each door panel shall be fitted with a cold roll drop pin located in the door panel for securing the door to the finished floor. Depending on the size of the door system pin placement and quantity will vary per the engineering.
5. Hinges:
 - a. Door system shall be shipped with five (5) barrel hinges with grease fittings. Pins for the door system shall be cold rolled stock with welded ends to prevent unintended removal or movement.

2.03 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened labeled packaging until ready for installation.
- B. Protect materials from exposure to moisture until ready for installation.
- C. Store materials in a dry, ventilated weathertight location.

2.04 OPERATION OF PANELS

Bifold Hangar Door System operation

The doors shall be upward folding doors pivoting on hinges at the head and middle of the door system. Doors are actuated by means of top mounted electric motors.

A. Motor operation of bifold Hangar Doors

1. Electric motors:

Motors shall be sized in accordance and configuration of the power supply from 120v in single phase.

2. Controls:

Hangar doors shall be controlled by means of constant pressure push buttons mounted on the interior of the door panel or remotely. Push buttons shall stop the movement of the door when pressure is release. The Control Boxes shall be NEMA ICS 6 type 4 boxes in the interior.

B. Accessories

a. Warning Devices:

Warning devices such as bells, horns and strobes may be added to the operation of the controls to notify the area of the movement of the Door Panel. Devices are to be located on the operation hangar wall.

PART 3 – EXECUTION

3.01 ERECTION & INSTALLATION

- A. Inspection of the existing conditions prior to installation of the door system. Installer should review the structure insuring the header supporting frame are installed in accordance with the design. The opening shall be square and plumb. The door should not be installed until the primary structure is correctly installed and all trades have completed the sequences of work. Do not begin installation until openings have been properly prepared.
- B. Verify wall openings are ready to receive work and opening dimensions and tolerances are within specified limits. Verify electric power is available and of correct characteristics.
- C. Bifold door system shall be installed in a workman like manner and assembly shall be in accordance with the shop drawings and installation manuals. Door systems that require a splice due to the size of the door system shall be placed upon cribbage or blocking that completely levels the door panel prior to splice. Slices that are welded are to be welded per the AWS specifications for field welding.
- D. Clean any surfaces abraded, bolts and field welds and field coat surfaces with primer.

3.02 QUALITY CONTROL FIELD TESTING

- A. Test the bifold door upon completion to insure proper operation. Owner's representative shall be present to approve the installation of door systems. Adjust door as required to provide the correct operation if necessary. Provide written report to Owner and door manufacture stating door was successfully operational.
- B. Manufacture Representative Commissioning.

A commissioning inspection shall be performed by the manufacturer to inspect the overall operation and installation of the door system. The commissioning shall include a written report as well as photographic evidence of the correct installation.

- C. Warranty

Owner shall be provided a Standard one year warranty for the door systems. Warranty shall be warranting the hangar door free from defects of materials and labor for a period of one year. Warranty shall be transferable for up to one year.

END OF SECTION

SECTION 13 34 19

METAL BUILDING SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Post, beams, and rigid frame.
- B. Open web trusses and rafters.
- C. Bay spacing as shown on drawings
- D. Roof Slope: 1 in 12
- E. Primary Framing: per manufacturer, may be open web trusses and columns or rigid frame.
- F. Secondary Framing: Purlins, girts, eave struts, flange bracing, and other items detailed.
- G. Lateral Bracing: Horizontal loads not resisted by main frame action shall be resisted by rod and/or diaphragm, portal frames, fixed base columns in the sidewall. Diaphragm and/or rod, portal frame, fixed base columns in the endwall. Rod and/or diaphragm in the roof.
- H. Wall and Roof System: Preformed steel panels insulation, liner sheets, gutters and downspouts and accessory components.
- I. Accessories: Ventilators, louvers, windows, doors, hardware.

1.2 REFERENCE STANDARDS

- A. AISI S100, North American Specification for the Design of Cold-Formed Steel Structural Members, Washington, D.C., 2007 (with Supplement No. 2 , dated 2010).
- B. AISC 360, Specification for Structural Steel Buildings, American Institute of Steel Construction, Chicago, IL 2010.
- C. AISC, Steel Design Guide Series 3, Serviceability Design Considerations for Low-Rise Buildings, Chicago, IL, Second Edition, 2003.
- D. ANSI/ASHRAE/IESNA Standard 90.1, Energy Standard for Buildings Except Low-Rise Residential Buildings, Atlanta, GA, 2010.
- E. ASTM A36-08, Standard "Specification for Carbon Structural Steel," West Conshohocken, PA.
- F. ASTM A123-08, Standard "Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products, "West Conshohocken, PA.
- G. ASTM A153-05, Standard "Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware," West Conshohocken, PA.

- H. ASTM A307-07b, Standard "Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength, " West Conshohocken, PA.
- I. ASTM A32510, Standard "Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength," West Conshohocken, PA.
- J. ASTM A463-06, Standard "Specification for Steel Sheet, Aluminum-Coated, by the Hot-Dip Process, West Conshohocken, PA, 2006.
- K. ASTM A475-03(2009), Standard "Specification for Zinc-Coated Steel Wire Strand," West Conshohocken, PA,.
- L. ASTM A49010a, Standard "Specification for Heat Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength," West Conshohocken, PA.
- M. ASTM A50010, Standard "Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes," West Conshohocken, PA.
- N. ASTM A501-07, Standard "Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing," West Conshohocken, PA.
- O. ASTM A529-05(2009), Standard "Specification for High-Strength Carbon-Manganese Steel of Structural Quality," West Conshohocken, PA, 2005.
- P. ASTM A572-07, Standard "Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel," West Conshohocken, PA.
- Q. ASTM A653-08, Standard "Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process," West Conshohocken, PA.
- R. ASTM A792-08, Standard "Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process, " West Conshohocken, PA.
- S. ASTM A1011-08, Standard "Specification for Steel Sheet and Strip Hot Rolled Carbon, Structural High Strength Low-Alloy and High Strength Low-Alloy with Improved Formability," West Conshohocken, PA.
- T. ASTM C665-06, Standard "Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing, " West Conshohocken, PA.
- U. ASTM D1494-97(2008), Standard "Test Method for Diffused Light Transmission Factor of Reinforced Plastic panels," West Conshohocken, PA.
- V. ASTM E1514-98(2003), Standard "Specification for Structural Standing Seam Steel Roof panel Systems," West Conshohocken, PA.
- W. ASTM E159205, Standard "Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference," West Conshohocken, PA.
- X. ASTM E1646-95(2003), Standard "Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference," West Conshohocken, PA.

- Y. ASTM E1680-95(2003), Standard "Test Method of Rate of Air Leakage through Exterior Metal Roof Panel Systems," West Conshohocken, PA.
- Z. AWS A2.4, Standard Welding Symbols, Miami, FL, 1998.
- AA. AWS D1.1, Structural Welding Code - Steel, Miami, FL, 2010.
- BB. AWS D1.3, Structural Welding Code - Sheet Steel, Miami, FL, 1998.
- CC. MBMA, Metal Building Systems Manual, Metal Building Manufacturers Association, Cleveland, OH, 2012.
- DD. NAIMA 202, Standard for Flexible Fiberglass Insulation Systems in Metal Buildings, 2000.
- EE. SJI, (Steel Joist Institute) - Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders, 42nd Edition.
- FF. SSPC, (Society for Protective Coatings) - SP-2 - Specification for Hand Tool Cleaning, 2004 (Part of Steel Structures Painting Manual, Vol. Two)
- GG. SSPC, - Paint 15 – Steel Joist Shop Primer/Metal Building Primer; Society for Protective Coatings; 2004 (Part of Steel Structures Painting Manual, Vol. Two)
- HH. SSPC, – Paint 20 – Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 1991 (Part of Steel Structures Painting Manual, Vol. Two).
- II. UL 580, - Tests for Uplift Resistance of Roof Assemblies, 2006 (with Revisions through July 2009).

1.3 DESIGN REQUIREMENTS

- A. The building shall be designed by the Manufacturer as a complete system. All components of the system shall be supplied or specified by the same manufacturer. The building shall be supplied by a manufacturer who is regular engaged in the manufacture of aircraft hangar buildings.
- B. Applicable Design Codes: See section 01 1000.
- C. *Structural Steel Framing: See section 05 1200.***
- D. Structural Risk Category II (IBC Chapter 16).
- E. Design Loads:
 - 1. Dead Load – Weight of the building system and components as determined by manufacturer.
 - 2. Roof Live Load – 20 PSF
 - 3. Collateral Load – Per Manufacturer.
 - 4. Roof Snow Load:
 - a. Ground Snow Load – 20 psf.
 - b. Roof Snow Load – 20 psf.
 - 5. Wind Load:
 - a. Wind Speed –90.
 - b. Wind Exposure – C.

6. Seismic Load:
 - a. Spectral response acceleration for short periods (S_s) – 0.1 g
 - b. Spectral response acceleration for 1-sec. period (S_1) – 0.066 g
 - c. Site Class – D
 7. Floor Load.
 - a. Dead Load (Weight of Material by others) – per structural engineer and manufacturer.
 8. Auxiliary Loads: Incorporate bi-fold door reactions and requirements.
- E. General Serviceability Limits:
1. Deflection Limits shall be in accordance with the applicable provisions of the Metal Building Systems Manual (MBMA), latest edition.
 2. Vertical Deflections:
 - a. Roof Secondary (Purlins) – $L/150$.
 - b. Main Frame roof beams – $L/180$.
 3. Horizontal Deflections:
 - a. Wall Secondary (Girts) – $L/90$.
 - b. Main Frames – $H/60$.
 4. Vertical deflection limits apply for snow load (50-year mean-recurrence interval) plus collateral load, or the code required live load. The horizontal drift and deflections limits apply for the loads induced by a basic wind speed corresponding to a 10 year mean-recurrence interval.
- F. Thermal Effects: Metal panel roof and wall panel systems shall be free to move in response to the expansion and contraction forces resulting from a temperature variation. Assembly to permit movement of components without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to temperature range of 120 degrees F ambient; 180 degrees F surfaces.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 1000.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
- C. Preparation instructions and recommendations.
- D. Storage and handling requirements and recommendations.
- E. Installation methods.
- F. Shop Drawings: Provide complete erection drawings for the proper identification and assembly of all building components. Drawings will show anchor bolt settings, transverse cross-sections, sidewall, endwall and roof framing, flashing and sheeting, closures, and accessory installation details.
- G. Provide column reactions for the design of the foundation for each location.
- H. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

- I. Verification Samples: For each finish product specified, two samples, representing actual product, color, and patterns.
- J. Certifications: Shop drawings and design analysis shall bear the seal of a registered professional engineer upon request. Design analysis shall be on file and furnished by manufacturer upon request.
- K. Bill of Materials: Bills of material shall be furnished and shall include item weights.
- L. Preventative Maintenance Manual.
- M. Welder's Certifications: Certification of welder qualifications shall be furnished as specified by the Project Engineer.
- N. Submit certification verifying that the metal roof system has been tested and approved by Underwriter's Laboratory as Class 90.

1.5 QUALITY ASSURANCE

- A. Manufacturer / Fabricator Qualifications:
 - 1. (US) All primary products specified in this section will be supplied by a single IAS AC 472 Accredited Manufacturer /Fabricator with a minimum of five (5) years' experience. Upon request the hangar manufacturer shall provide a list of completed hangar projects.
- B. Weldments/Welder/Weld Inspection Qualifications:
 - 1. (US) Welding inspection and welding inspector qualification for structural steel shall be in accordance with AWS D1.1, "Structural Welding Code – Steel", latest edition. Welding inspection and welding inspector qualification for cold-formed steel shall be in accordance with AWS D1.3, "Structural Welding Code – Sheet Steel", latest edition.
- C. Erector Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five (5) years demonstrated experience in installing products of the same type and scope as specified.
- D. Design: Standard drawings and design analysis must bear the seal of a registered professional engineer in the state of the project location. Design analysis must be on file and furnished by manufacturer upon request.
- E. Metal building contractor shall verify that field measurements are as indicated on erection drawings and as instructed by the manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Acceptance Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage and Handling Requirements:

1. Store and handle materials in accordance with manufacturer's instructions.
 2. Keep materials in manufacturer's original, unopened containers and packaging until installation.
 3. Do not store materials directly on ground.
 4. Store materials on flat, level surface, raised above ground, with adequate support to prevent sagging.
 5. Protect materials and finish during storage, handling, and installation to prevent damage.
- C. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- D. Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.

1.7 WARRANTY

- A. Building System Warranty
1. Furnish manufacturer's standard warranty for the metal building system, excluding paint.
 2. The manufacturer shall warranty the metal building system against failure due to defective material or workmanship for a minimum period of one (1) year from date of shipment.
 3. The liability under this warranty shall be limited to furnishing, but not dismantling or installing, necessary replacement material F.O.B. manufacturer's plant. In no event shall the manufacturer be liable for loss of profits, or other incidental, consequential, or special damages.
- B. Roof and Wall Paint Finish Warranty
1. Paint Systems
 - a. Furnish manufacturer's standard warranty for the metal panel paint system against chipping, peeling, blistering, fading in excess of 5 NBS Hunter units as set forth in ASTM-D-2244, and chalking in excess of 8 units as set forth in ASTM-D-4214.
 2. The warranty shall be for a period of 30 years from the date of shipment for PVDF paint systems.
 3. The warranty shall be for a period of 25 years from the date of shipment for silicone-polyester paint systems.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer:
1. Erect-A-Tube

2. FulFab Aircraft Hangars
3. Prime Steel Buildings
4. Peak Steel Buildings
5. Olympia Steel Buildings
6. Nucor Building Systems
7. Rigid Global Buildings
8. NCI Building systems, Inc.
9. Alliance Steel, Inc.
10. Butler Manufacturing Co.
11. Ceco Building Systems.
12. Gulf States Manufacturers.
13. Kirby Building Systems, Inc.
14. Mid-West Steel Building Company.
15. Robertson Buildings.
16. Star Building Systems.
17. Substitutions: Must meet the requirements of Section 1.5 above, submit a request along with their resume to the architect for approval.

2.2 MATERIALS

A. Primary Framing Steel:

1. Steel for hot rolled shapes must conform to the requirements of ASTM Specifications A-36, A-572 or A-992, with minimum yield of 36 or 50 ksi, respectively.
2. Steel for built-up sections must conform to the requirements of ASTM A-1011, A-1018, A-529, A-572 or A-36 as applicable, with minimum yield of 42, 46, 50, or 55 ksi as indicated by the design requirements.
3. Round Tube must conform to the requirements of ASTM A-500 Grade B with minimum yield strength of 42 ksi.
4. Square and Rectangular Tube must conform to the requirements of ASTM A-500 Grade B with a minimum yield strength of 46 ksi.
5. Steel for Cold-Formed Endwall "C" sections must conform to the requirements of ASTM A-1011 or A-1039 Grade 55, or ASTM A-653 Grade 55 with minimum yield strength of 55 ksi.
6. X-bracing will conform to ASTM A-36 or ASTM A-529 for rod and angle bracing or ASTM A-475 for cable bracing.

B. Secondary Framing Steel:

1. Steel used to form purlins, girts and eave struts must meet the requirements of ASTM A-1011 or ASTM A-1039 Grade 55 for primed material or ASTM A-653 Grade 55 for galvanized material with a minimum yield of 55 ksi.
2. Design Thicknesses – Gauge to be determined by design to meet specified loading conditions.

C. Panels:

1. Galvanized G90 Exterior-Side and G60 Interior-Side.
2. Through-fastened panels must have:
 - a. 50 percent minimum aluminum-zinc alloy coating and conform to ASTM A-792 or ASTM A-653 with a minimum yield of 50 ksi.
3. Panel Finish:
 - a. SP Finish: Modified Siliconized Polyester paint system with a 25-year finish warranty.

- D. Panel Fasteners:
 - 1. Painted finished roof panels: Long Life Cast Zinc head.
 - 2. For wall panels: Coated carbon steel.
 - 3. Color of exposed fastener heads to match the wall and roof panel finish.
 - 4. Concealed Fasteners: Self-drilling type, of size required.
- E. Flashing and Trim: Match material, finish, and color of adjacent components. Provide trim at rakes, including peak and corner assemblies, high and low eaves, corners, bases, framed openings and as required or specified to provide weather-tightness and a finished appearance.
- F. Sealant And Closures:
 - 1. Sidelaps: Factory applied non-skinning Butyl mastic.
 - 2. Endlaps, Eave, Ridge Assembly, and Gable Flashings: Field applied 100% solids butyl-based elastomeric tape sealant, furnished in pre-cut lengths.
 - 3. Outside Closures: Closed-cell, plastic or metal
 - 4. Inside Closures: Closed-cell, plastic or metal
- G. Gutters and Downspouts:
 - 1. Material: Formed from 0.022" nominal thickness, metallic coated steel sheet or aluminum-zinc alloy coated steel sheet prepainted with coil coating; finished to match roof fascia and rake trim. Mounting straps to be of same material.
 - 2. Gutters to match profile of gable trim, complete with end piece, outlet tubes and other special pieces required, fabricate in 96-inch min. long sections.
 - 3. Downspouts to include elbows and offsets. Fabricate in 10-foot long min. sections.

2.3 PRIMARY FRAMING

- A. Roof Trusses:
 - 1. Fabricated open web trusses or steel rafters, simple span load carrying members suitable for the direct support of roof systems utilizing material sizes and yield strengths as required.
 - a. Bridging: Attached per manufacturer's recommendations.
 - b. Joist attachment: Attached per manufacturer's recommendations.
 - c. Open web members shall be fabricated of material that conforms to the material specifications designated by the Steel Joist Institute as acceptable for this product.
 - 2. Rigid Frame symmetrical gable units may be used in lieu of open web trusses. Roof joists and rafters to be provided per manufacturers recommendations.
- B. Columns:
 - 1. Door Columns: Shall be manufactured of steel wide flange beams "W" shapes ASTM A36 and shall be W6 x 15 pounds per foot minimum with pre-welded base plate and door truss saddles, final steel member sizing per manufacturer.
 - 2. Columns: shall be square structural welded steel tube ASTM A500 with pre-welded base plates and girt clips.
 - 3. Rigid frame columns may be used in lieu of square or rectangular posts.
- C. Door Truss:

1. Door truss shall span width of hangar door opening and shall be shipped full length for ease of construction. Door truss design shall be integral with door design. Door truss shall be factory welded with chords 4" x 4" x 1/8" minimum square structural welded steel tube ASTM A500 GR.B. and 3" x 1" x 1/8" minimum diagonal webbing. Door truss shall be pre-punched for column connection and door hinge connections.
- D. Endwall Frames / Roof Beams: Fabricated steel sections as required to meet the design requirements.
- E. Finish: Red-Oxide.
- F. Field Bolted Connections: All field bolted connections shall be designed and detailed utilizing ASTM A-325 or A-490 depending on design requirement.

2.4 SECONDARY FRAMING

- A. Purlins and Girts: Purlins and girts shall be cold-formed "Z" sections with stiffened flanges. Flange stiffeners shall be sized to comply with the requirements of the latest edition of AISI and LGSI. They shall be pre-punched at the factory to provide for field bolting. They shall be simple or continuous span as required by design. Connection bolts will install through the purlin/girt webs, not purlin/girt flanges.
- B. Purlins (Excluding Open Web Joists): Horizontal structural members which support roof coverings.
 1. Depth and Gage: To be determined by design.
 2. Maximum Length: To be determined by design.
 3. Finish: Red Oxide Primer.
- C. Girts: Horizontal structural members that support vertical panels at interior and exterior walls, structural weld steel tubes or rolling formed "C" sections of ASTM 570 or ASTM A572, as applicable:
 1. Depth: To be determined by design (4", 6" or 8")
 2. Maximum Length: To be determined by design.
 3. Finish: Red Oxide Primer.
- D. Base Framing: Base members to which the base of the wall covering may be attached to the perimeter of the slab. Secured to the concrete slab with mechanical anchors.
 1. Formed base sill.
 2. Base channel.
 - a. With flashing.
 3. Finish: Red Oxide Primer.
- E. Miscellaneous: Provide wind pining, rafter/truss bracing, sheeting angles, and all other required structural members as necessary.

2.5 ROOF PANELS

- A. Metal Roof

1. Gauge: 26
2. Dimensions: 1 1/8" min. major ribs 12" on center. Panel coverage shall be 36" and shall be furnished full length from building eave to ridge purlin. The area between the ribs is reinforced to minimize oil-canning.
3. A pre-formed ridge cap shall be provided.
4. Fasteners:
 - a. #12-14x1" Atlas Ultimate zinc-alloy head on carbon steel shank, hex head, with dual seal washer.
 - b. Roof stitch screws shall be #12x3/4" A.B. Atlas Ultimate zinc-alloy head screws with washers.
5. Finish/Color: As specified in Article 2.8 PANEL FINISH.

2.6 WALL PANELS

- A. Exterior: A through-fastened sidewall panel with 1 1/8 inch (32mm) ribs at 12 inches (305mm) on center. The area between the ribs is reinforced to minimize oil-canning.
 1. Gauge: 26
 2. Dimensions: 1 1/8 inch (32mm) ribs at 12 inches (305mm) on center. Panel coverage shall be 36 inches (915mm) wide and furnished full height.
 3. Fasteners:
 - a. Wall fasteners shall be #12-14x1" hex head color match self-drilling sheet metal screws with washer.
 - b. Wall sheet stitch screws shall be 1/4"-#14x3/4" hex head color match self-drilling lap screw with washer.
 - c. Partition sheet fasteners shall be #12-3/4" hex head zinc plated self-drilling screws.
 - d. All sheet metal screws shall be installed as shown on building manufacturer's erection plans.
 4. Finish/Color: As specified in Article 2.8 PANEL FINISH.
- B. Interior Partition: A through-fastened sidewall panel with 1 1/8 inch (32mm) ribs at 12 inches (305mm) on center. The area between the ribs is reinforced to minimize oil-canning. Partition panels to be full height.
 1. Gauge: 29
 2. Dimensions: 1 1/8 inch (32mm) ribs at 12 inches (305mm) on center. Panel coverage shall be 36 inches (915mm) wide and furnished full height.
 3. Finish/Color: Galvalume.
 4. Provide a 6" high curb continuous around the interior perimeter of each hangar unit. Steel track with fuel rated gasketing per manufacturer standards.

2.7 ACCESSORIES

- A. Building trim shall include eave trim, gable trim, corner trim, service door trim, hangar door trim. All trim shall be 26ga. and manufactured of flat stock material equal in quality to wall sheets and color as selected from manufacturer's standard color chart. Trim pieces shall be packaged for shipment at factory.

- B. Framed Openings: Used to frame out doors, windows, louvers, and any other openings. Refers to the framing members and flashing which surround an opening and includes jambs, header and or sill, trim, and fasteners.
- C. Roof caulking shall be at all roof sheet side laps and at pre- formed ridge caps. Roof caulk shall be a tape sealant type and shall be pre-formed butyl rubber base and shall be supplied as a 3/16" x 3/8" extruded shape.
- D. Inside and outside semi-rigid cross-linked polyethylene foam closure shall be provided as required to provide a bird proof building. Inside closure shall be self-adhesive.

2.8 PANEL FINISHES

- A. Roof Panel:
 - 1. Cool Roof Colors:
 - a. Manufacturer Standard Panel Paint System (Siliconized Polyester Resin, 25-year Finish Warranty):
 - 1) Color: To be selected from manufacturer's standard pallet.
- B. Wall Panel:
 - 1. Manufacturer Standard Panel Paint System (Siliconized Polyester Resin, 25-year Finish Warranty):
 - a. Color: To be selected from manufacturer's standard pallet.

2.9 FABRICATION

- A. General:
 - 1. Shop-fabricate all framing members for field bolted assembly. The surfaces of the bolted connections must be smooth and free from burrs or distortions.
 - 2. Shop connections must conform to the manufacturer's standard design practices as defined in this section. Certification of welder qualifications will be furnished when required and specified in advance.
 - 3. All framing members must carry an identifying mark.
- B. Primary Framing:
 - 1. Plates, Stiffeners and Related Members.: Factory weld base plates splice plates, cap plates, and stiffeners into place on the structural members.
 - 2. Bolt Holes and Related Machining: Shop fabricate base plates, splices and flanges to include bolt connection holes. Shop fabricated webs to include bracing holes.
 - 3. Secondary structural connections (purlins and girts) to be ordinary bolted connections, which may include welded clips.
 - 4. Manufacturer is responsible for all welding inspection in accordance with the manufacturer's IAS Accreditation or CAN/CSA A660 Certification. Special inspection by the buyer or owner may be done in the manufacturer's facility and must be noted on the Contract Documents.
 - 5. Non-Destructive Testing (NDT) - NDT shall be performed and documented as required by the governing building code for this project.
- C. Open-Web Trusses/Joists:
 - 1. Shall be designed under Steel Joist Institute (SJI) specifications by an SJI-Certified
 - 2. Joist Manufacturer for the prescribed loads.

3. The Joist system includes joist bridging and joist-seat-to-supporting structural connections using 3/8" diameter self-drilling bolts made from ASTM A354 Grade BD steel.
 4. Field welding of joist bridging and seats is an alternative method for connection of joists to supporting primary structural members.
- D. Zee Purlins:
1. Fabricate purlins from cold-formed "Z" sections with stiffened flanges. Size flange stiffeners to comply with the requirements of the latest edition of AISI. Connection bolts will install through the webs, not the flanges.
- E. Girts
1. Girts must be simple or continuous span as required by design. Connection bolts will install through the webs, not the flanges.
- F. Bracing:
1. Diagonal Bracing:
 - a. Wind bracing in the roof and/or walls need not be furnished where it can be shown that the diaphragm strength of the roof and/or wall covering is adequate to resist the applied wind or seismic forces. Diagonal bracing in the roof and sidewalls may be used to resist longitudinal loads (wind, crane, etc.) in the structure if diaphragm action cannot be used.
 - b. Diagonal bracing will be furnished to length and equipped with hillside washers and nuts at each end. It may consist of rods threaded each end or galvanized cable with suitable threaded end anchors. If load requirements so dictate, bracing may be of structural angle and/or pipe, bolted in place.
 2. Special Bracing: When diagonal bracing is not permitted in the sidewall, a rigid frame type portal or fixed base column will be used. Shear walls can also be used where adequate to resist the applied wind or seismic forces.
 3. Flange Braces: The compression flange of all primary framing must be braced laterally with angles connecting to the bottom chords of purlins or to the webs of girts so that the flange compressive stress is within allowable limits for any combination of loading.
 4. Bridging:
 - a. Laterally bridge the top and bottom chords of the open-web trusses as required by design thereof and specified on the building erection drawings.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Before erection proceeds, survey elevations and locations of concrete bearing surfaces and locations of anchor rods, bearing plates and other embedment's to receive structural framing, with Erector present, for compliance with requirements and metal building system manufacturer's tolerances.
- C. Proceed with erection only after unsatisfactory conditions have been corrected.
- D. See Section 05 1200 for Structural Steel Framing requirements.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Provide temporary shores, guys, braces, and other supports during erection to keep structural framing secure, plumb, and in alignment against temporary construction loads equal in intensity to design loads. Remove temporary supports when permanent structural framing connections and bracing are in place, unless otherwise indicated.

3.3 INSTALLATION

- A. The erection of the building system shall be performed by a qualified erector, in accordance with the appropriate erection drawings, erection guides and /or other documents furnished by manufacturer, using proper tools, equipment and safety practices.
- B. Erection practices shall conform to “Common Industry Practices”, Section 6, MBMA (LR)-Building Systems Manual.
- C. There shall be no field modifications to primary structural members except as authorized and specified by manufacturer.

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

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APPENDIX A

FAA ADVISORY CIRCULAR 150/5370-2 OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION



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

Advisory Circular

Subject: Operational Safety on
Airports During Construction

Date: 12/13/2017

Initiated By: AAS-100

AC No: 150/5370-2G

Change:

1 **Purpose.**

This AC sets forth guidelines for operational safety on airports during construction.

2 **Cancellation.**

This AC cancels AC 150/5370-2F, *Operational Safety on Airports during Construction*, dated September 29, 2011.

3 **Application.**

This AC assists airport operators in complying with Title 14 Code of Federal Regulations (CFR) Part 139, *Certification of Airports*. For those certificated airports, this AC provides one way, but not the only way, of meeting those requirements. The use of this AC is mandatory for those airport construction projects receiving funds under the Airport Improvement Program (AIP). See Grant Assurance No. 34, *Policies, Standards, and Specifications*. While we do not require non-certificated airports without grant agreements or airports using Passenger Facility Charge (PFC) Program funds for construction projects to adhere to these guidelines, we recommend that they do so to help these airports maintain operational safety during construction.

4 **Related Documents.**

ACs and Orders referenced in the text of this AC do not include a revision letter, as they refer to the latest version. Appendix A contains a list of reading material on airport construction, design, and potential safety hazards during construction, as well as instructions for obtaining these documents.

5 **Principal Changes.**

The AC incorporates the following principal changes:

1. Notification about impacts to both airport owned and FAA-owned NAVAIDs was added. See paragraph 2.13.5.3, NAVAIDs.

2. Guidance for the use of orange construction signs was added. See paragraph 2.18.4.2, Temporary Signs.
3. Open trenches or excavations may be permitted in the taxiway safety area while the taxiway is open to aircraft operations, subject to restrictions. See paragraph 2.22.3.4, Excavations.
4. Guidance for temporary shortened runways and displaced thresholds has been enhanced. See Figure 2-1 and Figure 2-2.
5. Figures have been improved and a new Appendix F on the placement of orange construction signs has been added.

Hyperlinks (allowing the reader to access documents located on the internet and to maneuver within this document) are provided throughout this document and are identified with underlined text. When navigating within this document, return to the previously viewed page by pressing the “ALT” and “ ← ” keys simultaneously.

Figures in this document are schematic representations and are not to scale.

6 **Use of Metrics.**

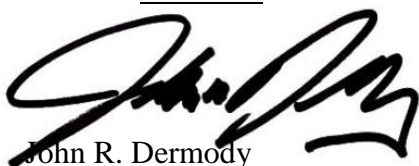
Throughout this AC, U.S. customary units are used followed with “soft” (rounded) conversion to metric units. The U.S. customary units govern.

7 **Where to Find this AC.**

You can view a list of all ACs at http://www.faa.gov/regulations_policies/advisory_circulars/. You can view the Federal Aviation Regulations at http://www.faa.gov/regulations_policies/faa_regulations/.

8 **Feedback on this AC.**

If you have suggestions for improving this AC, you may use the Advisory Circular Feedback form at the end of this AC.



John R. Dermody
Director of Airport Safety and Standards

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CHAPTER 1. PLANNING AN AIRFIELD CONSTRUCTION PROJECT

1.1 Overview.

Airports are complex environments, and procedures and conditions associated with construction activities often affect aircraft operations and can jeopardize operational safety. Safety considerations are paramount and may make operational impacts unavoidable. However, careful planning, scheduling, and coordination of construction activities can minimize disruption of normal aircraft operations and avoid situations that compromise the airport's operational safety. The airport operator must understand how construction activities and aircraft operations affect one another to be able to develop an effective plan to complete the project. While the guidance in this AC is primarily used for construction operations, the concepts, methods and procedures described may also enhance the day-to-day airport maintenance operations, such as lighting maintenance and snow removal operations.

1.2 Plan for Safety.

Safety, maintaining aircraft operations, and construction costs are all interrelated. Since safety must not be compromised, the airport operator must strike a balance between maintaining aircraft operations and construction costs. This balance will vary widely depending on the operational needs and resources of the airport and will require early coordination with airport users and the FAA. As the project design progresses, the necessary construction locations, activities, and associated costs will be identified and their impact to airport operations must be assessed. Adjustments are made to the proposed construction activities, often by phasing the project, and/or to airport operations to maintain operational safety. This planning effort will ultimately result in a project Construction Safety and Phasing Plan (CSPP). The development of the CSPP takes place through the following five steps:

1.2.1 Identify Affected Areas.

The airport operator must determine the geographic areas on the airport affected by the construction project. Some, such as a runway extension, will be defined by the project. Others may be variable, such as the location of haul routes and material stockpiles.

1.2.2 Describe Current Operations.

Identify the normal airport operations in each affected area for each phase of the project. This becomes the baseline from which the impact on operations by construction activities can be measured. This should include a narrative of the typical users and aircraft operating within the affected areas. It should also include information related to airport operations: the Aircraft Approach Category (AAC) and Airplane Design Group (ADG) of the airplanes that operate on each runway; the ADG and Taxiway Design Group (TDG)¹ for each affected taxiway; designated approach visibility minimums;

¹ Find Taxiway Design Group information in AC 150/5300-13, Airport Design.

available approach and departure procedures; most demanding aircraft; declared distances; available air traffic control services; airport Surface Movement Guidance and Control System (SMGCS) plan; and others. The applicable seasons, days and times for certain operations should also be identified as applicable.

1.2.3 Allow for Temporary Changes to Operations.

To the extent practical, current airport operations should be maintained during the construction. In consultation with airport users, Aircraft Rescue and Fire Fighting (ARFF) personnel, and FAA Air Traffic Organization (ATO) personnel, the airport operator should identify and prioritize the airport's most important operations. The construction activities should be planned, through project phasing if necessary, to safely accommodate these operations. When the construction activities cannot be adjusted to safely maintain current operations, regardless of their importance, then the operations must be revised accordingly. Allowable changes include temporary revisions to approach procedures, restricting certain aircraft to specific runways and taxiways, suspension of certain operations, decreased weights for some aircraft due to shortened runways, and other changes. An example of a table showing temporary operations versus current operations is shown in Appendix E.

1.2.4 Take Required Measures to Revise Operations.

Once the level and type of aircraft operations to be maintained are identified, the airport operator must determine the measures required to safely conduct the planned operations during the construction. These measures will result in associated costs, which can be broadly interpreted to include not only direct construction costs, but also loss of revenue from impacted operations. Analysis of costs may indicate a need to reevaluate allowable changes to operations. As aircraft operations and allowable changes will vary widely among airports, this AC presents general guidance on those subjects.

1.2.5 Manage Safety Risk.

The FAA is committed to incorporating proactive safety risk management (SRM) tools into its decision-making processes. FAA Order 5200.11, *FAA Airports (ARP) Safety Management System (SMS)*, requires the FAA to conduct a Safety Assessment for certain triggering actions. Certain airport projects may require the airport operator to provide a Project Proposal Summary to help the FAA determine whether a Safety Assessment is required prior to FAA approval of the CSPP. The airport operator must coordinate with the appropriate FAA Airports Regional or District Office early in the development of the CSPP to determine the need for a Safety Risk Assessment. If the FAA requires an assessment, the airport operator must at a minimum:

1. Notify the appropriate FAA Airports Regional or District Office during the project "scope development" phase of any project requiring a CSPP.
2. Provide documents identified by the FAA as necessary to conduct SRM.
3. Participate in the SRM process for airport projects.
4. Provide a representative to participate on the SRM panel.

5. Ensure that all applicable SRM identified risks elements are recorded and mitigated within the CSPP.

1.3 **Develop a Construction Safety and Phasing Plan (CSPP).**

Development of an effective CSPP will require familiarity with many other documents referenced throughout this AC. See Appendix A for a list of related reading material.

1.3.1 List Requirements.

A CSPP must be developed for each on-airfield construction project funded by the Airport Improvement Program (AIP) or located on an airport certificated under Part 139. For on-airfield construction projects at Part 139 airports funded without AIP funds, the preparation of a CSPP represents an acceptable method the certificate holder may use to meet Part 139 requirements during airfield construction activity. As per FAA Order 5200.11, projects that require Safety Assessments do not include construction, rehabilitation, or change of any facility that is entirely outside the air operations area, does not involve any expansion of the facility envelope and does not involve construction equipment, haul routes or placement of material in locations that require access to the air operations area, increase the facility envelope, or impact line-of-sight. Such facilities may include passenger terminals and parking or other structures. However, extraordinary circumstances may trigger the need for a Safety Assessment and a CSPP. The CSPP is subject to subsequent review and approval under the FAA's Safety Risk Management procedures (see paragraph 1.2.5).

1.3.2 Prepare a Safety Plan Compliance Document (SPCD).

The Safety Plan Compliance Document (SPCD) details how the contractor will comply with the CSPP. Also, it will not be possible to determine all safety plan details (for example specific hazard equipment and lighting, contractor's points of contact, construction equipment heights) during the development of the CSPP. The successful contractor must define such details by preparing an SPCD that the airport operator reviews for approval prior to issuance of a notice-to-proceed. The SPCD is a subset of the CSPP, similar to how a shop drawing review is a subset to the technical specifications.

1.3.3 Assume Responsibility for the CSPP.

The airport operator is responsible for establishing and enforcing the CSPP. The airport operator may use the services of an engineering consultant to help develop the CSPP. However, writing the CSPP cannot be delegated to the construction contractor. Only those details the airport operator determines cannot be addressed before contract award are developed by the contractor and submitted for approval as the SPCD. The SPCD does not restate nor propose differences to provisions already addressed in the CSPP.

1.4 **Who Is Responsible for Safety During Construction?**

1.4.1 Establish a Safety Culture.

Everyone has a role in operational safety on airports during construction: the airport operator, the airport's consultants, the construction contractor and subcontractors, airport users, airport tenants, ARFF personnel, Air Traffic personnel, including Technical Operations personnel, FAA Airports Division personnel, and others, such as military personnel at any airport supporting military operations (e.g. national guard or a joint use facility). Close communication and coordination between all affected parties is the key to maintaining safe operations. Such communication and coordination should start at the project scoping meeting and continue through the completion of the project. The airport operator and contractor should conduct onsite safety inspections throughout the project and immediately remedy any deficiencies, whether caused by negligence, oversight, or project scope change.

1.4.2 Assess Airport Operator's Responsibilities.

An airport operator has overall responsibility for all activities on an airport, including construction. This includes the predesign, design, preconstruction, construction, and inspection phases. Additional information on the responsibilities listed below can be found throughout this AC. The airport operator must:

- 1.4.2.1 Develop a CSPP that complies with the safety guidelines of Chapter 2, Construction Safety and Phasing Plans, and Chapter 3, Guidelines for Writing a CSPP. The airport operator may develop the CSPP internally or have a consultant develop the CSPP for approval by the airport operator. For tenant sponsored projects, approve a CSPP developed by the tenant or its consultant.
- 1.4.2.2 Require, review and approve the SPCD by the contractor that indicates how it will comply with the CSPP and provides details that cannot be determined before contract award.
- 1.4.2.3 Convene a preconstruction meeting with the construction contractor, consultant, airport employees and, if appropriate, tenant sponsor and other tenants to review and discuss project safety before beginning construction activity. The appropriate FAA representatives should be invited to attend the meeting. See AC 150/5370-12, Quality Management for Federally Funded Airport Construction Projects. (Note “FAA” refers to the Airports Regional or District Office, the Air Traffic Organization, Flight Standards Service, and other offices that support airport operations, flight regulations, and construction/environmental policies.)
- 1.4.2.4 Ensure contact information is accurate for each representative/point of contact identified in the CSPP and SPCD.
- 1.4.2.5 Hold weekly or, if necessary, daily safety meetings with all affected parties to coordinate activities.
- 1.4.2.6 Notify users, ARFF personnel, and FAA ATO personnel of construction and conditions that may adversely affect the operational safety of the airport via Notices to Airmen (NOTAM) and other methods, as appropriate. Convene a meeting for review and discussion if necessary.
- 1.4.2.7 Ensure construction personnel know applicable airport procedures and changes to those procedures that may affect their work.
- 1.4.2.8 Ensure that all temporary construction signs are located per the scheduled list for each phase of the project.
- 1.4.2.9 Ensure construction contractors and subcontractors undergo training required by the CSPP and SPCD.
- 1.4.2.10 Ensure vehicle and pedestrian operations addressed in the CSPP and SPCD are coordinated with airport tenants, the airport traffic control tower (ATCT), and construction contractors.
- 1.4.2.11 At certificated airports, ensure each CSPP and SPCD is consistent with Part 139.

- 1.4.2.12 Conduct inspections sufficiently frequently to ensure construction contractors and tenants comply with the CSPP and SPCD and that there are no altered construction activities that could create potential safety hazards.
 - 1.4.2.13 Take immediate action to resolve safety deficiencies.
 - 1.4.2.14 At airports subject to 49 CFR Part 1542, *Airport Security*, ensure construction access complies with the security requirements of that regulation.
 - 1.4.2.15 Notify appropriate parties when conditions exist that invoke provisions of the CSPP and SPCD (for example, implementation of low-visibility operations).
 - 1.4.2.16 Ensure prompt submittal of a Notice of Proposed Construction or Alteration (Form 7460-1) for conducting an aeronautical study of potential obstructions such as tall equipment (cranes, concrete pumps, other), stock piles, and haul routes. A separate form may be filed for each potential obstruction, or one form may be filed describing the entire construction area and maximum equipment height. In the latter case, a separate form must be filed for any object beyond or higher than the originally evaluated area/height. The FAA encourages online submittal of forms for expediency at <https://oeaaa.faa.gov/oeaaa/external/portal.jsp>. The appropriate FAA Airports Regional or District Office can provide assistance in determining which objects require an aeronautical study.
 - 1.4.2.17 Ensure prompt transmission of the Airport Sponsor Strategic Event Submission, FAA Form 6000-26, located at https://oeaaa.faa.gov/oeaaa/external/content/AIRPORT_SPONSOR_STRATEGIC_EVENT_SUBMISSION_FORM.pdf, to assure proper coordination for NAS Strategic Interruption per Service Level Agreement with ATO.
 - 1.4.2.18 Promptly notify the FAA Airports Regional or District Office of any proposed changes to the CSPP prior to implementation of the change. Changes to the CSPP require review and approval by the airport operator and the FAA. The FAA Airports Regional or District office will determine if further coordination within the FAA is needed. Coordinate with appropriate local and other federal government agencies, such as Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), Transportation Security Administration (TSA), and the state environmental agency.
- 1.4.3 Define Construction Contractor's Responsibilities.
- The contractor is responsible for complying with the CSPP and SPCD. The contractor must:

- 1.4.3.1 Submit a Safety Plan Compliance Document (SPCD) to the airport operator describing how it will comply with the requirements of the CSPP and supply any details that could not be determined before contract award. The SPCD must include a certification statement by the contractor, indicating an understanding of the operational safety requirements of the CSPP and the assertion of compliance with the approved CSPP and SPCD unless written approval is granted by the airport operator. Any construction practice proposed by the contractor that does not conform to the CSPP and SPCD may impact the airport's operational safety and will require a revision to the CSPP and SPCD and re-coordination with the airport operator and the FAA in advance.
- 1.4.3.2 Have available at all times copies of the CSPP and SPCD for reference by the airport operator and its representatives, and by subcontractors and contractor employees.
- 1.4.3.3 Ensure that construction personnel are familiar with safety procedures and regulations on the airport. 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. Many projects will require 24-hour coverage.
- 1.4.3.4 Identify in the SPCD the contractor's on-site employees responsible for monitoring compliance with the CSPP and SPCD during construction. At least one of these employees must be on-site when active construction is taking place.
- 1.4.3.5 Conduct sufficient inspections to ensure construction personnel comply with the CSPP and SPCD and that there are no altered construction activities that could create potential safety hazards.
- 1.4.3.6 Restrict movement of construction vehicles and personnel to permitted construction areas by flagging, barricading, erecting temporary fencing, or providing escorts, as appropriate, and as specified in the CSPP and SPCD.
- 1.4.3.7 Ensure that no contractor employees, employees of subcontractors or suppliers, or other persons enter any part of the air operations area (AOA) from the construction site unless authorized.
- 1.4.3.8 Ensure prompt submittal through the airport operator of Form 7460-1 for the purpose of conducting an aeronautical study of contractor equipment such as tall equipment (cranes, concrete pumps, and other equipment), stock piles, and haul routes when different from cases previously filed by the airport operator. The FAA encourages online submittal of forms for expediency at <https://oeaaa.faa.gov/oeaaa/external/portal.jsp>.

- 1.4.3.9 Ensure that all necessary safety mitigations are understood by all parties involved, and any special requirements of each construction phase will be fulfilled per the approved timeframe.
- 1.4.3.10 Participate in pre-construction meetings to review construction limits, safety mitigations, NOTAMs, and understand all special airport operational needs during each phase of the project.

1.4.4 Define Tenant's Responsibilities.

If planning construction activities on leased property, Airport tenants, such as airline operators, fixed base operators, and FAA ATO/Technical Operations sponsoring construction are strongly encouraged to:

1. Develop, or have a consultant develop, a project specific CSPP and submit it to the airport operator. The airport operator may forgo a complete CSPP submittal and instead incorporate appropriate operational safety principles and measures addressed in the advisory circular within their tenant lease agreements.
2. In coordination with its contractor, develop an SPCD and submit it to the airport operator for approval issued prior to issuance of a Notice to Proceed.
3. Ensure that construction personnel are familiar with safety procedures and regulations on the airport during all phases of the construction.
4. Provide a point of contact of who will coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport.
5. Identify in the SPCD the contractor's on-site employees responsible for monitoring compliance with the CSPP and SPCD during construction. At least one of these employees must be on-site when active construction is taking place.
6. Ensure that no tenant or contractor employees, employees of subcontractors or suppliers, or any other persons enter any part of the AOA from the construction site unless authorized.
7. Restrict movement of construction vehicles to construction areas by flagging and barricading, erecting temporary fencing, or providing escorts, as appropriate, as specified in the CSPP and SPCD.
8. Ensure prompt submittal through the airport operator of Form 7460-1 for conducting an aeronautical study of contractor equipment such as tall equipment (cranes, concrete pumps, other), stock piles, and haul routes. The FAA encourages online submittal of forms for expediency at <https://oeaaa.faa.gov/oeaaa/external/portal.jsp>.
9. Participate in pre-construction meetings to review construction limits, safety mitigations, NOTAMs, and understand all special airport operational needs during each phase of the project.

CHAPTER 2. CONSTRUCTION SAFETY AND PHASING PLANS

2.1 Overview.

Aviation safety is the primary consideration at airports, especially during construction. The airport operator's CSPP and the contractor's Safety Plan Compliance Document (SPCD) are the primary tools to ensure safety compliance when coordinating construction activities with airport operations. These documents identify all aspects of the construction project that pose a potential safety hazard to airport operations and outline respective mitigation procedures for each hazard. They must provide information necessary for the Airport Operations department to conduct airfield inspections and expeditiously identify and correct unsafe conditions during construction. All aviation safety provisions included within the project drawings, contract specifications, and other related documents must also be reflected in the CSPP and SPCD.

2.2 Assume Responsibility.

Operational safety on the airport remains the airport operator's responsibility at all times. The airport operator must develop, certify, and submit for FAA approval each CSPP. It is the airport operator's responsibility to apply the requirements of the FAA approved CSPP. The airport operator must revise the CSPP when conditions warrant changes and must submit the revised CSPP to the FAA for approval. The airport operator must also require and approve a SPCD from the project contractor.

2.3 Submit the CSPP.

Construction Safety and Phasing Plans should be developed concurrently with the project design. Milestone versions of the CSPP should be submitted for review and approval as follows. While these milestones are not mandatory, early submission will help to avoid delays. Submittals are preferred in 8.5×11 inch or 11×17 inch format for compatibility with the FAA's Obstruction Evaluation / Airport Airspace Analysis (OE / AAA) process.

2.3.1 Submit an Outline/Draft.

By the time approximately 25% to 30% of the project design is completed, the principal elements of the CSPP should be established. Airport operators are encouraged to submit an outline or draft, detailing all CSPP provisions developed to date, to the FAA for review at this stage of the project design.

2.3.2 Submit a CSPP.

The CSPP should be formally submitted for FAA approval when the project design is 80 percent to 90 percent complete. Since provisions in the CSPP will influence contract costs, it is important to obtain FAA approval in time to include all such provisions in the procurement contract.

2.3.3 Submit an SPCD.

The contractor should submit the SPCD to the airport operator for approval to be issued prior to the Notice to Proceed.

2.3.4 Submit CSPP Revisions.

All revisions to a previously approved CSPP must be re-submitted to the FAA for review and approval/disapproval action.

2.4 **Meet CSPP Requirements.**

2.4.1 To the extent possible, the CSPP should address the following as outlined in Chapter 3, Guidelines for Writing a CSPP. Details that cannot be determined at this stage are to be included in the SPCD.

1. Coordination.
 - a. Contractor progress meetings.
 - b. Scope or schedule changes.
 - c. FAA ATO coordination.
2. Phasing.
 - a. Phase elements.
 - b. Construction safety drawings.
3. Areas and operations affected by the construction activity.
 - a. Identification of affected areas.
 - b. Mitigation of effects.
4. Protection of navigation aids (NAVAIDs).
5. Contractor access.
 - a. Location of stockpiled construction materials.
 - b. Vehicle and pedestrian operations.
6. Wildlife management.
 - a. Trash.
 - b. Standing water.
 - c. Tall grass and seeds.
 - d. Poorly maintained fencing and gates.
 - e. Disruption of existing wildlife habitat.
7. Foreign Object Debris (FOD) management.
8. Hazardous materials (HAZMAT) management.
9. Notification of construction activities.

- a. Maintenance of a list of responsible representatives/ points of contact.
 - b. NOTAM.
 - c. Emergency notification procedures.
 - d. Coordination with ARFF Personnel.
 - e. Notification to the FAA.
10. Inspection requirements.
- a. Daily (or more frequent) inspections.
 - b. Final inspections.
11. Underground utilities.
12. Penalties.
13. Special conditions.
14. Runway and taxiway visual aids. Marking, lighting, signs, and visual NAVAIDs.
- a. General.
 - b. Markings.
 - c. Lighting and visual NAVAIDs.
 - d. Signs, temporary, including orange construction signs, and permanent signs.
15. Marking and signs for access routes.
16. Hazard marking and lighting.
- a. Purpose.
 - b. Equipment.
17. Work zone lighting for nighttime construction (if applicable).
18. Protection of runway and taxiway safety areas, object free areas, obstacle free zones, and approach/departure surfaces.
- a. Runway Safety Area (RSA).
 - b. Runway Object Free Area (ROFA).
 - c. Taxiway Safety Area (TSA). Provide details for any adjustments to Taxiway Safety Area width to allow continued operation of smaller aircraft. See paragraph 2.22.3.
 - d. Taxiway Object Free Area (TOFA). Provide details for any continued aircraft operations while construction occurs within the TOFA. See paragraph 2.22.4.
 - e. Obstacle Free Zone (OFZ).
 - f. Runway approach/departure surfaces.
19. Other limitations on construction.
- a. Prohibitions.

b. Restrictions.

2.4.2 The Safety Plan Compliance Document (SPCD) should include a general statement by the construction contractor that he/she has read and will abide by the CSPP. In addition, the SPCD must include all supplemental information that could not be included in the CSPP prior to the contract award. The contractor statement should include the name of the contractor, the title of the project CSPP, the approval date of the CSPP, and a reference to any supplemental information (that is, “I, (Name of Contractor), have read the (Title of Project) CSPP, approved on (Date), and will abide by it as written and with the following additions as noted:”). The supplemental information in the SPCD should be written to match the format of the CSPP indicating each subject by corresponding CSPP subject number and title. If no supplemental information is necessary for any specific subject, the statement, “No supplemental information,” should be written after the corresponding subject title. The SPCD should not duplicate information in the CSPP:

1. Coordination. Discuss details of proposed safety meetings with the airport operator and with contractor employees and subcontractors.
2. Phasing. Discuss proposed construction schedule elements, including:
 - a. Duration of each phase.
 - b. Daily start and finish of construction, including “night only” construction.
 - c. Duration of construction activities during:
 - i. Normal runway operations.
 - ii. Closed runway operations.
 - iii. Modified runway “Aircraft Reference Code” usage.
3. Areas and operations affected by the construction activity. These areas and operations should be identified in the CSPP and should not require an entry in the SPCD.
4. Protection of NAVAIDs. Discuss specific methods proposed to protect operating NAVAIDs.
5. Contractor access. Provide the following:
 - a. Details on how the contractor will maintain the integrity of the airport security fence (gate guards, daily log of construction personnel, and other).
 - b. Listing of individuals requiring driver training (for certificated airports and as requested).
 - c. Radio communications.
 - i. Types of radios and backup capabilities.
 - ii. Who will be monitoring radios.
 - iii. Who to contact if the ATCT cannot reach the contractor’s designated person by radio.

- d. Details on how the contractor will escort material delivery vehicles.
- 6. Wildlife management. Discuss the following:
 - a. Methods and procedures to prevent wildlife attraction.
 - b. Wildlife reporting procedures.
- 7. Foreign Object Debris (FOD) management. Discuss equipment and methods for control of FOD, including construction debris and dust.
- 8. Hazardous Materials (HAZMAT) management. Discuss equipment and methods for responding to hazardous spills.
- 9. Notification of construction activities. Provide the following:
 - a. Contractor points of contact.
 - b. Contractor emergency contact.
 - c. Listing of tall or other requested equipment proposed for use on the airport and the timeframe for submitting 7460-1 forms not previously submitted by the airport operator.
 - d. Batch plant details, including 7460-1 submittal.
- 10. Inspection requirements. Discuss daily (or more frequent) inspections and special inspection procedures.
- 11. Underground utilities. Discuss proposed methods of identifying and protecting underground utilities.
- 12. Penalties. Penalties should be identified in the CSPP and should not require an entry in the SPCD.
- 13. Special conditions. Discuss proposed actions for each special condition identified in the CSPP.
- 14. Runway and taxiway visual aids. Including marking, lighting, signs, and visual NAVAIDs. Discuss proposed visual aids including the following:
 - a. Equipment and methods for covering signage and airfield lights.
 - b. Equipment and methods for temporary closure markings (paint, fabric, other).
 - c. Temporary orange construction signs.
 - d. Types of temporary Visual Guidance Slope Indicators (VGSI).
- 15. Marking and signs for access routes. Discuss proposed methods of demarcating access routes for vehicle drivers.
- 16. Hazard marking and lighting. Discuss proposed equipment and methods for identifying excavation areas.
- 17. Work zone lighting for nighttime construction (if applicable). Discuss proposed equipment, locations, aiming, and shielding to prevent interference with air traffic control and aircraft operations.

18. Protection of runway and taxiway safety areas, object free areas, obstacle free zones, and approach/departure surfaces. Discuss proposed methods of identifying, demarcating, and protecting airport surfaces including:
 - a. Equipment and methods for maintaining Taxiway Safety Area standards.
 - b. Equipment and methods to ensure the safe passage of aircraft where Taxiway Safety Area or Taxiway Object Free Area standards cannot be maintained.
 - c. Equipment and methods for separation of construction operations from aircraft operations, including details of barricades.
19. Other limitations on construction should be identified in the CSPP and should not require an entry in the SPCD.

2.5 **Coordination.**

Airport operators, or tenants responsible for design, bidding and conducting construction on their leased properties, should ensure at all project developmental stages, such as predesign, prebid, and preconstruction conferences, they capture the subject of airport operational safety during construction (see AC 150/5370-12, *Quality Management for Federally Funded Airport Construction Projects*). In addition, the following should be coordinated as required:

2.5.1 Progress Meetings.

Operational safety should be a standing agenda item for discussion during progress meetings throughout the project developmental stages.

2.5.2 Scope or Schedule Changes.

Changes in the scope or duration at any of the project stages may require revisions to the CSPP and review and approval by the airport operator and the FAA (see paragraph 1.4.2.17).

2.5.3 FAA ATO Coordination.

Early coordination with FAA ATO is highly recommended during the design phase and is required for scheduling Technical Operations shutdowns prior to construction. Coordination is critical to restarts of NAVAID services and to the establishment of any special procedures for the movement of aircraft. Formal agreements between the airport operator and appropriate FAA offices are recommended. All relocation or adjustments to NAVAIDs, or changes to final grades in critical areas, should be coordinated with FAA ATO and may require an FAA flight inspection prior to restarting the facility. Flight inspections must be coordinated and scheduled well in advance of the intended facility restart. Flight inspections may require a reimbursable agreement between the airport operator and FAA ATO. Reimbursable agreements should be coordinated a minimum of 12 months prior to the start of construction. (See paragraph 2.13.5.3.2 for required FAA notification regarding FAA-owned NAVAIDs.)

2.6 **Phasing.**

Once it has been determined what types and levels of airport operations will be maintained, the most efficient sequence of construction may not be feasible. In this case, the sequence of construction may be phased to gain maximum efficiency while allowing for the required operations. The development of the resulting construction phases should be coordinated with local Air Traffic personnel and airport users. The sequenced construction phases established in the CSPP must be incorporated into the project design and must be reflected in the contract drawings and specifications.

2.6.1 Phase Elements.

For each phase the CSPP should detail:

- Areas closed to aircraft operations.
- Duration of closures.
- Taxi routes and/or areas of reduced TSA and TOFA to reflect reduced ADG use.
- ARFF access routes.
- Construction staging, disposal, and cleanout areas.
- Construction access and haul routes.
- Impacts to NAVAIDs.
- Lighting, marking, and signing changes.
- Available runway length and/or reduced RSA and ROFA to reflect reduced ADG use.
- Declared distances (if applicable).
- Required hazard marking, lighting, and signing.
- Work zone lighting for nighttime construction (if applicable).
- Lead times for required notifications.

2.6.2 Construction Safety Drawings.

Drawings specifically indicating operational safety procedures and methods in affected areas (i.e., construction safety drawings) should be developed for each construction phase. Such drawings should be included in the CSPP as referenced attachments and should also be included in the contract drawing package.

2.7 **Areas and Operations Affected by Construction Activity.**

Runways and taxiways should remain in use by aircraft to the maximum extent possible without compromising safety. Pre-meetings with the FAA ATO will support operational simulations. See Appendix E for an example of a table showing temporary operations versus current operations. The tables in Appendix E can be useful for coordination among all interested parties, including FAA Lines of Business.

2.7.1 Identification of Affected Areas.

Identifying areas and operations affected by the construction helps to determine possible safety problems. The affected areas should be identified in the construction safety drawings for each construction phase. (See paragraph 2.6.2.) Of particular concern are:

2.7.1.1 **Closing, or Partial Closing, of Runways, Taxiways and Aprons, and Displaced Thresholds.**

When a runway is partially closed, a portion of the pavement is unavailable for any aircraft operation, meaning taxiing, landing, or takeoff in either direction on that pavement is prohibited. A displaced threshold, by contrast, is established to ensure obstacle clearance and adequate safety area for landing aircraft. The pavement prior to the displaced threshold is normally available for take-off in the direction of the displacement and for landing and takeoff in the opposite direction. Misunderstanding this difference, may result in issuance of an inaccurate NOTAM, and can lead to a hazardous condition.

2.7.1.1.1 Partially Closed Runways.

The temporarily closed portion of a partially closed runway will generally extend from the threshold to a taxiway that may be used for entering and exiting the runway. If the closed portion extends to a point between taxiways, pilots will have to back-taxi on the runway, which is an undesirable operation. See Figure 2-1 for a desirable configuration.

2.7.1.1.2 Displaced Thresholds.

Since the portion of the runway pavement between the permanent threshold and a standard displaced threshold is available for takeoff and for landing in the opposite direction, the temporary displaced threshold need not be located at an entrance/exit taxiway. See Figure 2-2.

2.7.1.2 Closing of aircraft rescue and fire fighting access routes.

2.7.1.3 Closing of access routes used by airport and airline support vehicles.

2.7.1.4 Interruption of utilities, including water supplies for fire fighting.

2.7.1.5 Approach/departure surfaces affected by heights of objects.

2.7.1.6 Construction areas, storage areas, and access routes near runways, taxiways, aprons, or helipads.

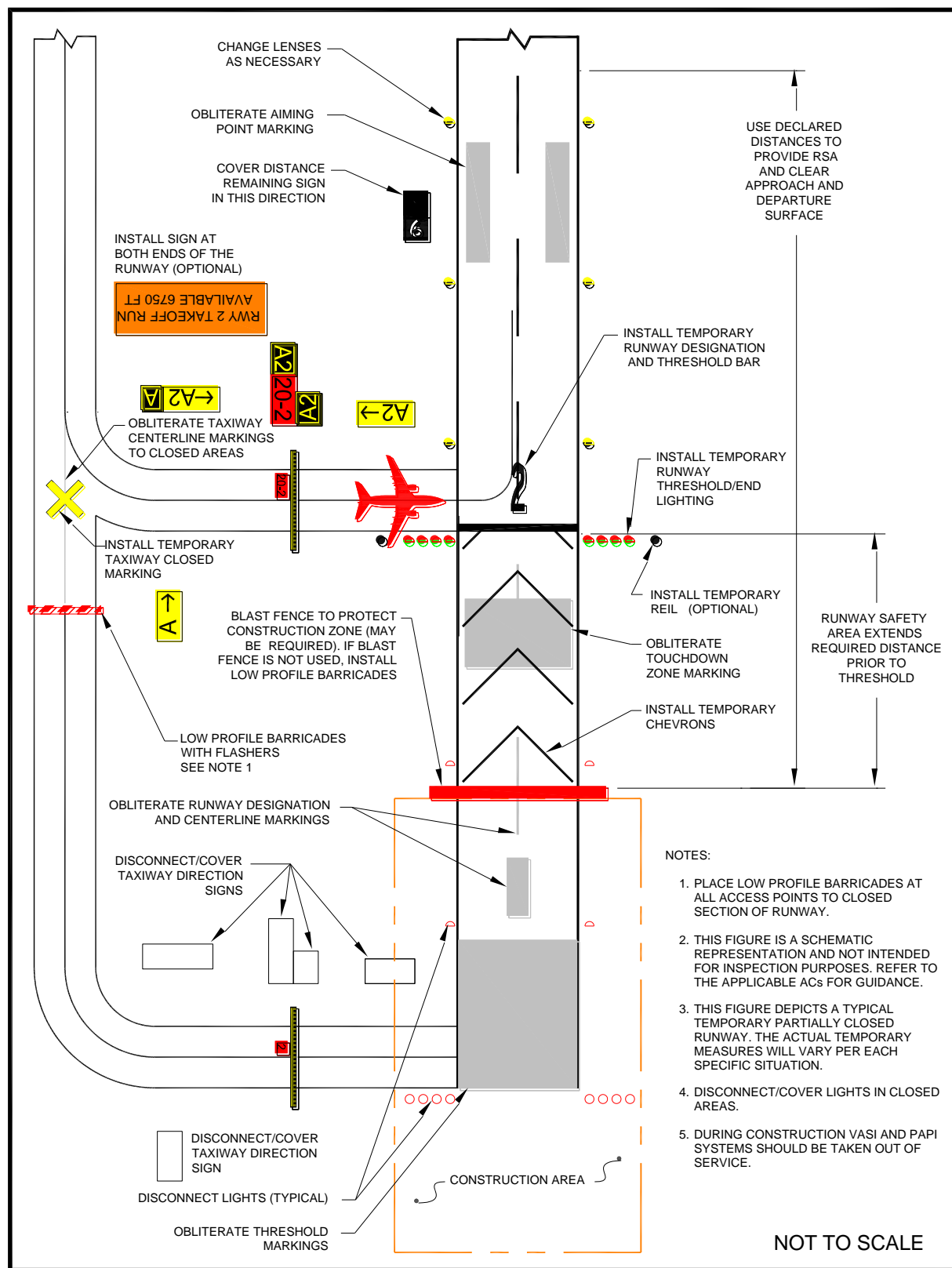
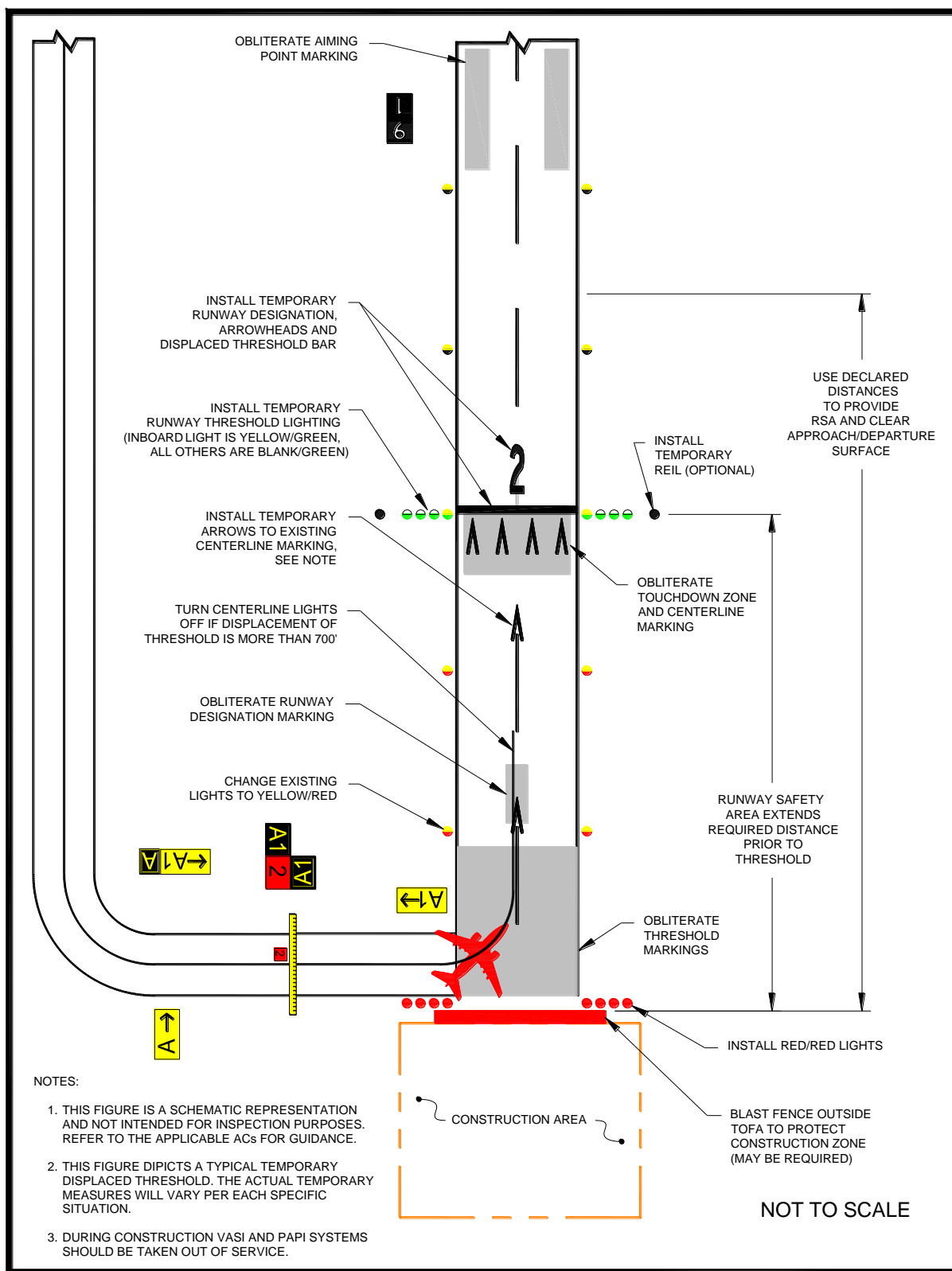
Figure 2-1. Temporary Partially Closed Runway

Figure 2-2. Temporary Displaced Threshold

Note: See paragraph 2.18.2.5.

2.7.2 Mitigation of Effects.

Establishment of specific procedures is necessary to maintain the safety and efficiency of airport operations. The CSPP must address:

- 2.7.2.1 Temporary changes to runway and/or taxi operations.
- 2.7.2.2 Detours for ARFF and other airport vehicles.
- 2.7.2.3 Maintenance of essential utilities.
- 2.7.2.4 Temporary changes to air traffic control procedures. Such changes must be coordinated with the ATO.

2.8 **Navigation Aid (NAVAID) Protection.**

Before commencing construction activity, parking vehicles, or storing construction equipment and materials near a NAVAID, coordinate with the appropriate FAA ATO/Technical Operations office to evaluate the effect of construction activity and the required distance and direction from the NAVAID. (See paragraph 2.13.5.3.) Construction activities, materials/equipment storage, and vehicle parking near electronic NAVAIDs require special consideration since they may interfere with signals essential to air navigation. If any NAVAID may be affected, the CSPP and SPCD must show an understanding of the “critical area” associated with each NAVAID and describe how it will be protected. Where applicable, the operational critical areas of NAVAIDs should be graphically delineated on the project drawings. 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 equipment and activities may require NAVAID shutdown or adjustment of instrument approach minimums for low visibility operations. This condition requires that a NOTAM be filed (see paragraph 2.13.2.). Construction activities and materials/equipment storage near a NAVAID must not obstruct access to the equipment and instruments for maintenance. Submittal of a 7460-1 form is required for construction vehicles operating near FAA NAVAIDs. (See paragraph 2.13.5.3.)

2.9 **Contractor Access.**

The CSPP must detail the areas to which the contractor must have access, and explain how contractor personnel will access those areas. Specifically address:

2.9.1 Location of Stockpiled Construction Materials.

Stockpiled materials and equipment storage are not permitted within the RSA and OFZ, and if possible should not be permitted within the Object Free Area (OFA) of an operational runway. Stockpiling material in the OFA requires submittal of a 7460-1 form and justification provided to the appropriate FAA Airports Regional or District Office for approval. 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. (See paragraph 2.18.2.) This includes determining and

verifying that materials are stabilized and stored at an approved location so as not to be a hazard to aircraft operations and to prevent attraction of wildlife and foreign object damage from blowing or tracked material. See paragraphs 2.10 and 2.11.

2.9.2 Vehicle and Pedestrian Operations.

The CSPP should include specific vehicle and pedestrian requirements. 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. The airport operator should coordinate requirements for vehicle operations with airport tenants, contractors, and the FAA air traffic manager. In regard to vehicle and pedestrian operations, the CSPP should include the following, with associated training requirements:

2.9.2.1 **Construction Site Parking.**

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

2.9.2.2 **Construction Equipment Parking.**

Contractor employees must park and service all construction vehicles in an area designated by the airport operator outside the OFZ and never in the safety area of an active runway or taxiway. Unless a complex setup procedure makes movement of specialized equipment infeasible, inactive equipment must not be parked on a closed taxiway or runway. If it is necessary to leave specialized equipment on a closed taxiway or runway at night, the equipment must be well lighted. Employees should also park construction vehicles outside the OFA when not in use by construction personnel (for example, 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 navigation aids. The FAA must also study those areas to determine effects on airport design criteria, surfaces established by 14 CFR Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace (Part 77), and on NAVAIDs and Instrument Approach Procedures (IAP). See paragraph 2.13.1 for further information.

2.9.2.3 **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. Access routes used by contractor vehicles must be clearly marked to prevent inadvertent entry to areas open to airport operations. Pay special attention to ensure that if construction traffic is to share or cross any ARFF routes that ARFF right of way is not impeded at any time, and that construction traffic on haul

roads does not interfere with NAVAIDs or approach surfaces of operational runways. Address whether access gates will be blocked or inoperative or if a rally point will be blocked or inaccessible.

- 2.9.2.4 Marking and lighting of vehicles in accordance with AC 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport*.
- 2.9.2.5 Description of proper vehicle operations on various areas under normal, lost communications, and emergency conditions.
- 2.9.2.6 Required escorts.
- 2.9.2.7 **Training Requirements for Vehicle Drivers to Ensure Compliance with the Airport Operator's Vehicle Rules and Regulations.**

Specific training should be provided to vehicle operators, including those providing escorts. See AC 150/5210-20, *Ground Vehicle Operations on Airports*, for information on training and records maintenance requirements.
- 2.9.2.8 **Situational Awareness.**

Vehicle drivers must confirm by personal observation that no aircraft is approaching their position (either in the air or on the ground) when given clearance to cross a runway, taxiway, or any other area open to airport operations. In addition, it is the responsibility of the escort vehicle driver to verify the movement/position of all escorted vehicles at any given time. At non-towered airports, all aircraft movements and flight operations rely on aircraft operators to self-report their positions and intentions. However, there is no requirement for an aircraft to have radio communications. Because aircraft do not always broadcast their positions or intentions, visual checking, radio monitoring, and situational awareness of the surroundings is critical to safety.
- 2.9.2.9 **Two-Way Radio Communication Procedures.**
- 2.9.2.9.1 General.

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 ATCT. When operating vehicles on or near open runways or taxiways, construction personnel must understand the critical importance of maintaining radio contact, as directed by the airport operator, with:

 1. Airport operations
 2. ATCT

3. Common Traffic Advisory Frequency (CTAF), which may include UNICOM, MULTICOM.
4. Automatic Terminal Information Service (ATIS). This frequency is useful for monitoring conditions on the airport. Local air traffic will broadcast information regarding construction related runway closures and “shortened” runways on the ATIS frequency.

2.9.2.9.2 Areas Requiring Two-Way Radio Communication with the ATCT.

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.

2.9.2.9.3 Frequencies to be Used.

The airport operator will specify the frequencies to be used by the contractor, which may include the CTAF for monitoring of aircraft operations. Frequencies may also be assigned by the airport operator for other communications, including any radio frequency in compliance with Federal Communications Commission requirements. At airports with an ATCT, the airport operator will specify the frequency assigned by the ATCT to be used between contractor vehicles and the ATCT.

2.9.2.9.4 Proper radio usage, including read back requirements.

2.9.2.9.5 Proper phraseology, including the International Phonetic Alphabet.

2.9.2.9.6 Light Gun Signals.

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 downloaded through the Runway Safety Program Web site at http://www.faa.gov/airports/runway_safety/publications/ (see “Signs & Markings Vehicle Dashboard Sticker”) or obtained from the FAA Airports Regional Office.

2.9.2.10 **Maintenance of the secured area of the airport, including:**

2.9.2.10.1 Fencing and Gates.

Airport operators and contractors must take care to maintain 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 unauthorized people. 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.

2.9.2.10.2 Badging 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.

2.10 **Wildlife Management.**

The CSPP and SPCD must be in accordance with the airport operator's wildlife hazard management plan, if applicable. See AC 150/5200-33, *Hazardous Wildlife Attractants On or Near Airports*, and CertAlert 98-05, *Grasses Attractive to Hazardous Wildlife*. Construction contractors must carefully control and continuously remove waste or loose materials that might attract wildlife. Contractor personnel must be aware of and avoid construction activities that can create wildlife hazards on airports, such as:

2.10.1 Trash.

Food scraps must be collected from construction personnel activity.

2.10.2 Standing Water.

2.10.3 Tall Grass and Seeds.

Requirements for turf establishment can be at odds with requirements for wildlife control. Grass seed is attractive to birds. Lower quality seed mixtures can contain seeds of plants (such as clover) that attract larger wildlife. Seeding should comply with the guidance in AC 150/5370-10, *Standards for Specifying Construction of Airports*, Item T-901, Seeding. Contact the local office of the United States Department of Agriculture Soil Conservation Service or the State University Agricultural Extension Service (County Agent or equivalent) for assistance and recommendations. These agencies can also provide liming and fertilizer recommendations.

2.10.4 Poorly Maintained Fencing and Gates.

See paragraph 2.9.2.10.1.

2.10.5 Disruption of Existing Wildlife Habitat.

While this will frequently be unavoidable due to the nature of the project, the CSPP should specify under what circumstances (location, wildlife type) contractor personnel should immediately notify the airport operator of wildlife sightings.

2.11 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 capable of creating FOD must be continuously removed during the construction project. Fencing (other than security fencing) or covers may be necessary to contain material that can be carried by wind into areas where aircraft operate. See AC 150/5210-24, *Foreign Object Debris (FOD) Management*.

2.12 Hazardous Materials (HAZMAT) Management.

Contractors operating construction vehicles and equipment on the airport must be prepared to expeditiously contain and clean-up spills resulting from fuel or hydraulic fluid leaks. Transport and handling of other hazardous materials on an airport also requires special procedures. See AC 150/5320-15, *Management of Airport Industrial Waste*.

2.13 Notification of Construction Activities.

The CSPP and SPCD must detail procedures for the immediate notification of airport users and the FAA of any conditions adversely affecting the operational safety of the airport. It must address the notification actions described below, as applicable.

2.13.1 List of Responsible Representatives/points of contact for all involved parties, and procedures for contacting each of them, including after hours.

2.13.2 NOTAMs.

Only the airport operator may initiate or cancel NOTAMs on airport conditions, and is the only entity that can close or open a runway. 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), and must either enter the NOTAM into NOTAM Manager, or provide information on closed or hazardous conditions on airport movement areas to the FAA Flight Service Station (FSS) so it can issue a NOTAM. The airport operator must file and maintain a list of authorized representatives with the FSS. Refer to AC 150/5200-28, *Notices to Airmen (NOTAMs) for Airport Operators*, for a sample NOTAM form. Only the FAA may issue or cancel NOTAMs on shutdown or irregular operation of FAA owned facilities. Any person having reason to believe that a NOTAM is missing, incomplete, or inaccurate must notify the airport operator. See paragraph 2.7.1.1 about issuing NOTAMs for partially closed runways versus runways with displaced thresholds.

2.13.3 Emergency notification procedures for medical, fire fighting, and police response.

2.13.4 Coordination with ARFF.

The CSPP must detail procedures for coordinating through the airport sponsor with ARFF personnel, mutual aid providers, and other emergency services if construction requires:

1. The deactivation and subsequent reactivation of water lines or fire hydrants, or
2. The rerouting, blocking and restoration of emergency access routes, or
3. The use of hazardous materials on the airfield.

2.13.5 Notification to the FAA.

2.13.5.1 **Part 77.**

Any person proposing construction or alteration of objects that affect navigable airspace, as defined in Part 77, must notify the FAA. This includes construction equipment and proposed parking areas for this equipment (i.e., cranes, graders, other equipment) on airports. FAA Form 7460-1, *Notice of Proposed Construction or Alteration*, can be used for this purpose and submitted to the appropriate FAA Airports Regional or District Office. See Appendix A to download the form. Further guidance is available on the FAA web site at oeaaa.faa.gov.

2.13.5.2 **Part 157.**

With some exceptions, Title 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 Airports Regional or District Office. See Appendix A to download the form.

2.13.5.3 **NAVAIDs.**

For emergency (short-notice) notification about impacts to both airport owned and FAA owned NAVAIDs, contact: 866-432-2622.

2.13.5.3.1 Airport Owned/FAA Maintained.

If construction operations require a shutdown of 24 hours or greater in duration, or more than 4 hours daily on consecutive days, of a NAVAID owned by the airport but maintained by the FAA, provide a 45-day minimum notice to FAA ATO/Technical Operations prior to facility shutdown, using Strategic Event Coordination (SEC) Form 6000.26 contained within FAA Order 6000.15, *General Maintenance Handbook for National Airspace System (NAS) Facilities*.

2.13.5.3.2 FAA Owned.

1. The airport operator must notify the appropriate FAA ATO Service Area Planning and Requirements (P&R) Group a minimum of 45 days prior to implementing an event that causes impacts to NAVAIDs, using SEC Form 6000.26.
2. Coordinate work for an FAA owned NAVAID shutdown with the local FAA ATO/Technical Operations office, including any necessary reimbursable agreements and flight checks. Detail procedures that address unanticipated utility outages and cable cuts that could impact FAA NAVAIDs. Refer to active Service Level Agreement with ATO for specifics.

2.14 **Inspection Requirements.**

2.14.1 Daily Inspections.

Inspections should be conducted at least daily, but more frequently if necessary to ensure conformance with the CSPP. A sample checklist is provided in Appendix D, Construction Project Daily Safety Inspection Checklist. See also AC 150/5200-18, Airport Safety Self-Inspection. Airport operators holding a Part 139 certificate are required to conduct self-inspections during unusual conditions, such as construction activities, that may affect safe air carrier operations.

2.14.2 Interim Inspections.

Inspections should be conducted of all areas to be (re)opened to aircraft traffic to ensure the proper operation of lights and signs, for correct markings, and absence of FOD. The contractor should conduct an inspection of the work area with airport operations personnel. The contractor should ensure that all construction materials have been secured, all pavement surfaces have been swept clean, all transition ramps have been properly constructed, and that surfaces have been appropriately marked for aircraft to operate safely. Only if all items on the list meet with the airport operator's approval should the air traffic control tower be notified to open the area to aircraft operations. The contractor should be required to retain a suitable workforce and the necessary equipment at the work area for any last minute cleanup that may be requested by the airport operator prior to opening the area.

2.14.3 Final Inspections.

New runways and extended runway closures may require safety inspections at certificated airports prior to allowing air carrier service. Coordinate with the FAA Airport Certification Safety Inspector (ACSI) to determine if a final inspection will be necessary.

2.15 Underground Utilities.

The CSPP and/or SPCD must include procedures for locating and protecting existing underground utilities, cables, wires, pipelines, and other underground facilities in excavation areas. This may involve coordinating with public utilities and FAA ATO/Technical Operations. Note that “One Call” or “Miss Utility” services do not include FAA ATO/Technical Operations.

2.16 Penalties.

The CSPP should detail penalty provisions for noncompliance with airport rules and regulations and the safety plans (for example, if a vehicle is involved in a runway incursion). Such penalties typically include rescission of driving privileges or access to the AOA.

2.17 Special Conditions.

The CSPP must detail any special conditions that affect the operation of the airport and will require the activation of any special procedures (for example, low-visibility operations, snow removal, aircraft in distress, aircraft accident, security breach, Vehicle / Pedestrian Deviation (VPD) and other activities requiring construction suspension/resumption).

2.18 Runway and Taxiway Visual Aids.

This includes marking, lighting, signs, and visual NAVAIDs. The CSPP must ensure that areas where aircraft will be operating are clearly and visibly separated from construction areas, including closed runways. Throughout the duration of the construction project, verify that these areas remain clearly marked and visible at all times and that marking, lighting, signs, and visual NAVAIDs that are to continue to perform their functions during construction remain in place and operational. Visual NAVAIDs that are not serving their intended function during construction must be temporarily disabled, covered, or modified as necessary. The CSPP must address the following, as appropriate:

2.18.1 General.

Airport markings, lighting, signs, and visual NAVAIDs must be clearly visible to pilots, not misleading, confusing, or deceptive. All must be secured in place to prevent movement by prop wash, jet blast, wing vortices, and other wind currents and constructed of materials that will minimize damage to an aircraft in the event of inadvertent contact. Items used to secure such markings must be of a color similar to the marking.

2.18.2 Markings.

During the course of construction projects, temporary pavement markings are often required to allow for aircraft operations during or between work periods. During the design phase of the project, the designer should coordinate with the project manager,

airport operations, airport users, the FAA Airports project manager, and Airport Certification Safety Inspector for Part 139 airports to determine minimum temporary markings. The FAA Airports project manager will, wherever a runway is closed, coordinate with the appropriate FAA Flight Standards Office and disseminate findings to all parties. Where possible, the temporary markings on finish grade pavements should be placed to mirror the dimensions of the final markings. Markings must be in compliance with the standards of AC 150/5340-1, *Standards for Airport Markings*, except as noted herein. Runways and runway exit taxiways closed to aircraft operations are marked with a yellow X. The preferred visual aid to depict temporary runway closure is the lighted X signal placed on or near the runway designation numbers. (See paragraph 2.18.2.1.2.)

2.18.2.1 Closed Runways and Taxiways.

2.18.2.1.1 Permanently Closed Runways.

For runways, obliterate the threshold marking, runway designation marking, and touchdown zone markings, and place an X at each end and at 1,000-foot (300 m) intervals. For a multiple runway environment, if the lighted X on a designated number will be located in the RSA of an adjacent active runway, locate the lighted X farther down the closed runway to clear the RSA of the active runway. In addition, the closed runway numbers located in the RSA of an active runway must be marked with a flat yellow X.

2.18.2.1.2 Temporarily Closed Runways.

For runways that have been temporarily closed, place an X at each end of the runway directly on or as near as practicable to the runway designation numbers. For a multiple runway environment, if the lighted X on a designated number will be located in the RSA of an adjacent active runway, locate the lighted X farther down the closed runway to clear the RSA of the active runway. In addition, the closed runway numbers located in the RSA of an active runway must be marked with a flat yellow X. See Figure 2-3. See also paragraph 2.18.3.3.

2.18.2.1.3 Partially Closed Runways and Displaced Thresholds.

When threshold markings are needed to identify the temporary beginning of the runway that is available for landing, the markings must comply with AC 150/5340-1. An X is not used on a partially closed runway or a runway with a displaced threshold. See paragraph 2.7.1.1 for the difference between partially closed runways and runways with displaced thresholds. Because of the temporary nature of threshold displacement due to construction, it is not necessary to re-adjust the existing runway centerline markings to meet standard spacing for a runway with a visual approach. Some of the requirements below may be waived in the cases of low-activity airports and/or short duration changes that are measured in days rather than weeks. Consider whether the presence of an airport traffic

control tower allows for the development of special procedures. Contact the appropriate FAA Airports Regional or District Office for assistance.

Figure 2-3. Markings for a Temporarily Closed Runway

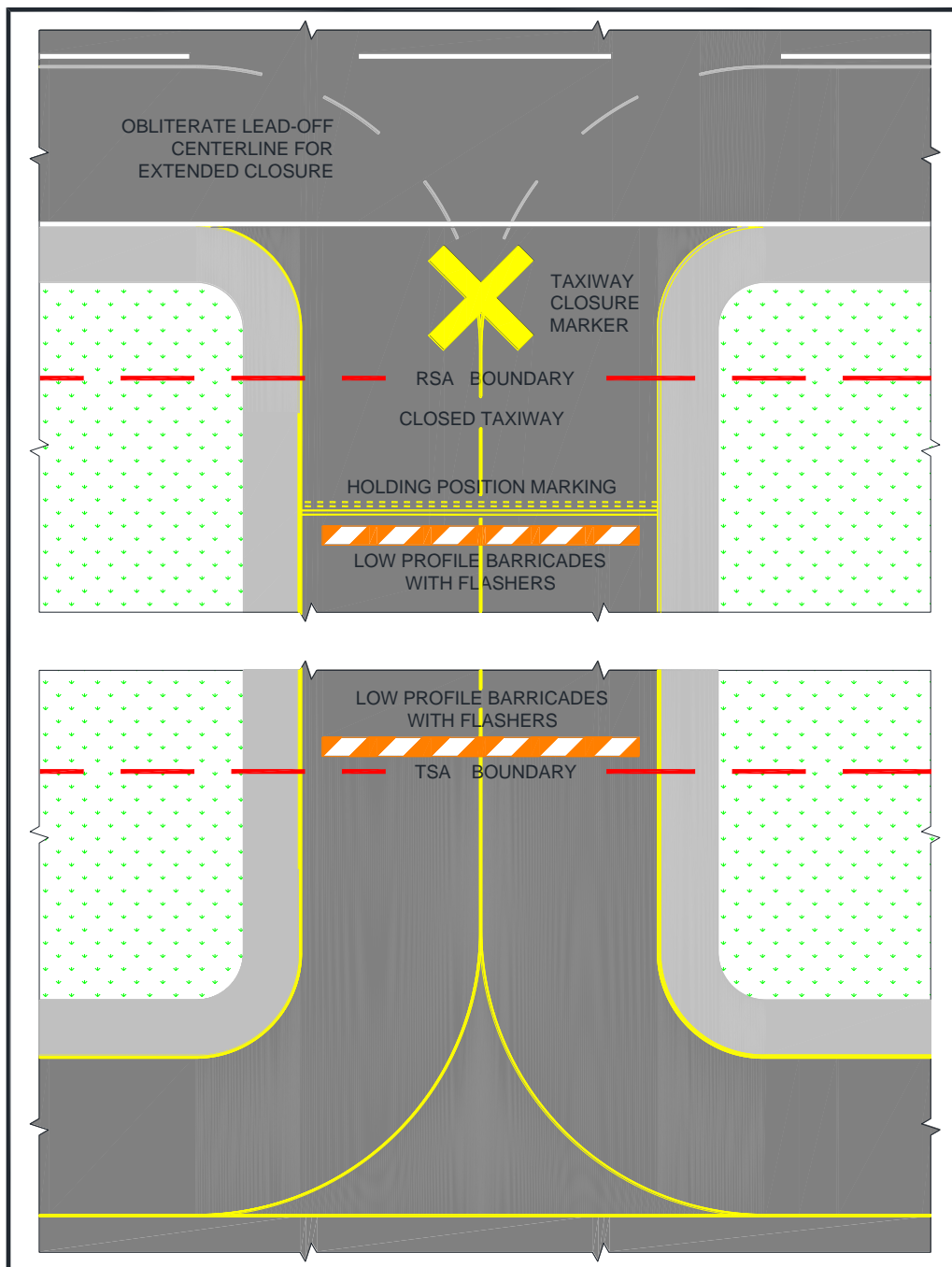


1. **Partially Closed Runways.** Pavement markings for temporary closed portions of the runway consist of a runway threshold bar, runway designation, and yellow chevrons to identify pavement areas that are unsuitable for takeoff or landing (see [AC 150/5340-1](#)). Obliterate or cover markings prior to the moved threshold. Existing touchdown zone markings beyond the moved threshold may remain in place. Obliterate aiming point markings. Issue appropriate NOTAMs regarding any nonstandard markings. See [Figure 2-4](#).
2. **Displaced Thresholds.** Pavement markings for a displaced threshold consist of a runway threshold bar, runway designation, and white arrowheads with and without arrow shafts. These markings are required to identify the portion of the runway before the displaced threshold to provide centerline guidance for pilots during approaches, takeoffs, and landing rollouts from the opposite direction. See [AC 150/5340-1](#). Obliterate markings prior to the displaced threshold. Existing touchdown zone markings beyond the displaced threshold may remain in place. Obliterate aiming point markings. Issue appropriate NOTAMs regarding any nonstandard markings. See [Figure 2-2](#).

2.18.2.1.4 Taxiways.

1. **Permanently Closed Taxiways.** AC 150/5300-13 Airport Design, notes that it is preferable to remove the pavement, but for pavement that is to remain, place an X at the entrance to both ends of the closed section. Obliterate taxiway centerline markings, including runway leadoff lines, leading to the closed taxiway. See Figure 2-4.

Figure 2-4. Temporary Taxiway Closure



2. **Temporarily Closed Taxiways.** Place barricades outside the safety area of intersecting taxiways. For runway/taxiway intersections, place an X at the entrance to the closed taxiway from the runway. If the taxiway will be closed for an extended period, obliterate taxiway centerline markings, including runway leadoff lines and taxiway to taxiway turns, leading to the closed section. Always obliterate runway lead-off lines for high speed exits, regardless of the duration of the closure. If the centerline markings will be reused upon reopening the taxiway, it is preferable to paint over the marking. This will result in less damage to the pavement when the upper layer of paint is ultimately removed. See Figure 2-4.

2.18.2.1.5 Temporarily Closed Airport.

When the airport is closed temporarily, mark all the runways as closed.

- 2.18.2.2 If unable to paint temporary markings on the pavement, construct them from any of the following materials: fabric, colored plastic, painted sheets of plywood, or similar materials. They must be properly configured and appropriately secured to prevent movement by prop wash, jet blast, or other wind currents. Items used to secure such markings must be of a color similar to the marking.

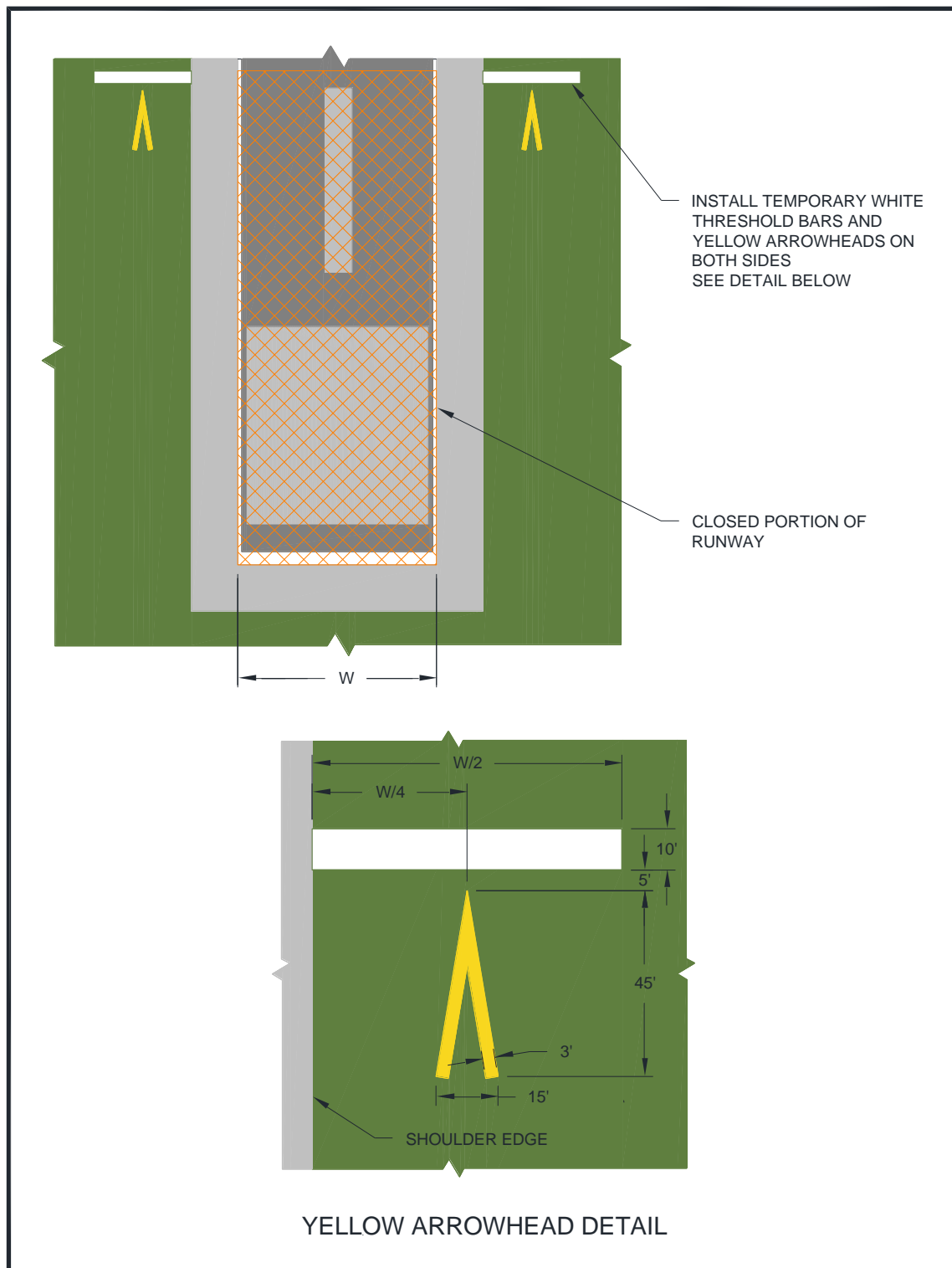
- 2.18.2.3 It may be necessary to remove or cover runway markings, including but not limited to, runway designation markings, threshold markings, centerline markings, edge stripes, touchdown zone markings and aiming point markings, depending on the length of construction and type of activity at the airport. When removing runway markings, apply the same treatment to areas between stripes or numbers, as the cleaned area will appear to pilots as a marking in the shape of the treated area.

- 2.18.2.4 If it is not possible to install threshold bars, chevrons, and arrows on the pavement, “temporary outboard white threshold bars and yellow arrowheads”, see Figure 2-5, may be used. Locate them outside of the runway pavement surface on both sides of the runway. The dimensions must be as shown in Figure 2-5. If the markings are not discernible on grass or snow, apply a black background with appropriate material over the ground to ensure they are clearly visible.

- 2.18.2.5 The application rate of paint to mark a short-term temporary runway and taxiway markings may deviate from the standard (see Item P-620, “Runway and Taxiway Painting,” in AC 150/5370-10), but the dimensions must meet the existing standards. When applying temporary markings at night, it is recommended that the fast curing, Type II paint be used to help offset the higher humidity and cooler temperatures often experienced at night. Diluting the paint will substantially increase cure time and is not recommended. Glass beads are not recommended for temporary markings. Striated markings may also be used for certain temporary markings. AC

150/5340-1, Standards for Airport Markings, has additional guidance on temporary markings.

Figure 2-5. Temporary Outboard White Threshold Bars and Yellow Arrowheads



2.18.3 Lighting and Visual NAVAIDs.

This paragraph refers to standard runway and taxiway lighting systems. See below for hazard lighting. Lighting installation must be in conformance with AC 150/5340-30, *Design and Installation Details for Airport Visual Aids*, and fixture design in conformance with AC 150/5345-50, *Specification for Portable Runway and Taxiway Lights*. When disconnecting runway and taxiway lighting fixtures, disconnect the associated isolation transformers. See AC 150/5340-26, *Maintenance of Airport Visual Aid Facilities*, for disconnect procedures and safety precautions. 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. Secure, identify, and place any above ground temporary wiring in conduit to prevent electrocution and fire ignition sources. Maintain mandatory hold signs to operate normally in any situation where pilots or vehicle drivers could mistakenly be in that location. At towered airports certificated under Part 139, holding position signs are required to be illuminated on open taxiways crossing to closed or inactive runways. If the holding position sign is installed on the runway circuit for the closed runway, install a jumper to the taxiway circuit to provide power to the holding position sign for nighttime operations. Where it is not possible to maintain power to signs that would normally be operational, install barricades to exclude aircraft. Figure 2-1, Figure 2-2, Figure 2-3, and Figure 2-4 illustrate temporary changes to lighting and visual NAVAIDs.

2.18.3.1 **Permanently Closed Runways and Taxiways.**

For runways and taxiways that have been permanently closed, disconnect the lighting circuits.

2.18.3.2 **Temporarily Closed Runways and New Runways Not Yet Open to Air Traffic.**

If available, use a lighted X, both at night and during the day, placed at each end of the runway on or near the runway designation numbers facing the approach. (Note that the lighted X must be illuminated at all times that it is on a runway.) The use of a lighted X is required if night work requires runway lighting to be on. See AC 150/5345-55, *Specification for L-893, Lighted Visual Aid to Indicate Temporary Runway Closure*. For runways that have been temporarily closed, but for an extended period, and for those with pilot controlled lighting, disconnect the lighting circuits or secure switches to prevent inadvertent activation. For runways that will be opened periodically, coordinate procedures with the FAA air traffic manager or, at airports without an ATCT, the airport operator. Activate stop bars if available. Figure 2-6 shows a lighted X by day. Figure 2-7 shows a lighted X at night.

Figure 2-6. Lighted X in Daytime**Figure 2-7. Lighted X at Night**

2.18.3.3 **Partially Closed Runways and Displaced Thresholds.**

When a runway is partially closed, a portion of the pavement is unavailable for any aircraft operation, meaning taxiing and landing or taking off in either direction. A displaced threshold, by contrast, is put in place to ensure obstacle clearance by landing aircraft. The pavement prior to the displaced threshold is available for takeoff in the direction of the displacement, and for landing and takeoff in the opposite direction. Misunderstanding this difference and issuance of a subsequently inaccurate NOTAM can result in a hazardous situation. For both partially

closed runways and displaced thresholds, approach lighting systems at the affected end must be placed out of service.

2.18.3.3.1 Partially Closed Runways.

Disconnect edge and threshold lights on that part of the runway at and behind the threshold (that is, the portion of the runway that is closed). Alternately, cover the light fixtures in such a way as to prevent light leakage. See Figure 2-1.

2.18.3.3.2 Temporary Displaced Thresholds.

Edge lighting in the area of the displacement emits red light in the direction of approach and yellow light (white for visual runways) in the opposite direction. If the displacement is 700 feet or less, blank out centerline lights in the direction of approach or place the centerline lights out of service. If the displacement is over 700 feet, place the centerline lights out of service. See AC 150/5340-30 for details on lighting displaced thresholds. See Figure 2-2.

2.18.3.3.3 Temporary runway thresholds and runway ends must be lighted if the runway is lighted and it is the intended threshold for night landings or instrument meteorological conditions.

2.18.3.3.4 A temporary threshold on an unlighted runway may be marked by retroreflective, elevated markers in addition to markings noted in paragraph 2.18.2.1.3. Markers seen by aircraft on approach are green. Markers at the rollout end of the runway are red. At certificated airports, temporary elevated threshold markers must be mounted with a frangible fitting (see 14 CFR Part 139.309). At non-certificated airports, the temporary elevated threshold markings may either be mounted with a frangible fitting or be flexible. See AC 150/5345-39, *Specification for L-853, Runway and Taxiway Retroreflective Markers*.

2.18.3.3.5 Temporary threshold lights and runway end lights and related visual NAVAIDs are installed outboard of the edges of the full-strength pavement only when they cannot be installed on the pavement. They are installed with bases at grade level or as low as possible, but not more than 3 inch (7.6 cm) above ground. (The standard above ground height for airport lighting fixtures is 14 inches (35 cm)). 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.

2.18.3.3.6 Maintain threshold and edge lighting color and spacing standards as described in AC 150/5340-30. Battery powered, solar, or portable lights that meet the criteria in AC 150/5345-50 may be used. These systems are intended primarily for visual flight rules (VFR) aircraft operations 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.

- 2.18.3.3.7 When runway thresholds are temporarily displaced, reconfigure yellow lenses (caution zone), as necessary, and place the centerline lights out of service.
- 2.18.3.3.8 Relocate the Visual Glide Slope Indicator (VGSI), such as Visual Approach Slope Indicator (VASI) and Precision Approach Path Indicator (PAPI); other airport lights, such as Runway End Identifier Lights (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 ATO/Technical Operations Office. Relocation of such visual aids will depend on the duration of the project and the benefits gained from the relocation, as this can result in great expense. See FAA JO 6850.2, *Visual Guidance Lighting Systems*, for installation criteria for FAA owned and operated NAVAIDs.
- 2.18.3.3.9 Issue a NOTAM to inform pilots of temporary lighting conditions.
- 2.18.3.4 **Temporarily Closed Taxiways.**
If possible, deactivate the taxiway lighting circuits. When deactivation is not possible (for example other taxiways on the same circuit are to remain open), cover the light fixture in a way as to prevent light leakage.

2.18.4 Signs.

To the extent possible, signs must be in conformance with AC 150/5345-44, *Specification for Runway and Taxiway Signs*, and AC 150/5340-18, *Standard for Airport Sign Systems*.

2.18.4.1 **Existing Signs.**

Runway exit signs are to be covered for closed runway exits. Outbound destination signs are to be covered for closed runways. Any time a sign does not serve its normal function or would provide conflicting information, it must be covered or removed to prevent misdirecting pilots. Note that information signs identifying a crossing taxiway continue to perform their normal function even if the crossing taxiway is closed. For long term construction projects, consider relocating signs, especially runway distance remaining signs.

2.18.4.2 Temporary Signs.

Orange construction signs comprise a message in black on an orange background. Orange construction signs may help pilots be aware of changed conditions. The airport operator may choose to introduce these signs as part of a movement area construction project to increase situational awareness when needed. Locate signs outside the taxiway safety limits and ahead of construction areas so pilots can take timely action. Use temporary signs judiciously, striking a balance between the need for information and the increase in pilot workload. When there is a concern of pilot “information overload,” the applicability of mandatory hold signs must take precedence over orange construction signs recommended during construction. Temporary signs must meet the standards for such signs in Engineering Brief 93, *Guidance for the Assembly and Installation of Temporary Orange Construction Signs*. Many criteria in AC 150/5345-44, *Specification for Runway and Taxiway Signs*, are referenced in the Engineering Brief. Permissible sign legends are:

1. CONSTRUCTION AHEAD,
2. CONSTRUCTION ON RAMP, and
3. RWY XX TAKEOFF RUN AVAILABLE XXX FT.

Phasing, supported by drawings and sign schedule, for the installation of orange construction signs must be included in the CSPP or SPCD.

2.18.4.2.1 Takeoff Run Available (TORA) signs.

Recommended: Where a runway has been shortened for takeoff, install orange TORA signs well before the hold lines, such as on a parallel taxiway prior to a turn to a runway hold position. See EB 93 for sign size and location.

2.18.4.2.2 Sign legends are shown in Figure F-1.

Note: See Figure E-1, Figure E-2, Figure E-3, Figure F-2, and Figure F-3 for examples of orange construction sign locations.

2.19 Marking and Signs for Access Routes.

The CSPP should indicate that pavement markings and signs for construction personnel will conform to AC 150/5340-18 and, to the extent practicable, with the Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD) and/or State highway specifications. Signs adjacent to areas used by aircraft must comply with the frangibility requirements of AC 150/5220-23, *Frangible Connections*, which may require modification to size and height guidance in the MUTCD.

2.20 **Hazard Marking, Lighting and Signing.**

2.20.1 Hazard marking, lighting, and signing prevent pilots from entering areas closed to aircraft, and prevent construction personnel from entering areas open to aircraft. The CSPP must specify prominent, comprehensible warning indicators for any area affected by construction that is normally accessible to aircraft, personnel, or vehicles. Hazard marking and lighting must also be specified to identify open manholes, small areas under repair, stockpiled material, waste areas, and areas subject to jet blast. 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.

2.20.2 Equipment.

2.20.2.1 **Barricades.**

Low profile barricades, including traffic cones, (weighted or sturdily attached to the surface) are acceptable methods used to identify and define the limits of construction and hazardous areas on airports. Careful consideration must be given to selecting equipment that poses the least danger to aircraft but is sturdy enough to remain in place when subjected to typical winds, prop wash and jet blast. The spacing of barricades must be such that a breach is physically prevented barring a deliberate act. For example, if barricades are intended to exclude aircraft, gaps between barricades must be smaller than the wingspan of the smallest aircraft to be excluded; if barricades are intended to exclude vehicles, gaps between barricades must be smaller than the width of the excluded vehicles, generally 4 feet (1.2 meters). Provision must be made for ARFF access if necessary. If barricades are intended to exclude pedestrians, they must be continuously linked. Continuous linking may be accomplished through the use of ropes, securely attached to prevent FOD.

2.20.2.2 **Lights.**

Lights must be red, either steady burning or flashing, and must meet the luminance requirements of the State Highway Department. Batteries powering lights will last longer if lights flash. Lights must be mounted on barricades and spaced at no more than 10 feet (3 meters). Lights must be operated between sunset and sunrise and during periods of low visibility whenever the airport is open for operations. They may be operated by photocell, but this may require that the contractor turn them on manually during periods of low visibility during daytime hours.

2.20.2.3 **Supplement Barricades with Signs (for example) As Necessary.**

Examples are “No Entry” and “No Vehicles.” Be aware of the increased effects of wind and jet blast on barricades with attached signs.

2.20.2.4 Air Operations Area – General.

Barricades are not permitted in any active safety area or on the runway side of a runway hold line. Within a runway or taxiway object free area, and on aprons, use orange traffic cones, flashing or steady burning red lights as noted above, highly reflective collapsible barricades marked with diagonal, alternating orange and white stripes; and/or signs to separate all construction/maintenance areas from the movement area. Barricades may be supplemented with alternating orange and white flags at least 20 by 20 inch (50 by 50 cm) square and securely fastened to eliminate FOD. All barricades adjacent to any open runway or taxiway / taxilane safety area, or apron must be as low as possible to the ground, and no more than 18 inches high, exclusive of supplementary lights and flags. Barricades must be 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, and 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 inch (7.6 cm) above the ground. Figure 2-8 and Figure 2-9 show sample barricades with proper coloring and flags.

Figure 2-8. Interlocking Barricades



Figure 2-9. Low Profile Barricades**2.20.2.5 Air Operations Area – Runway/Taxiway Intersections.**

Use highly reflective barricades with lights to close 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, even for closures of relatively short duration, close all taxiway/runway intersections with barricades. The use of traffic cones is appropriate for short duration closures.

2.20.2.6 Air Operations Area – Other.

Beyond runway and taxiway object free areas and aprons, barricades intended for construction vehicles and personnel may be many different shapes and made from various materials, including railroad ties, sawhorses, jersey barriers, or barrels.

2.20.2.7 Maintenance.

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 operator. Lighting should be checked for proper operation at least once per day, preferably at dusk.

2.21 Work Zone Lighting for Nighttime Construction.

Lighting equipment must adequately illuminate the work area if the construction is to be performed during nighttime hours. Refer to [AC 150/5370-10](#) for minimum illumination levels for nighttime paving projects. Additionally, it is recommended that all support equipment, except haul trucks, be equipped with artificial illumination to safely

illuminate the area immediately surrounding their work areas. The lights should be positioned to provide the most natural color illumination and contrast with a minimum of shadows. The spacing must be determined by trial. Light towers should be positioned and adjusted to aim away from ATCT cabs and active runways to prevent blinding effects. Shielding may be necessary. Light towers should be removed from the construction site when the area is reopened to aircraft operations. Construction lighting units should be identified and generally located on the construction phasing plans in relationship to the ATCT and active runways and taxiways.

2.22 Protection of Runway and Taxiway Safety Areas.

Runway and taxiway safety areas, OFZs, OFAs, and approach surfaces are described in AC 150/5300-13. Protection of these areas includes limitations on the location and height of equipment and stockpiled material. An FAA airspace study may be required. Coordinate with the appropriate FAA Airports Regional or District Office if there is any doubt as to requirements or dimensions (see paragraph 2.13.5) as soon as the location and height of materials or equipment are known. The CSPP should include drawings showing all safety areas, object free areas, obstacle free zones and approach departure surfaces affected by construction.

2.22.1 Runway Safety Area (RSA).

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). Construction activities within the existing RSA are subject to the following conditions:

- 2.22.1.1 No construction may occur within the existing RSA while the runway is open for aircraft operations. The RSA dimensions may be temporarily adjusted if the runway is restricted to aircraft operations requiring an RSA that is equal to the RSA width and length beyond the runway ends available during construction. (See AC 150/5300-13). The temporary use of declared distances and/or partial runway closures may provide the necessary RSA under certain circumstances. Coordinate with the appropriate FAA Airports Regional or District Office to have declared distances information published, and appropriate NOTAMs issued. See AC 150/5300-13 for guidance on the use of declared distances.
- 2.22.1.2 The airport operator must coordinate the adjustment of RSA dimensions as permitted above with the appropriate FAA Airports Regional or District Office and the local FAA air traffic manager and issue a NOTAM.
- 2.22.1.3 The CSPP and SPCD must provide procedures for ensuring adequate distance for protection from blasting operations, if required by operational considerations.

2.22.1.4 Excavations.

2.22.1.4.1 Open trenches or excavations are not permitted within the RSA while the runway is open. Backfill trenches before the runway is opened. If backfilling excavations before the runway must be opened is impracticable, cover the excavations appropriately. Covering for open trenches must be designed to allow the safe operation of the heaviest aircraft operating on the runway across the trench without damage to the aircraft.

2.22.1.4.2 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.

2.22.1.5 Erosion Control.

Soil erosion must be controlled to maintain RSA standards, that is, the RSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations, and capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and fire fighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft.

2.22.2 Runway Object Free Area (ROFA).

Construction, including excavations, may be permitted in the ROFA. However, equipment must be removed from the ROFA when not in use, and material should not be stockpiled in the ROFA if not necessary. Stockpiling material in the OFA requires submittal of a 7460-1 form and justification provided to the appropriate FAA Airports Regional or District Office for approval.

2.22.3 Taxiway Safety Area (TSA).

2.22.3.1 A taxiway safety area is a defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway. (See AC 150/5300-13.) Since the width of the TSA is equal to the wingspan of the design aircraft, no construction may occur within the TSA while the taxiway is open for aircraft operations. The TSA dimensions may be temporarily adjusted if the taxiway is restricted to aircraft operations requiring a TSA that is equal to the TSA width available during construction. Give special consideration to TSA dimensions at taxiway turns and intersections. (see AC 150/5300-13).

2.22.3.2 The airport operator must coordinate the adjustment of the TSA width as permitted above with the appropriate FAA Airports Regional or District Office and the FAA air traffic manager and issue a NOTAM.

2.22.3.3 The CSPP and SPCD must provide procedures for ensuring adequate distance for protection from blasting operations.

2.22.3.4 **Excavations.**

1. Curves. Open trenches or excavations are not permitted within the TSA while the taxiway is open. Trenches should be backfilled before the taxiway is opened. If backfilling excavations before the taxiway must be opened is impracticable, cover the excavations appropriately. Covering for open trenches must be designed to allow the safe operation of the heaviest aircraft operating on the taxiway across the trench without damage to the aircraft.
2. Straight Sections. Open trenches or excavations are not permitted within the TSA while the taxiway is open for unrestricted aircraft operations. Trenches should be backfilled before the taxiway is opened. If backfilling excavations before the taxiway must be opened is impracticable, cover the excavations to allow the safe passage of ARFF equipment and of the heaviest aircraft operating on the taxiway across the trench without causing damage to the equipment or aircraft. In rare circumstances where the section of taxiway is indispensable for aircraft movement, open trenches or excavations may be permitted in the TSA while the taxiway is open to aircraft operations, subject to the following restrictions:
 - a. Taxiing speed is limited to 10 mph.
 - b. Appropriate NOTAMs are issued.
 - c. Marking and lighting meeting the provisions of paragraphs 2.18 and 2.20 are implemented.
 - d. Low mass, low-profile lighted barricades are installed.
 - e. Appropriate temporary orange construction signs are installed.
3. 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.

2.22.3.5 **Erosion control.**

Soil erosion must be controlled to maintain TSA standards, that is, the TSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations, and capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and firefighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft.

2.22.4 Taxiway Object Free Area (TOFA).

Unlike the Runway Object Free Area, aircraft wings regularly penetrate the taxiway object free area during normal operations. Thus, the restrictions are more stringent. Except as provided below, no construction may occur within the taxiway object free area while the taxiway is open for aircraft operations.

- 2.22.4.1 The taxiway object free area dimensions may be temporarily adjusted if the taxiway is restricted to aircraft operations requiring a taxiway object free area that is equal to the taxiway object free area width available. Give special consideration to TOFA dimensions at taxiway turns and intersections.
- 2.22.4.2 Offset taxiway centerline and edge pavement markings (do not use glass beads) may be used as a temporary measure to provide the required taxiway object free area. Where offset taxiway pavement markings are provided, centerline lighting, centerline reflectors, or taxiway edge reflectors are required. Existing lighting that does not coincide with the temporary markings must be taken out of service.
- 2.22.4.3 Construction activity, including open excavations, may be accomplished without adjusting the width of the taxiway object free area, subject to the following restrictions:
 - 2.22.4.3.1 Taxiing speed is limited to 10 mph.
 - 2.22.4.3.2 NOTAMs issued advising taxiing pilots of hazard and recommending reduced taxiing speeds on the taxiway.
 - 2.22.4.3.3 Marking and lighting meeting the provisions of paragraphs 2.18 and 2.20 are implemented.
 - 2.22.4.3.4 If desired, appropriate orange construction signs are installed. See paragraph 2.18.4.2 and Appendix F.
 - 2.22.4.3.5 Five-foot clearance is maintained between equipment and materials and any part of an aircraft (includes wingtip overhang). 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 usable pavement), then it will be necessary to move personnel and equipment for the passage of that aircraft.
 - 2.22.4.3.6 Flaggers furnished by the contractor must be used to direct and control construction equipment and personnel to a pre-established setback distance for safe passage of aircraft, and airline and/or airport personnel. Flaggers must also be used to direct taxiing aircraft. Due to liability issues, the airport operator should require airlines to provide flaggers for directing taxiing aircraft.

2.22.5 Obstacle Free Zone (OFZ).

In general, personnel, material, and/or equipment may not penetrate the OFZ while the runway is open for aircraft operations. If a penetration to the OFZ is necessary, it may be possible to continue aircraft operations through operational restrictions. Coordinate with the FAA through the appropriate FAA Airports Regional or District Office.

2.22.6 Runway Approach/Departure Areas and Clearways.

All personnel, materials, and/or equipment must remain clear of the applicable threshold siting surfaces, as defined in AC 150/5300-13. Objects that do not penetrate these surfaces may still be obstructions to air navigation and may affect standard instrument approach procedures. Coordinate with the FAA through the appropriate FAA Airports Regional or District Office.

2.22.6.1 Construction activity in a runway approach/departure area may result in the need to partially close a runway or displace the existing runway threshold. Partial runway closure, displacement of the runway threshold, as well as closure of the complete runway and other portions of the movement area also require coordination through the airport operator with the appropriate FAA air traffic manager (FSS if non-towered) and ATO/Technical Operations (for affected NAVAIDS) and airport users.

2.22.6.2 **Caution About Partial Runway Closures.**

When filing a NOTAM for a partial runway closure, clearly state 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). There may be situations where the portion of closed runway is available for taxiing only. If so, the NOTAM must reflect this condition).

2.22.6.3 **Caution About 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, or other work within the existing RSA of any usable runway end, do not implement a displaced threshold unless arrivals and departures toward the construction activity are prohibited. Instead, implement a partial closure.

2.23 **Other Limitations on Construction.**

The CSPP must specify any other limitations on construction, including but not limited to:

2.23.1 Prohibitions.

- 2.23.1.1 No use of tall equipment (cranes, concrete pumps, and so on) unless a 7460-1 determination letter is issued for such equipment.
- 2.23.1.2 No use of open flame welding or torches unless fire safety precautions are provided and the airport operator has approved their use.
- 2.23.1.3 No use of electrical blasting caps on or within 1,000 feet (300 meters) of the airport property. See AC 150/5370-10.

2.23.2 Restrictions.

- 2.23.2.1 Construction suspension required during specific airport operations.
- 2.23.2.2 Areas that cannot be worked on simultaneously.
- 2.23.2.3 Day or night construction restrictions.
- 2.23.2.4 Seasonal construction restrictions.
- 2.23.2.5 Temporary signs not approved by the airport operator.
- 2.23.2.6 Grades changes that could result in unplanned effects on NAVAIDs.

CHAPTER 3. GUIDELINES FOR WRITING A CSPP

3.1 General Requirements.

The CSPP is a standalone document written to correspond with the subjects outlined in paragraph 2.4. The CSPP is organized by numbered sections corresponding to each subject listed in paragraph 2.4, and described in detail in paragraphs 2.5 - 2.23. Each section number and title in the CSPP matches the corresponding subject outlined in paragraph 2.4 (for example, 1. Coordination, 2. Phasing, 3. Areas and Operations Affected by the Construction Activity, and so on). With the exception of the project scope of work outlined in Section 2. Phasing, only subjects specific to operational safety during construction should be addressed.

3.2 Applicability of Subjects.

Each section should, to the extent practical, focus on the specific subject. Where an overlapping requirement spans several sections, the requirement should be explained in detail in the most applicable section. A reference to that section should be included in all other sections where the requirement may apply. For example, the requirement to protect existing underground FAA ILS cables during trenching operations could be considered FAA ATO coordination (Coordination, paragraph 2.5.3), an area and operation affected by the construction activity (Areas and Operations Affected by the Construction Activity, paragraph 2.7.1.4), a protection of a NAVAID (Protection of Navigational Aids (NAVAIDs), paragraph 2.8), or a notification to the FAA of construction activities (Notification of Construction Activities, paragraph 2.13.5.3.2). However, it is more specifically an underground utility requirement (Underground Utilities, paragraph 2.15). The procedure for protecting underground ILS cables during trenching operations should therefore be described in 2.4.2.11: “The contractor must coordinate with the local FAA System Support Center (SSC) to mark existing ILS cable routes along Runway 17-35. The ILS cables will be located by hand digging whenever the trenching operation moves within 10 feet of the cable markings.” All other applicable sections should include a reference to 2.4.2.11: “ILS cables shall be identified and protected as described in 2.4.2.11” or “See 2.4.2.11 for ILS cable identification and protection requirements.” Thus, the CSPP should be considered as a whole, with no need to duplicate responses to related issues.

3.3 Graphical Representations.

Construction safety drawings should be included in the CSPP as attachments. When other graphical representations will aid in supporting written statements, the drawings, diagrams, and/or photographs should also be attached to the CSPP. References should be made in the CSPP to each graphical attachment and may be made in multiple sections.

3.4 **Reference Documents.**

The CSPP must not incorporate a document by reference unless reproduction of the material in that document is prohibited. In that case, either copies of or a source for the referenced document must be provided to the contractor. Where this AC recommends references (e.g. as in paragraph 3.9) the intent is to include a reference to the corresponding section in the CSPP, not to this Advisory Circular.

3.5 **Restrictions.**

The CSPP should not be considered as a project design review document. The CSPP should also avoid mention of permanent (“as-built”) features such as pavements, markings, signs, and lighting, except when such features are intended to aid in maintaining operational safety during the construction.

3.6 **Coordination.**

Include in this section a detailed description of conferences and meetings to be held both before and during the project. Include appropriate information from AC 150/5370-12. Discuss coordination procedures and schedules for each required FAA ATO Technical Operations shutdown and restart and all required flight inspections.

3.7 **Phasing.**

Include in this section a detailed scope of work description for the project as a whole and each phase of work covered by the CSPP. This includes all locations and durations of the work proposed. Attach drawings to graphically support the written scope of work. Detail in this section the sequenced phases of the proposed construction. Include a reference to paragraph 3.8, as appropriate.

3.8 **Areas and Operations Affected by Construction.**

Focus in this section on identifying the areas and operations affected by the construction. Describe corresponding mitigation that is not covered in detail elsewhere in the CSPP. Include references to paragraphs below as appropriate. Attach drawings as necessary to graphically describe affected areas and mechanisms proposed. See Appendix F for sample operational effects tables and figures.

3.9 **NAVAID Protection.**

List in this section all NAVAID facilities that will be affected by the construction. Identify NAVAID facilities that will be placed out of service at any time prior to or during construction activities. Identify individuals responsible for coordinating each shutdown and when each facility will be out of service. Include a reference to paragraph 3.6 for FAA ATO NAVAID shutdown, restart, and flight inspection coordination. Outline in detail procedures to protect each NAVAID facility remaining in service from interference by construction activities. Include a reference to paragraph 3.14 for the

issuance of NOTAMs as required. Include a reference to paragraph 3.16 for the protection of underground cables and piping serving NAVAIDs. If temporary visual aids are proposed to replace or supplement existing facilities, include a reference to paragraph 3.19. Attach drawings to graphically indicate the affected NAVAIDS and the corresponding critical areas.

3.10 **Contractor Access.**

This will necessarily be the most extensive section of the CSPP. Provide sufficient detail so that a contractor not experienced in working on airports will understand the unique restrictions such work will require. Due to this extent, it should be broken down into subsections as described below:

3.10.1 Location of Stockpiled Construction Materials.

Describe in this section specific locations for stockpiling material. Note any height restrictions on stockpiles. Include a reference to paragraph 3.21 for hazard marking and lighting devices used to identify stockpiles. Include a reference to paragraph 3.11 for provisions to prevent stockpile material from becoming wildlife attractants. Include a reference to paragraph 3.12 for provisions to prevent stockpile material from becoming FOD. Attach drawings to graphically indicate the stockpile locations.

3.10.2 Vehicle and Pedestrian Operations.

While there are many items to be addressed in this major subsection of the CSPP, all are concerned with one main issue: keeping people and vehicles from areas of the airport where they don't belong. This includes preventing unauthorized entry to the AOA and preventing the improper movement of pedestrians or vehicles on the airport. In this section, focus on mechanisms to prevent construction vehicles and workers traveling to and from the worksite from unauthorized entry into movement areas. Specify locations of parking for both employee vehicles and construction equipment, and routes for access and haul roads. In most cases, this will best be accomplished by attaching a drawing. Quote from AC 150/5210-5 specific requirements for contractor vehicles rather than referring to the AC as a whole, and include special requirements for identifying HAZMAT vehicles. Quote from, rather than incorporate by reference, AC 150/5210-20 as appropriate to address the airport's rules for ground vehicle operations, including its training program. Discuss the airport's recordkeeping system listing authorized vehicle operators.

3.10.3 Two-Way Radio Communications.

Include a special section to identify all individuals who are required to maintain communications with Air Traffic (AT) at airports with active towers, or monitor CTAF at airports without or with closed ATCT. Include training requirements for all individuals required to communicate with AT. Individuals required to monitor AT frequencies should also be identified. If construction employees are also required to communicate by radio with Airport Operations, this procedure should be described in detail. Usage of vehicle mounted radios and/or portable radios should be addressed. Communication procedures for the event of disabled radio communication (that is, light

signals, telephone numbers, others) must be included. All radio frequencies should be identified (Tower, Ground Control, CTAF, UNICOM, ATIS, and so on).

3.10.4 **Airport Security.**

Address security as it applies to vehicle and pedestrian operations. Discuss TSA requirements, security badging requirements, perimeter fence integrity, gate security, and other needs. Attach drawings to graphically indicate secured and/or Security Identification Display Areas (SIDA), perimeter fencing, and available access points.

3.11 **Wildlife Management.**

Discuss in this section wildlife management procedures. Describe the maintenance of existing wildlife mitigation devices, such as perimeter fences, and procedures to limit wildlife attractants. Include procedures to notify Airport Operations of wildlife encounters. Include a reference to paragraph 3.10 for security (wildlife) fence integrity maintenance as required.

3.12 **FOD Management.**

In this section, discuss methods to control and monitor FOD: worksite housekeeping, ground vehicle tire inspections, runway sweeps, and so on. Include a reference to paragraph 3.15 for inspection requirements as required.

3.13 **HAZMAT Management.**

Describe in this section HAZMAT management procedures: fuel deliveries, spill recovery procedures, Safety Data Sheet (SDS), Material Safety Data Sheet (MSDS) or Product Safety Data Sheet (PSDS) availability, and other considerations. Any specific airport HAZMAT restrictions should also be identified. Include a reference to paragraph 3.10 for HAZMAT vehicle identification requirements. Quote from, rather than incorporate by reference, AC 150/5320-15.

3.14 **Notification of Construction Activities.**

List in this section the names and telephone numbers of points of contact for all parties affected by the construction project. We recommend a single list that includes all telephone numbers required under this section. Include emergency notification procedures for all representatives of all parties potentially impacted by the construction. Identify individual representatives – and at least one alternate – for each party. List both on-duty and off-duty contact information for each individual, including individuals responsible for emergency maintenance of airport construction hazard lighting and barricades. Describe procedures to coordinate immediate response to events that might adversely affect the operational safety of the airport (such as interrupted NAVAID service). Explain requirements for and the procedures for the issuance of Notices to Airmen (NOTAMs), notification to FAA required by 14 CFR Part 77 and Part 157 and in the event of affected NAVAIDs. For NOTAMs, identify an individual, and at least one alternate, responsible for issuing and cancelling each specific type of Notice to

Airmen (NOTAM) required. Detail notification methods for police, fire fighting, and medical emergencies. This may include 911, but should also include direct phone numbers of local police departments and nearby hospitals. Identify the E911 address of the airport and the emergency access route via haul roads to the construction site. Require the contractor to have this information available to all workers. The local Poison Control number should be listed. Procedures regarding notification of Airport Operations and/or the ARFF Department of such emergencies should be identified, as applicable. If airport radio communications are identified as a means of emergency notification, include a reference to paragraph 3.10. Differentiate between emergency and nonemergency notification of ARFF personnel, the latter including activities that affect ARFF water supplies and access roads. Identify the primary ARFF contact person and at least one alternate. If notification is to be made through Airport Operations, then detail this procedure. Include a method of confirmation from the ARFF department.

3.15 Inspection Requirements.

Describe in this section inspection requirements to ensure airfield safety compliance. Include a requirement for routine inspections by the resident engineer (RE) or other airport operator's representative and the construction contractors. If the engineering consultants and/or contractors have a Safety Officer who will conduct such inspections, identify this individual. Describe procedures for special inspections, such as those required to reopen areas for aircraft operations. Part 139 requires daily airfield inspections at certificated airports, but these may need to be more frequent when construction is in progress. Discuss the role of such inspections on areas under construction. Include a requirement to immediately remedy any deficiencies, whether caused by negligence, oversight, or project scope change.

3.16 Underground Utilities.

Explain how existing underground utilities will be located and protected. Identify each utility owner and include contact information for each company/agency in the master list. Address emergency response procedures for damaged or disrupted utilities. Include a reference to paragraph 3.14 for notification of utility owners of accidental utility disruption as required.

3.17 Penalties.

Describe in this section specific penalties imposed for noncompliance with airport rules and regulations, including the CSPP: SIDA violations, VPD, and others.

3.18 Special Conditions.

Identify any special conditions that may trigger specific safety mitigation actions outlined in this CSPP: low visibility operations, snow removal, aircraft in distress, aircraft accident, security breach, VPD, and other activities requiring construction suspension/resumption. Include a reference to paragraph 3.10 for compliance with airport safety and security measures and for radio communications as required. Include

a reference to paragraph 3.14 for emergency notification of all involved parties, including police/security, ARFF, and medical services.

3.19 Runway and Taxiway Visual Aids.

Include marking, lighting, signs, and visual NAVAIDS. Detail temporary runway and taxiway marking, lighting, signs, and visual NAVAIDS required for the construction. Discuss existing marking, lighting, signs, and visual NAVAIDS that are temporarily, altered, obliterated, or shut down. Consider non-federal facilities and address requirements for reimbursable agreements necessary for alteration of FAA facilities and for necessary flight checks. Identify temporary TORA signs or runway distance remaining signs if appropriate. Identify required temporary visual NAVAIDS such as REIL or PAPI. Quote from, rather than incorporate by reference, AC 150/5340-1, *Standards for Airport Markings*; AC 150/5340-18, *Standards for Airport Sign Systems*; and AC 150/5340-30, as required. Attach drawings to graphically indicate proposed marking, lighting, signs, and visual NAVAIDS.

3.20 Marking and Signs for Access Routes.

Detail plans for marking and signs for vehicle access routes. To the extent possible, signs should be in conformance with the Federal Highway Administration MUTCD and/or State highway specifications, not hand lettered. Detail any modifications to the guidance in the MUTCD necessary to meet frangibility/height requirements.

3.21 Hazard Marking and Lighting.

Specify all marking and lighting equipment, including when and where each type of device is to be used. Specify maximum gaps between barricades and the maximum spacing of hazard lighting. Identify one individual and at least one alternate responsible for maintenance of hazard marking and lighting equipment in the master telephone list. Include a reference to paragraph 3.14. Attach drawings to graphically indicate the placement of hazard marking and lighting equipment.

3.22 Work Zone Lighting for Nighttime Construction.

If work is to be conducted at night, specify all lighting equipment, including when and where each type of device is to be used. Indicate the direction lights are to be aimed and any directions that aiming of lights is prohibited. Specify any shielding necessary in instances where aiming is not sufficient to prevent interference with air traffic control and aircraft operations. Attach drawings to graphically indicate the placement and aiming of lighting equipment. Where the plan only indicates directions that aiming of lights is prohibited, the placement and positioning of portable lights must be proposed by the Contractor and approved by the airport operator's representative each time lights are relocated or repositioned.

3.23 Protection of Runway and Taxiway Safety Areas.

This section should focus exclusively on procedures for protecting all safety areas, including those altered by the construction: methods of demarcation, limit of access, movement within safety areas, stockpiling and trenching restrictions, and so on. Reference AC 150/5300-13, as required. Include a reference to paragraph 3.10 for procedures regarding vehicle and personnel movement within safety areas. Include a reference to paragraph 3.10 for material stockpile restrictions as required. Detail requirements for trenching, excavations, and backfill. Include a reference to paragraph 3.21 for hazard marking and lighting devices used to identify open excavations as required. If runway and taxiway closures are proposed to protect safety areas, or if temporary displaced thresholds and/or revised declared distances are used to provide the required Runway Safety Area, include a reference to paragraphs 3.14 and 3.19. Detail procedures for protecting the runway OFZ, runway OFA, taxiway OFA and runway approach surfaces including those altered by the construction: methods of demarcation, limit of cranes, storage of equipment, and so on. Quote from, rather than incorporate by reference, AC 150/5300-13, as required. Include a reference to paragraph 3.24 for height (i.e., crane) restrictions as required. One way to address the height of equipment that will move during the project is to establish a three-dimensional “box” within which equipment will be confined that can be studied as a single object. Attach drawings to graphically indicate the safety area, OFZ, and OFA boundaries.

3.24 Other Limitations on Construction.

This section should describe what limitations must be applied to each area of work and when each limitation will be applied: limitations due to airport operations, height (i.e., crane) restrictions, areas which cannot be worked at simultaneously, day/night work restrictions, winter construction, and other limitations. Include a reference to paragraph 3.7 for project phasing requirements based on construction limitations as required.

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APPENDIX A. RELATED READING MATERIAL

Obtain the latest version of the following free publications from the FAA on its Web site at <http://www.faa.gov/airports/>.

Table A-1. FAA Publications

Number	Title and Description
<u>AC 150/5200-28</u>	<i>Notices to Airmen (NOTAMs) for Airport Operators</i> Guidance for using the NOTAM System in airport reporting.
<u>AC 150/5200-30</u>	<i>Airport Field Condition Assessments and Winter Operations Safety</i> Guidance for airport owners/operators on the development of an acceptable airport snow and ice control program and on appropriate field condition reporting procedures.
<u>AC 150/5200-33</u>	<i>Hazardous Wildlife Attractants On or Near Airports</i> Guidance on locating certain land uses that might attract hazardous wildlife to public-use airports.
<u>AC 150/5210-5</u>	<i>Painting, Marking, and Lighting of Vehicles Used on an Airport</i> Guidance, specifications, and standards for painting, marking, and lighting vehicles operating in the airport air operations areas.
<u>AC 150/5210-20</u>	<i>Ground Vehicle Operations to include Taxiing or Towing an Aircraft on Airports</i> Guidance to airport operators on developing ground vehicle operation training programs.
<u>AC 150/5300-13</u>	<i>Airport Design</i> 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.
<u>AC 150/5210-24</u>	<i>Airport Foreign Object Debris (FOD) Management</i> Guidance for developing and managing an airport foreign object debris (FOD) program

Number	Title and Description
<u>AC 150/5320-15</u>	<p><i>Management of Airport Industrial Waste</i></p> <p>Basic information on the characteristics, management, and regulations of industrial wastes generated at airports. Guidance for developing a Storm Water Pollution Prevention Plan (SWPPP) that applies best management practices to eliminate, prevent, or reduce pollutants in storm water runoff with particular airport industrial activities.</p>
<u>AC 150/5340-1</u>	<p><i>Standards for Airport Markings</i></p> <p>FAA standards for the siting and installation of signs on airport runways and taxiways.</p>
<u>AC 150/5340-18</u>	<p><i>Standards for Airport Sign Systems</i></p> <p>FAA standards for the siting and installation of signs on airport runways and taxiways.</p>
<u>AC 150/5345-28</u>	<p><i>Precision Approach Path Indicator (PAPI) Systems</i></p> <p>FAA standards for PAPI systems, which provide pilots with visual glide slope guidance during approach for landing.</p>
<u>AC 150/5340-30</u>	<p><i>Design and Installation Details for Airport Visual Aids</i></p> <p>Guidance and recommendations on the installation of airport visual aids.</p>
<u>AC 150/5345-39</u>	<p><i>Specification for L-853, Runway and Taxiway Retroreflective Markers</i></p>
<u>AC 150/5345-44</u>	<p><i>Specification for Runway and Taxiway Signs</i></p> <p>FAA specifications for unlighted and lighted signs for taxiways and runways.</p>
<u>AC 150/5345-53</u>	<p><i>Airport Lighting Equipment Certification Program</i></p> <p>Details on the Airport Lighting Equipment Certification Program (ALECP).</p>
<u>AC 150/5345-50</u>	<p><i>Specification for Portable Runway and Taxiway Lights</i></p> <p>FAA standards for portable runway and taxiway lights and runway end identifier lights for temporary use to permit continued aircraft operations while all or part of a runway lighting system is inoperative.</p>
<u>AC 150/5345-55</u>	<p><i>Specification for L-893, Lighted Visual Aid to Indicate Temporary Runway Closure</i></p>

Number	Title and Description
<u>AC 150/5370-10</u>	<i>Standards for Specifying Construction of Airports</i> Standards for construction of airports, including earthwork, drainage, paving, turfing, lighting, and incidental construction.
<u>AC 150/5370-12</u>	<i>Quality Management for Federally Funded Airport Construction Projects</i>
EB 93	<i>Guidance for the Assembly and Installation of Temporary Orange Construction Signs</i>
FAA Order 5200.11	<u>FAA Airports (ARP) Safety Management System (SMS)</u> Basics for implementing SMS within ARP. Includes roles and responsibilities of ARP management and staff as well as other FAA lines of business that contribute to the ARP SMS.
FAA Certalert 98-05	<i>Grasses Attractive to Hazardous Wildlife</i> Guidance on grass management and seed selection.
FAA Form 7460-1	<u>Notice of Proposed Construction or Alteration</u>
FAA Form 7480-1	<u>Notice of Landing Area Proposal</u>
FAA Form 6000.26	National NAS Strategic Interruption Service Level Agreement, Strategic Events Coordination, Airport Sponsor Form

Obtain the latest version of the following free publications from the Electronic Code of Federal Regulations at <http://www.ecfr.gov/>.

Table A-2. Code of Federal Regulation

Number	Title
Title 14 CFR Part 77	Safe, Efficient Use and Preservation of the Navigable Airspace
Title 14 CFR Part 139	Certification of Airports
Title 49 CFR Part 1542	Airport Security

Obtain the latest version of the Manual on Uniform Traffic Control Devices from the Federal Highway Administration at <http://mutcd.fhwa.dot.gov/>.

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APPENDIX B. TERMS AND ACRONYMS**Table B-1. Terms and Acronyms**

Term	Definition
Form 7460-1	Notice of Proposed Construction or Alteration. For on-airport projects, the form submitted to the FAA regional 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, <i>Safe, Efficient Use, and Preservation of the Navigable Airspace</i> . (See guidance available on the FAA web site at https://oeaaa.faa.gov .) The form may be downloaded at http://www.faa.gov/airports/resources/forms/ , or filed electronically at: https://oeaaa.faa.gov .
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. The form may be downloaded at http://www.faa.gov/airports/resources/forms/ .
Form 6000-26	Airport Sponsor Strategic Event Submission Form
AC	Advisory Circular
ACSI	Airport Certification Safety Inspector
ADG	Airplane Design Group
AIP	Airport Improvement Program
ALECP	Airport Lighting Equipment Certification Program
ANG	Air National Guard
AOA	Air Operations Area, as defined in 14 CFR Part 107. Means a portion of an airport, specified in the airport security program, in which security measures are carried out. This area includes aircraft movement areas, aircraft parking areas, loading ramps, and safety areas, and any adjacent areas (such as general aviation areas) that are not separated by adequate security systems, measures, or procedures. This area does not include the secured area of the airport terminal building.
ARFF	Aircraft Rescue and Fire Fighting
ARP	FAA Office of Airports
ASDA	Accelerate-Stop Distance Available
AT	Air Traffic
ATCT	Airport Traffic Control Tower
ATIS	Automatic Terminal Information Service
ATO	Air Traffic Organization
Certificated Airport	An airport that has been issued an Airport Operating Certificate by the FAA under

Term	Definition
	the authority of 14 CFR Part 139, <i>Certification of Airports</i> .
CFR	Code of Federal Regulations
Construction	The presence of construction-related personnel, equipment, and materials in any location that could infringe upon the movement of aircraft.
CSPP	Construction Safety and Phasing Plan. The overall plan for safety and phasing of a construction project developed by the airport operator, or developed by the airport operator's consultant and approved by the airport operator. It is included in the invitation for bids and becomes part of the project specifications.
CTAF	Common Traffic Advisory Frequency
Displaced Threshold	A threshold that is located at a point on the runway other than the designated beginning of the runway. The portion of pavement behind a displaced threshold is available for takeoffs in either direction or landing from the opposite direction.
DOT	Department of Transportation
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FOD	Foreign Object Debris/Damage
FSS	Flight Service Station
GA	General Aviation
HAZMAT	Hazardous Materials
HMA	Hot Mix Asphalt
IAP	Instrument Approach Procedures
IFR	Instrument Flight Rules
ILS	Instrument Landing System
LDA	Landing Distance Available
LOC	Localizer antenna array
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 aprons and aircraft parking areas (reference 14 CFR Part 139).
MSDS	Material Safety Data Sheet
MUTCD	Manual on Uniform Traffic Control Devices
NAVAID	Navigation Aid
NAVAID Critical Area	An area of defined shape and size associated with a NAVAID that must remain clear and graded to avoid interference with the electronic signal.
Non-Movement Area	The area inside the airport security fence exclusive of the Movement Area. It is important to note that the non-movement area includes pavement traversed by aircraft.

Term	Definition
NOTAM	Notices to Airmen
Obstruction	Any object/obstacle exceeding the obstruction standards specified by 14 CFR Part 77, subpart C.
OCC	Operations Control Center
OE / AAA	Obstruction Evaluation / Airport Airspace Analysis
OFA	Object Free Area. An area on the ground centered on the runway, taxiway, or taxi lane 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 <u>AC 150/5300-13</u> for additional guidance on OFA standards and wingtip clearance criteria.)
OFZ	Obstacle Free Zone. The airspace below 150 ft (45 m) 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. The OFZ is subdivided as follows: Runway OFZ, Inner Approach OFZ, Inner Transitional OFZ, and Precision OFZ. Refer to <u>AC 150/5300-13</u> for guidance on OFZ.
OSHA	Occupational Safety and Health Administration
OTS	Out of Service
P&R	Planning and Requirements Group
NPI	NAS Planning & Integration
PAPI	Precision Approach Path Indicator
PFC	Passenger Facility Charge
PLASI	Pulse Light Approach Slope Indicator
Project Proposal Summary	A clear and concise description of the proposed project or change that is the object of Safety Risk Management.
RA	Reimbursable Agreement
RE	Resident Engineer
REIL	Runway End Identifier Lights
RNAV	Area Navigation
ROFA	Runway Object Free Area
RSA	Runway Safety Area. 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 <u>AC 150/5300-13</u> .
SDS	Safety Data Sheet
SIDA	Security Identification Display Area
SMS	Safety Management System

Term	Definition
SPCD	Safety Plan Compliance Document. Details developed and submitted by a contractor to the airport operator for approval providing details on how the performance of a construction project will comply with the CSPP.
SRM	Safety Risk Management
SSC	System Support Center
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 <u>AC 150/5300-13</u> .
TDG	Taxiway Design Group
Temporary	Any condition that is not intended to be permanent.
Temporary Runway End	The beginning of that portion of the runway available for landing and taking off in one direction, and for landing in the other direction. Note the difference from a displaced threshold.
Threshold	The beginning of that portion of the runway available for landing. In some instances, the landing threshold may be displaced.
TODA	Takeoff Distance Available
TOFA	Taxiway Object Free Area
TORA	Takeoff Run Available. The length of the runway less any length of runway unavailable and/or unsuitable for takeoff run computations. See <u>AC 150/5300-13</u> for guidance on declared distances.
TSA	Taxiway Safety Area, or Transportation Security Administration
UNICOM	A radio communications system of a type used at small airports.
VASI	Visual Approach Slope Indicator
VGSI	Visual Glide Slope Indicator. A device that provides a visual glide slope indicator to landing pilots. These systems include precision approach path indicator (PAPI), visual approach slope indicator (VASI), and pulse light approach slope indicator (PLASI).
VFR	Visual Flight Rules
VOR	Very High Frequency Omnidirectional Radio Range
VPD	Vehicle / Pedestrian Deviation

APPENDIX C. SAFETY AND PHASING PLAN CHECKLIST

This appendix is keyed to Chapter 2. In the electronic version of this AC, clicking on the paragraph designation in the Reference column will access the applicable paragraph. There may be instances where the CSPP requires provisions that are not covered by the list in this appendix.

This checklist is intended as an aid, not a required submittal.

Table C-1. CSPP Checklist

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
General Considerations					
Requirements for predesign, prebid, and preconstruction conferences to introduce the subject of airport operational safety during construction are specified.	<u>2.5</u>				
Operational safety is a standing agenda item for construction progress meetings.	<u>2.5</u>				
Scheduling of the construction phases is properly addressed.	<u>2.6</u>				
Any formal agreements are established.	<u>2.5.3</u>				
Areas and Operations Affected by Construction Activity					
Drawings showing affected areas are included.	<u>2.7.1</u>				
Closed or partially closed runways, taxiways, and aprons are depicted on drawings.	<u>2.7.1.1</u>				
Access routes used by ARFF vehicles affected by the project are addressed.	<u>2.7.1.2</u>				
Access routes used by airport and airline support vehicles affected by the project are addressed.	<u>2.7.1.3</u>				
Underground utilities, including water supplies for firefighting and drainage.	<u>2.7.1.4</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Approach/departure surfaces affected by heights of temporary objects are addressed.	<u>2.7.1.5</u>				
Construction areas, storage areas, and access routes near runways, taxiways, aprons, or helipads are properly depicted on drawings.	<u>2.7.1</u>				
Temporary changes to taxi operations are addressed.	<u>2.7.2.1</u>				
Detours for ARFF and other airport vehicles are identified.	<u>2.7.2.2</u>				
Maintenance of essential utilities and underground infrastructure is addressed.	<u>2.7.2.3</u>				
Temporary changes to air traffic control procedures are addressed.	<u>2.7.2.4</u>				
NAVAIDs					
Critical areas for NAVAIDs are depicted on drawings.	<u>2.8</u>				
Effects of construction activity on the performance of NAVAIDS, including unanticipated power outages, are addressed.	<u>2.8</u>				
Protection of NAVAID facilities is addressed.	<u>2.8</u>				
The required distance and direction from each NAVAID to any construction activity is depicted on drawings.	<u>2.8</u>				
Procedures for coordination with FAA ATO/Technical Operations, including identification of points of contact, are included.	<u>2.8, 2.13.1, 2.13.5.3.1, 2.18.1</u>				
Contractor Access					
The CSPP addresses areas to which contractor will have access and how	<u>2.9</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
the areas will be accessed.					
The application of 49 CFR Part 1542 Airport Security, where appropriate, is addressed.	<u>2.9</u>				
The location of stockpiled construction materials is depicted on drawings.	<u>2.9.1</u>				
The requirement for stockpiles in the ROFA to be approved by FAA is included.	<u>2.9.1</u>				
Requirements for proper stockpiling of materials are included.	<u>2.9.1</u>				
Construction site parking is addressed.	<u>2.9.2.1</u>				
Construction equipment parking is addressed.	<u>2.9.2.2</u>				
Access and haul roads are addressed.	<u>2.9.2.3</u>				
A requirement for marking and lighting of vehicles to comply with <u>AC 150/5210-5, Painting, Marking and Lighting of Vehicles Used on an Airport</u> , is included.	<u>2.9.2.4</u>				
Proper vehicle operations, including requirements for escorts, are described.	<u>2.9.2.5, 2.9.2.6</u>				
Training requirements for vehicle drivers are addressed.	<u>2.9.2.7</u>				
Two-way radio communications procedures are described.	<u>2.9.2.9</u>				
Maintenance of the secured area of the airport is addressed.	<u>2.9.2.10</u>				
Wildlife Management					
The airport operator's wildlife management procedures are addressed.	<u>2.10</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Foreign Object Debris Management					
The airport operator’s FOD management procedures are addressed.	<u>2.11</u>				
Hazardous Materials Management					
The airport operator’s hazardous materials management procedures are addressed.	<u>2.12</u>				
Notification of Construction Activities					
Procedures for the immediate notification of airport user and local FAA of any conditions adversely affecting the operational safety of the airport are detailed.	<u>2.13</u>				
Maintenance of a list by the airport operator of the responsible representatives/points of contact for all involved parties and procedures for contacting them 24 hours a day, seven days a week is specified.	<u>2.13.1</u>				
A list of local ATO/Technical Operations personnel is included.	<u>2.13.1</u>				
A list of ATCT managers on duty is included.	<u>2.13.1</u>				
A list of authorized representatives to the OCC is included.	<u>2.13.2</u>				
Procedures for coordinating, issuing, maintaining and cancelling by the airport operator of NOTAMS about airport conditions resulting from construction are included.	<u>2.8, 2.13.2, 2.18.3.3.9</u>				
Provision of information on closed or hazardous conditions on airport movement areas by the airport operator to the OCC is specified.	<u>2.13.2</u>				
Emergency notification procedures for medical, fire fighting, and police	<u>2.13.3</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
response are addressed.					
Coordination with ARFF personnel for non-emergency issues is addressed.	<u>2.13.4</u>				
Notification to the FAA under 14 CFR parts 77 and 157 is addressed.	<u>2.13.5</u>				
Reimbursable agreements for flight checks and/or design and construction for FAA owned NAVAIDs are addressed.	<u>2.13.5.3.2</u>				
Inspection Requirements					
Daily and interim inspections by both the airport operator and contractor are specified.	<u>2.14.1, 2.14.2</u>				
Final inspections at certificated airports are specified when required.	<u>2.14.3</u>				
Underground Utilities					
Procedures for protecting existing underground facilities in excavation areas are described.	<u>2.15</u>				
Penalties					
Penalty provisions for noncompliance with airport rules and regulations and the safety plans are detailed.	<u>2.16</u>				
Special Conditions					
Any special conditions that affect the operation of the airport or require the activation of any special procedures are addressed.	<u>2.17</u>				
Runway and Taxiway Visual Aids - Marking, Lighting, Signs, and Visual NAVAIDs					
The proper securing of temporary airport markings, lighting, signs, and visual NAVAIDs is addressed.	<u>2.18.1</u>				
Frangibility of airport markings, lighting, signs, and visual NAVAIDs is specified.	<u>2.18.1, 2.18.3, 2.18.4.2, 2.20.2.4</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
The requirement for markings to be in compliance with <u>AC 150/5340-1</u> , <i>Standards for Airport Markings</i> , is specified.	<u>2.18.2</u>				
Detailed specifications for materials and methods for temporary markings are provided.	<u>2.18.2</u>				
The requirement for lighting to conform to <u>AC 150/5340-30</u> , <i>Design and Installation Details for Airport Visual Aids</i> ; <u>AC 150/5345-50</u> , <i>Specification for Portable Runway and Taxiway Lights</i> ; and <u>AC 150/5345-53</u> , <i>Airport Lighting Certification Program</i> , is specified.	<u>2.18.3</u>				
The use of a lighted X is specified where appropriate.	<u>2.18.2.1.2</u> , <u>2.18.3.2</u>				
The requirement for signs to conform to <u>AC 150/5345-44</u> , <i>Specification for Runway and Taxiway Signs</i> ; <u>AC 150/5340-18</u> , <i>Standards for Airport Sign Systems</i> ; and <u>AC 150/5345-53</u> , <i>Airport Lighting Certification Program</i> , is specified.	<u>2.18.4</u>				
Marking and Signs For Access Routes					
The CSPP specifies that pavement markings and signs intended for construction personnel should conform to <u>AC 150/5340-18</u> and, to the extent practicable, with the MUTCD and/or State highway specifications.	<u>2.18.4.2</u>				
Hazard Marking and Lighting					
Prominent, comprehensible warning indicators for any area affected by construction that is normally accessible to aircraft, personnel, or vehicles are specified.	<u>2.20.1</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Hazard marking and lighting are specified to identify open manholes, small areas under repair, stockpiled material, and waste areas.	<u>2.20.1</u>				
The CSPP considers less obvious construction-related hazards.	<u>2.20.1</u>				
Equipment that poses the least danger to aircraft but is sturdy enough to remain in place when subjected to typical winds, prop wash and jet blast is specified.	<u>2.20.2.1</u>				
The spacing of barricades is specified such that a breach is physically prevented barring a deliberate act.	<u>2.20.2.1</u>				
Red lights meeting the luminance requirements of the State Highway Department are specified.	<u>2.20.2.2</u>				
Barricades, temporary markers, and other objects placed and left in areas adjacent to any open runway, taxiway, taxi lane, or apron are specified to be as low as possible to the ground, and no more than 18 inch high.	<u>2.20.2.3</u>				
Barricades are specified to indicate construction locations in which no part of an aircraft may enter.	<u>2.20.2.3</u>				
Highly reflective barriers with lights are specified to barricade taxiways leading to closed runways.	<u>2.20.2.5</u>				
Markings for temporary closures are specified.	<u>2.20.2.5</u>				
The provision of a contractor's representative on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades is specified.	<u>2.20.2.7</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Work Zone Lighting for Nighttime Construction					
If work is to be conducted at night, the CSPP identifies construction lighting units and their general locations and aiming in relationship to the ATCT and active runways and taxiways.	<u>2.21</u>				
Protection of Runway and Taxiway Safety Areas					
The CSPP clearly states that no construction may occur within a safety area while the associated runway or taxiway is open for aircraft operations.	<u>2.22.1.1,</u> <u>2.22.3.1</u>				
The CSPP specifies that the airport operator coordinates the adjustment of RSA or TSA dimensions with the ATCT and the appropriate FAA Airports Regional or District Office and issues a local NOTAM.	<u>2.22.1.2,</u> <u>2.22.3.2</u>				
Procedures for ensuring adequate distance for protection from blasting operations, if required by operational considerations, are detailed.	<u>2.22.3.3</u>				
The CSPP specifies that open trenches or excavations are not permitted within a safety area while the associated runway or taxiway is open, subject to approved exceptions.	<u>2.22.1.4</u>				
Appropriate covering of excavations in the RSA or TSA that cannot be backfilled before the associated runway or taxiway is open is detailed.	<u>2.22.1.4</u>				
The CSPP includes provisions for prominent marking of open trenches and excavations at the construction site.	<u>2.22.1.4</u>				
Grading and soil erosion control to maintain RSA/TSA standards are	<u>2.22.3.5</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
addressed.					
The CSPP specifies that equipment is to be removed from the ROFA when not in use.	<u>2.22.2</u>				
The CSPP clearly states that no construction may occur within a taxiway safety area while the taxiway is open for aircraft operations.	<u>2.22.3</u>				
Appropriate details are specified for any construction work to be accomplished in a taxiway object free area.	<u>2.22.4</u>				
Measures to ensure that personnel, material, and/or equipment do not penetrate the OFZ or threshold siting surfaces while the runway is open for aircraft operations are included.	<u>2.22.4.3.6</u>				
Provisions for protection of runway approach/departure areas and clearways are included.	<u>2.22.6</u>				
Other Limitations on Construction					
The CSPP prohibits the use of open flame welding or torches unless adequate fire safety precautions are provided and the airport operator has approved their use.	<u>2.23.1.2</u>				
The CSPP prohibits the use of electrical blasting caps on or within 1,000 ft (300 m) of the airport property.	<u>2.23.1.3</u>				

APPENDIX D. CONSTRUCTION PROJECT DAILY SAFETY INSPECTION CHECKLIST

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. The list below is one tool that the airport operator or contractor may use to aid in identifying and correcting potentially hazardous conditions. It should be customized as appropriate for each project including information such as the date, time and name of the person conducting the inspection.

Table D-1. Potentially Hazardous Conditions

Item	Action Required (Describe)	No Action Required (Check)
Excavation adjacent to runways, taxiways, and aprons improperly backfilled.		
Mounds of earth, construction materials, temporary structures, and other obstacles near any open runway, taxiway, or taxi lane; in the related Object Free area and aircraft approach or departure areas/zones; or obstructing any sign or marking.		
Runway resurfacing projects resulting in lips exceeding 3 inch (7.6 cm) from pavement edges and ends.		
Heavy equipment (stationary or mobile) operating or idle near AOA, in runway approaches and departures areas, or in OFZ.		
Equipment or material near NAVAIDs that may degrade or impair radiated signals and/or the monitoring of navigation and visual aids. Unauthorized or improper vehicle operations in localizer or glide slope critical areas, resulting in electronic interference and/or facility shutdown.		
Tall and especially relatively low visibility units (that is, equipment with slim profiles) — cranes, drills, and similar objects — located in critical areas, such as OFZ and		

Item	Action Required (Describe)	No Action Required (Check)
approach zones.		
Improperly positioned or malfunctioning lights or unlighted airport hazards, such as holes or excavations, on any apron, open taxiway, or open taxi lane or in a related safety, approach, or departure area.		
Obstacles, loose pavement, trash, and other debris on or near AOA. Construction debris (gravel, sand, mud, paving materials) 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.		
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 AOA create aviation hazards.		
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 AOA create aviation hazards.		
Wildlife attractants — such as trash (food scraps not collected from construction personnel activity), grass seeds, tall grass, or standing water — on or near airports.		
Obliterated or faded temporary markings on active operational areas.		
Misleading or malfunctioning obstruction lights. Unlighted or unmarked obstructions in the approach to any open runway pose aviation hazards.		

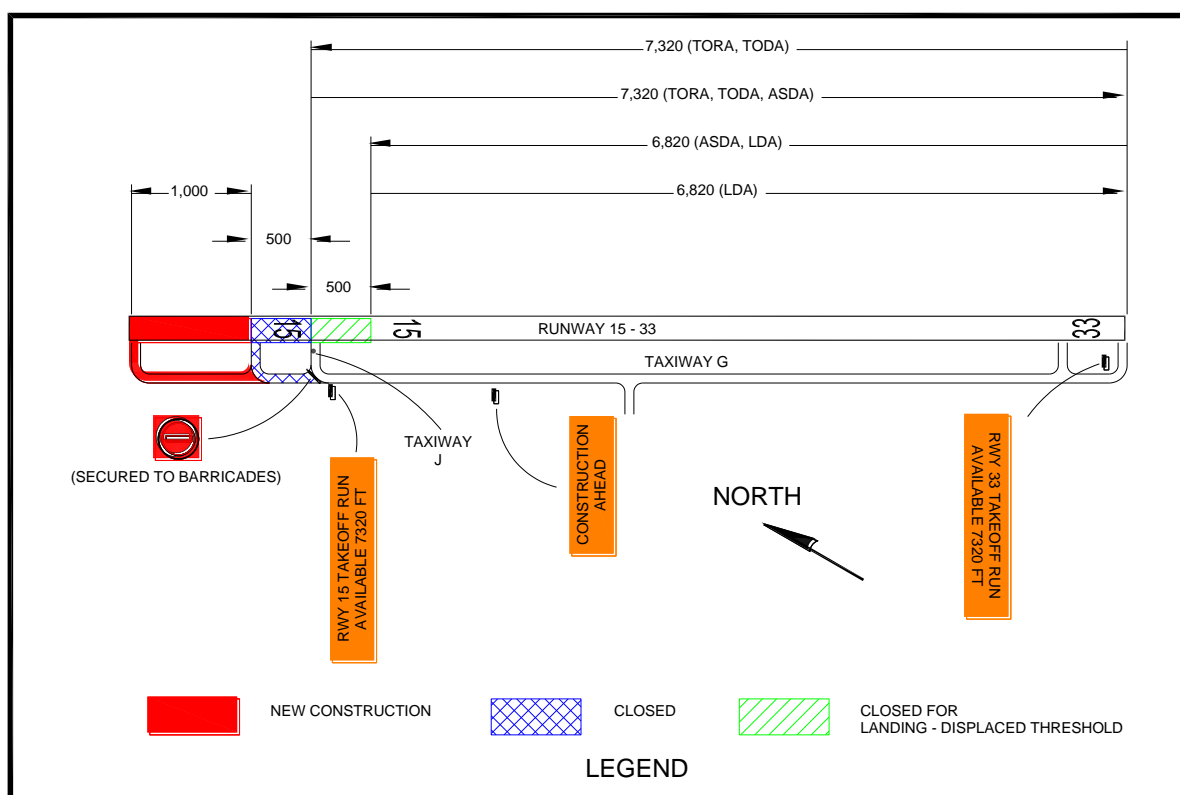
Item	Action Required (Describe)	No Action Required (Check)
Failure to issue, update, or cancel NOTAMs about airport or runway closures or other construction related airport conditions.		
Failure to mark and identify utilities or power cables. Damage to utilities and power cables during construction activity can result in the loss of runway / taxiway lighting; loss of navigation, visual, or approach aids; disruption of weather reporting services; and/or loss of communications.		
Restrictions on ARFF access from fire stations to the runway / taxiway system or airport buildings.		
Lack of radio communications with construction vehicles in airport movement areas.		
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.		
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.		
Spillage from vehicles (gasoline, diesel fuel, oil) on active pavement areas, such as runways, taxiways, aprons, and airport roadways.		
Failure to maintain drainage system integrity during construction (for example, no temporary drainage provided when working on a drainage system).		

Item	Action Required (Describe)	No Action Required (Check)
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.		
Failure to control dust. Consider limiting the amount of area from which the contractor is allowed to strip turf.		
Exposed wiring that creates an electrocution or fire ignition hazard. Identify and secure wiring, and place it in conduit or bury it.		
Site burning, which can cause possible obscuration.		
Construction work taking place outside of designated work areas and out of phase.		

APPENDIX E. SAMPLE OPERATIONAL EFFECTS TABLE**E.1 Project Description.**

Runway 15-33 is currently 7820 feet long, with a 500 foot stopway on the north end. This project will remove the stopway and extend the runway 1000 feet to the north and 500 feet to the south. Finally, the existing portion of the runway will be repaved. The runway 33 glide slope will be relocated. The new runway 33 localizer has already been installed by FAA Technical Operations and only needs to be switched on. Runway 15 is currently served only by a localizer, which will remain in operation as it will be beyond the future RSA. Appropriate NOTAMS will be issued throughout the project.

- E.1.1 During Phase I, the runway 15 threshold will be displaced 1000 feet to keep construction equipment below the approach surface. The start of runway 15 takeoff and the departure end of runway 33 will also be moved 500 feet to protect workers from jet blast. Declared distances for runway 33 will be adjusted to provide the required RSA and applicable departure surface. Excavation near Taxiway G will require its ADG to be reduced from IV to III. See [Figure E-1](#).

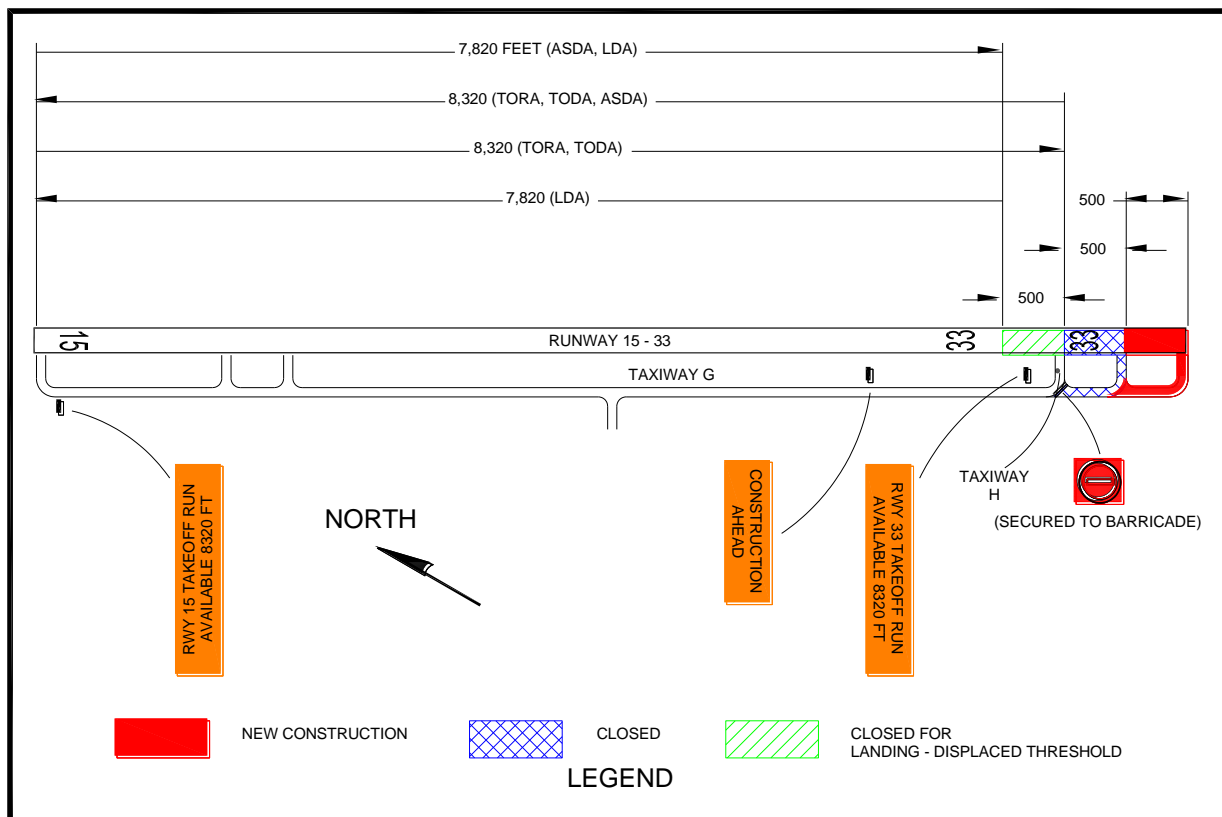
Figure E-1. Phase I Example

Note 1: Where hold signs are installed on both sides of a taxiway, install the TORA sign on the left side of the taxiway before the final turn to the runway intersection.

Note 2: Based on the declared distances for Runway 33 departures, the maximum equipment height in the construction area is 12.5 feet ($500/40 = 12.5$).

- E.2 During Phase II, the runway 33 threshold will be displaced 1000 feet to keep construction equipment below the approach surface. The start of runway 33 takeoff and the departure end of runway 15 will also be moved 500 feet to protect workers from jet blast. Declared distances for runway 15 will be adjusted to provide the required RSA and applicable departure surface. See Figure E-2.

Figure E-2. Phase II Example



Note 1: Where hold signs are installed on both sides of a taxiway, install the TORA sign on the left side of the taxiway before the final turn to the runway intersection.

Note 2: Based on the declared distances for Runway 15 departures, the maximum equipment height in the construction area is 12.5 feet ($500/40 = 12.5$).

- E.3 During Phase III, the existing portion of the runway will be repaved with Hot Mix Asphalt (HMA) and the runway 33 glide slope will be relocated. Construction will be accomplished between the hours of 8:00 pm and 5:00 am, during which the runway will be closed to operations.

Figure E-3. Phase III Example

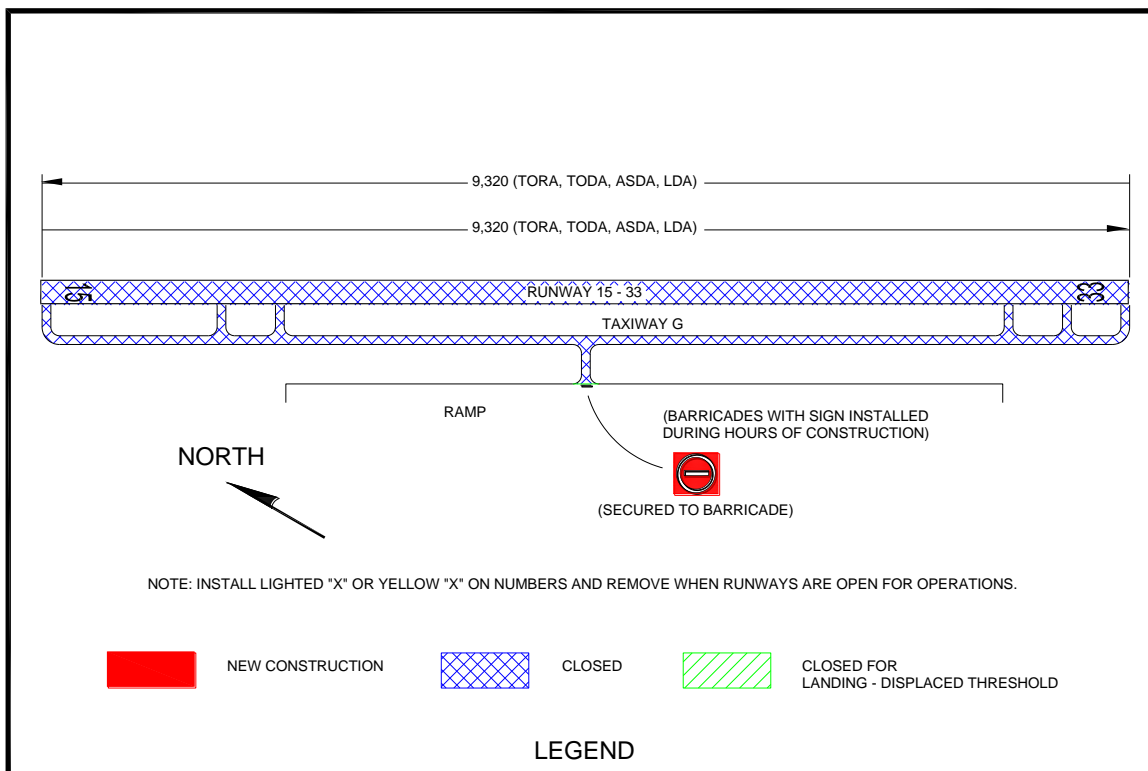


Table E-1. Operational Effects Table

Project	Runway 15-33 Extension and Repaving			
Phase	Normal (Existing)	Phase I: Extend Runway 15 End	Phase II: Extend Runway 33 End	Phase III: Repave Runway
Scope of Work	N/A	Extend Runway 15-33 1,000 ft on north end with Hot Mix Asphaltic Concrete (HMA).	Extend Runway 15-33 500 ft on south end with Hot Mix Asphaltic Concrete (HMA).	Repave existing runway with HMA Relocate Runway 33 Glide Slope
Effects of Construction Operations	N/A	Existing North 500 ft closed	Existing South 500 ft closed	Runway closed between 8:00 pm and 5:00 am Edge lighting out of service
Construction Phase	N/A	Phase I (Anticipated)	Phase II (Anticipated)	Phase III (Anticipated)
Runway 15 Average Aircraft Operations	Carrier: 52 /day GA: 26 /day Military: 11 /day	Carrier: 40 /day GA: 26 /day Military: 0 /day	Carrier: 45 /day GA: 26 /day Military: 5 /day	Carrier: 45 / day GA: 20 / day Military: 0 /day
Runway 33 Average Aircraft Operations	Carrier: 40 /day GA: 18 /day Military: 10 /day	Carrier: 30 /day GA: 18 /day Military: 0 /day	Carrier: 25 /day GA: 18 /day Military: 5 /day	Carrier: 20 /day GA: 5 /day Military: 0 /day
Runway 15-33 Aircraft Category	C-IV	C-IV	C-IV	C-IV
Runway 15 Approach Visibility Minimums	1 mile	1 mile	1 mile	1 mile
Runway 33 Approach Visibility Minimums	$\frac{3}{4}$ mile	$\frac{3}{4}$ mile	$\frac{3}{4}$ mile	1 mile

Note: Proper coordination with Flight Procedures group is necessary to maintain instrument approach procedures during construction.

Project		Runway 15-33 Extension and Repaving			
Phase		Normal (Existing)	Phase I: Extend Runway 15 End	Phase II: Extend Runway 33 End	Phase III: Repave Runway
Runway 15 Declared Distances	TORA	7,820	7,320	8,320	9,320
	TODA	7,820	7,320	8,320	9,320
	ASDA	7,820	7,320	7,820	9,320
	LDA	7,820	6,820	7,820	9,320
Runway 33 Declared Distances	TORA	7,820	7,320	8,320	9,320
	TODA	7,820	7,320	8,320	9,320
	ASDA	8,320	6,820	8,320	9,320
	LDA	7,820	6,820	7,820	9,320
Runway 15 Approach Procedures		LOC only	LOC only	LOC only	LOC only
		RNAV	RNAV	RNAV	RNAV
		VOR	VOR	VOR	VOR
Runway 33 Approach Procedures		ILS	ILS	ILS	LOC only
		RNAV	RNAV	RNAV	RNAV
		VOR	VOR	VOR	VOR
Runway 15 NAVAIDs		LOC	LOC	LOC	LOC
Runway 33 NAVAIDs		ILS, MALSR	ILS, MALSR	ILS, MALSR	LOC, MALSR
Taxiway G ADG		IV	III	IV	IV
Taxiway G TDG		4	4	4	4
ATCT (hours open)		24 hours	24 hours	24 hours	0500 - 2000
ARFF Index		D	D	D	D

Project	Runway 15-33 Extension and Repaving			
Phase	Normal (Existing)	Phase I: Extend Runway 15 End	Phase II: Extend Runway 33 End	Phase III: Repave Runway
Special Conditions	Air National Guard (ANG) military operations	All military aircraft relocated to alternate ANG Base	Some large military aircraft relocated to alternate ANG Base	All military aircraft relocated to alternate ANG Base
Information for NOTAMs		Refer above for applicable declared distances. Taxiway G limited to 118 ft wingspan	Refer above for applicable declared distances.	Refer above for applicable declared distances. Airport closed 2000 – 0500. Runway 15 glide slope OTS.

Note: This table is one example. It may be advantageous to develop a separate table for each project phase and/or to address the operational status of the associated NAVAIDs per construction phase.

Complete the following chart for each phase to determine the area that must be protected along the runway and taxiway edges:

Table E-2. Runway and Taxiway Edge Protection

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

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

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

Table E-3. Protection Prior to 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 Distance to Threshold Based on Required Approach Slope*	
				ft	: 1
			ft	ft	: 1
			ft	ft	: 1
			ft	ft	: 1
			ft	ft	: 1

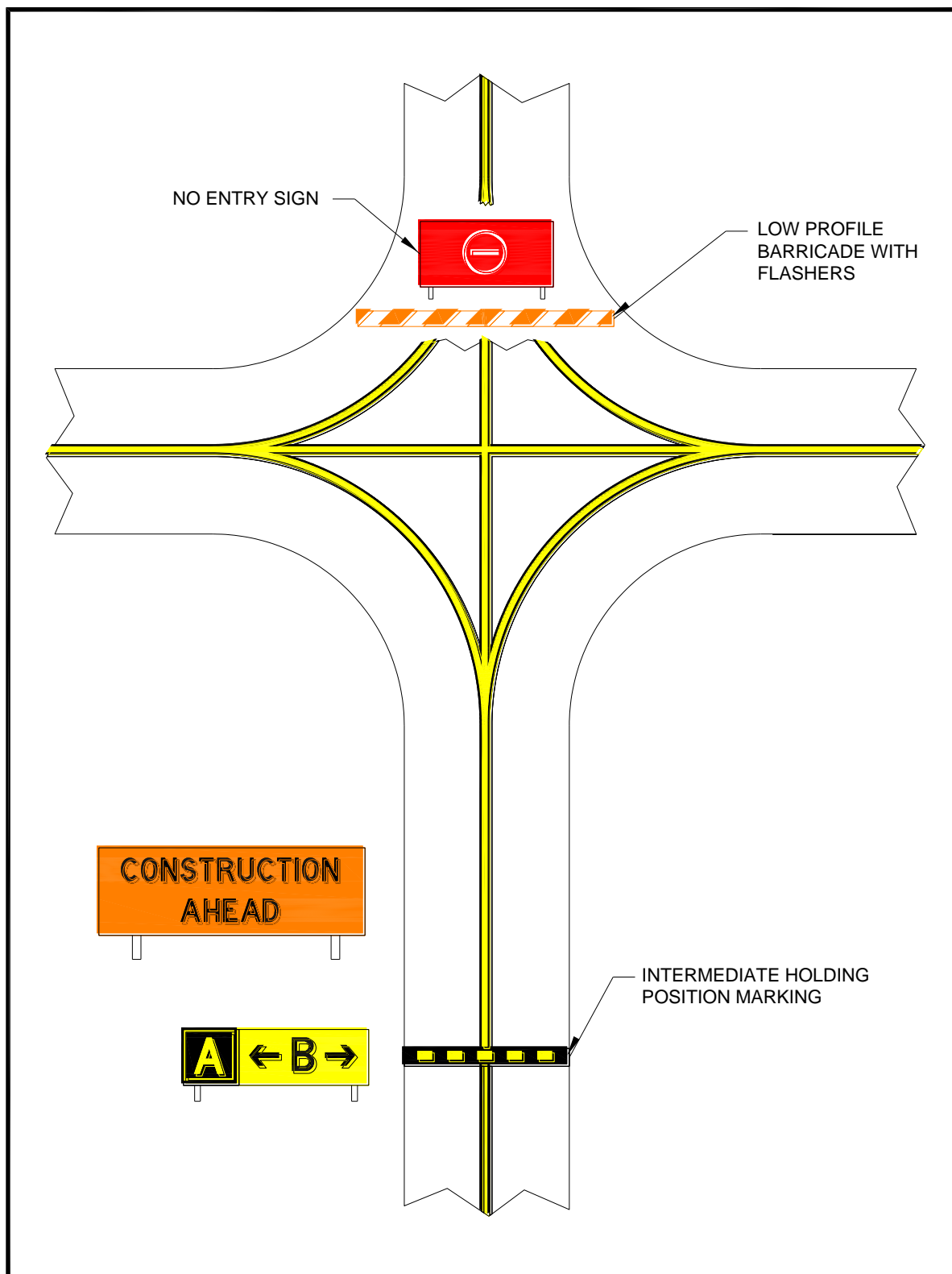
*See AC 150/5300-13 to complete the chart for a specific runway.

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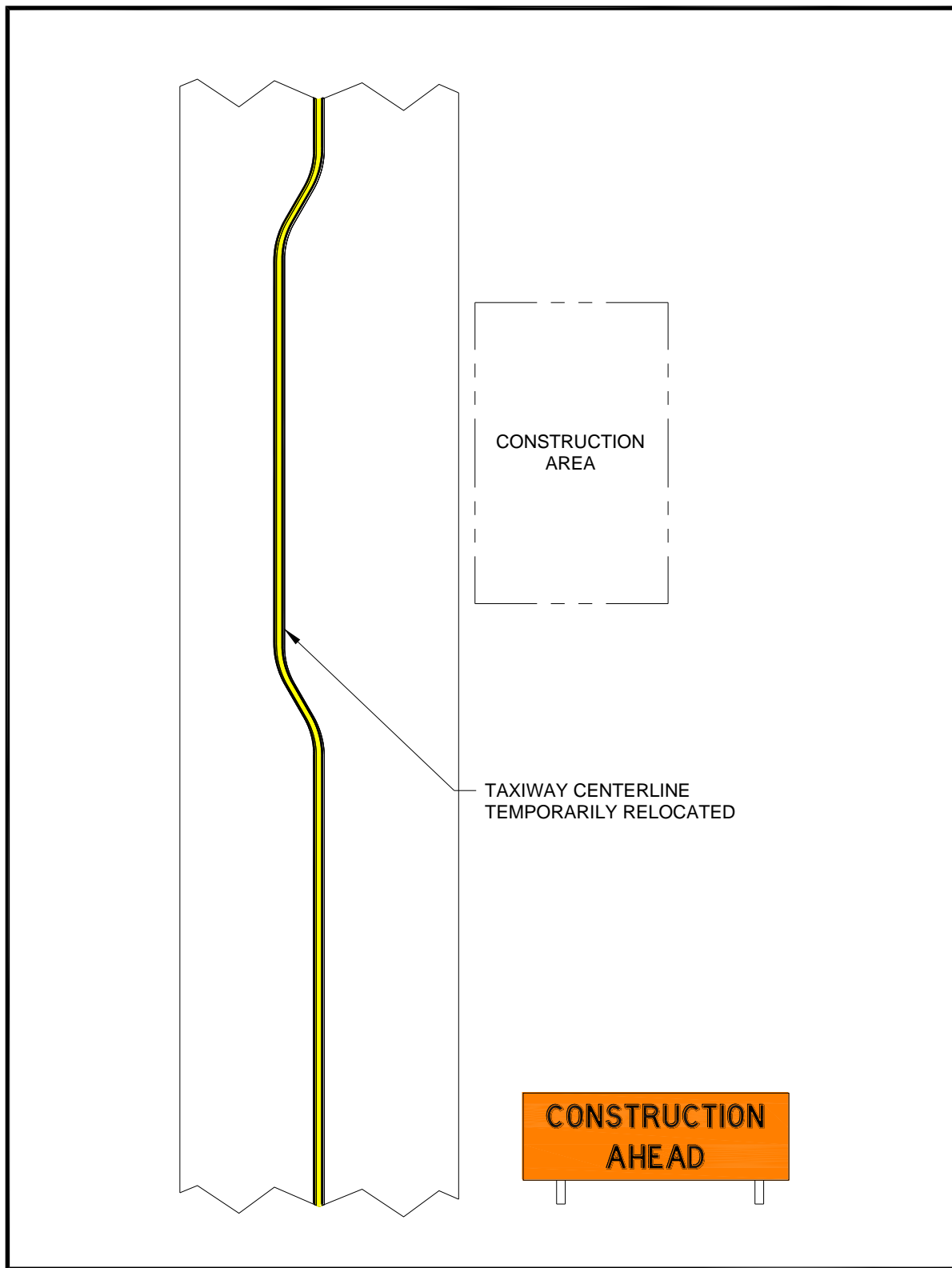
APPENDIX F. ORANGE CONSTRUCTION SIGNS

Figure F-1. Approved Sign Legends



Figure F-2. Orange Construction Sign Example 1

Note: For proper placement of signs, refer to EB 93.

Figure F-3. Orange Construction Sign Example 2

Note: For proper placement of signs, refer to EB 93.

APPENDIX B

CONSTRUCTION SAFETY AND PHASING PLAN

CONSTRUCTION SAFETY AND PHASING PLAN (CSPP)

Schedule I
Apron Expansion

Schedule II
8 Unit T-Hangar

Schedule III
2 Additional T-Hangars

Schedule IV
2 Additional T-Hangars

MoDOT Project No. 19-026A-1

Memphis Memorial Airport

Memphis, Missouri

Sponsored By:
City of Memphis
Federal Aviation Administration (FAA)
MoDOT

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Main 573.636.3200
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1. COORDINATION

During construction, airport operational safety is of paramount importance. Coordination of project information to all individuals involved with the project is essential for ensuring safe operations are maintained at all times. In order to minimize potential for incidents during construction, it is imperative that all individuals involved with the project and/or airport users be kept informed of any and all changes to operations. Discussions of operational safety will need to take place throughout the entire life of the project, including design, bidding, pre-construction, and construction. Meetings between the Resident Engineer, Eagle County Regional Airport (Airport), Contractor, sub-contractors, airport tenants and airport users will be required to discuss specific project related impacts to operations. The Airport staff is ultimately responsible for the safety at the airport. Notice to users of operational changes due to construction will be issued via NOTAM's by the airport. No closures will be permitted without the pertinent NOTAM in place for each specific closure. Emergency access for both airport (ARFF) and off-airport (Police, Fire, and EMT) based emergency service shall be maintained at all times. Routing for such traffic shall be determined and made known to all supervisor personnel involved in the construction project. Coordination of this access will be proposed by the Contractor and approved by the Resident Engineer and the Airport Operations Manager.

A pre-construction meeting will be held prior to the Contractor beginning work or resuming staging of major construction material and equipment on-site. The Airport, the Contractor's on-site supervisory staff, and representatives from the Engineer shall be present. Safety, this document and the Safety Plan Compliance Document (SPCD) prepared by the Contractor, will be a significant topic on the agenda. Additionally, operational safety during construction will be a main topic of discussion at the pre-construction meeting.

A. CONTRACTOR PROGRESS MEETINGS

The Contractor is required to have weekly construction progress meetings to discuss all relevant construction topics including safety reminders, scheduling, and general construction issues. Attendance of the Contractor, Resident Engineer, Airport, and any other pertinent personnel are required at these meetings. Operational safety will be a standing agenda item for discussion during these progress meetings. A review of the Contractor's adherence to the project's Construction Safety and Phasing Plan (CSPP) and Safety Plan Compliance Document (SPCD) will be made at each meeting. Immediate correction of any deficiencies or violations will be required. The location and time of the weekly meetings will be determined during the pre-construction meeting. Where operational safety is concerned, the Contractor shall update the Resident Engineer overseeing construction on daily basis or more frequently if needed, of any changes or Contractor concerns.

B. SCOPE OR SCHEDULE CHANGES

In the event of a scope or schedule change, the Contractor shall notify the Resident Engineer and the Memphis Regional Airport Operations Manager immediately. All parties involved will need to evaluate the impact(s) of the change and will determine what measures will need to be taken to maintain a safe construction site. Change in the scope or duration of the project may necessitate revisions to the Construction Safety and Phase Plan (CSPP).

C. FAA ATO COORDINATION

The FAA ATO will need to be notified immediately of any changes that affect aircraft movement within the airport which include airway facility shutdowns and restarts. The Airport will be responsible for coordinating any changes including NOTAM's to the FAA

ATO. It is not anticipated that any shutdown to FAA facilities will be required for this project. All project limits are outside the critical area of any navigational aid (NAVAID).

2. PHASING

In order to minimize disruptions to airport operations during construction, construction will be broken up by areas to limit the amount of aircraft operational areas affected at any given time. Maintaining continual access to the terminal building and air carrier apron is mandatory during all phases of construction to allow the airlines to operate during construction. The phasing plan proposed was developed with help from the Airport and is considered to be the most effective way of maintaining the required aircraft access, while imposing the least amount of impact on construction operations, and without sacrificing safety. The phasing for this project is presented below, and is visually depicted in the Construction Safety Drawings (Sheets G050 through G052) attached at the back of this document.

This project will be completed in one schedule having multiple phases. Each of the phases is discussed in further detail in the Construction Safety Drawing plan sheets included at the end of this document.

A. PHASE ELEMENTS

1. Schedule I, Phase 1 – Apron Expansion (Phasing Sheet G052)

The Contractor will be given 30 calendar days to complete the project. The project will only consist of one phase, but four schedules. Schedule I, Phase 1 will consist of the expansion of the Apron. Schedule I will be constructed concurrently with Schedules II, III and IV. During Schedule I, the Contractor will be: completing unclassified excavation, placing an aggregate base course, paving the P-401 pavement and completing temporary pavement markings on the new pavement.

Hauling activities will be required and will be routed per the haul routes depicted on the phasing plans. Aircraft will have the right of way at all times. Prior to beginning work on this phase, the Contractor shall have barricades and necessary traffic control in place in accordance with the plans.

Additionally, the Contractor will be hauling across active airport pavements. The contractor shall have sweepers on site at all times to immediately remove any FOD that falls on to these active pavements.

2. Schedule II, Phase 1 – Construct 8-Unit T-Hangar (Phasing Sheet G052)

Schedule II, Phase 1 will be constructed concurrently with Schedule I Phase 1. During Schedule II, the Contractor will be: completing unclassified excavation, pouring a concrete slab for the T-Hangar and erecting the 8-unit T-Hangar. During Schedule II, the Contractor will be: excavating for the foundation, replacing the base material with imported aggregate, erecting the 8-unit T-Hangar and completing all the electrical.

Hauling activities will be required and will be routed per the haul routes depicted on the phasing plans. Aircraft will have the right of way at all times. Prior to beginning work on this phase, the Contractor shall have barricades and necessary traffic control in place in accordance with the plans.

3. Schedule III, Phase 1 – Additional 2 T-Hangars (Phasing Sheet G052)

Schedule III, Phase 1 will be constructed concurrently with Schedule I Phase 1. During Schedule III, the Contractor will be: completing unclassified excavation, pouring a concrete slab for the T-Hangar and erecting the 2-unit T-Hangar. During Schedule III, the Contractor will be: excavating for the foundation, replacing the base material with imported aggregate, erecting the 2-unit T-Hangar and completing all the electrical.

Hauling activities will be required and will be routed per the haul routes depicted on the phasing plans. Aircraft will have the right of way at all times. Prior to beginning work on this phase, the Contractor shall have barricades and necessary traffic control in place in accordance with the plans.

4. Schedule IV, Phase 1 – Additional 2 T-Hangars (Phasing Sheet G052)

Schedule IV, Phase 1 will be constructed concurrently with Schedule I Phase 1. During Schedule IV, the Contractor will be: completing unclassified excavation, pouring a concrete slab for the T-Hangar and erecting the 2-unit T-Hangar. During Schedule IV, the Contractor will be: excavating for the foundation, replacing the base material with imported aggregate, erecting the 2-unit T-Hangar and completing all the electrical.

Hauling activities will be required and will be routed per the haul routes depicted on the phasing plans. Aircraft will have the right of way at all times. Prior to beginning work on this phase, the Contractor shall have barricades and necessary traffic control in place in accordance with the plans.

B. CONSTRUCTION SAFETY DRAWINGS

The Construction Safety Drawings (Sheets G050 through G052) are attached at the back of this document to show the phasing requirements for this project.

3. AREAS AND OPERATIONS AFFECTED BY THE CONSTRUCTION ACTIVITY

All work within the Airport Operations Area shall be accomplished in conformance to Advisory Circular 150/5370-2G, Operational Safety on Airports During Construction. The contract drawings include information regarding requirements for operational safety on the airport during construction.

The Contractor shall prepare a detailed Safety Plan Compliance Document (SPDC) as stated in the Advisory Circular 150-5370-2G. The Contractor's SPDC shall identify specific methods, sequencing, phasing that he/she intends to use in order to accomplish the project work. The SPDC shall be submitted by the Contractor to the Engineer for approval prior to the pre-construction conference for the project. The Engineer will review the SPDC with the Sponsor/Owner and supply any changes or revisions to the Contractor for incorporation into the plan. The final SPDC shall be the result of a coordinated effort between the Owner/Sponsor, the Engineer and the Contractor.

The Contractor shall adhere to the approved SPDC as agreed upon by Airport Staff, Engineer, and Contractor. Modifications or deviations from the approved safety plan shall be submitted to the Engineer for review and approval prior to implementation.

A. IDENTIFICATION OF AFFECTED AREAS

Areas affected by construction activities associated with this project are identified on the Construction Safety Drawings. Construction activities associated with Schedule I will primarily take place south of the existing ramp. Haul routes associated with the project include the private road off of Highway 136 and Highway 136. Section 2 of this document and the attached Construction Safety Drawings describe in detail which areas are affected and for what durations.

B. MITIGATION OF EFFECTS

To mitigate the effects of the construction activities associated with the project; alternative routes have been established for emergency and ARFF vehicles, aircraft taxiway movements have been considered and phasing plans have been created. Because the phasing for this project is critical to maintaining safety and operations at the airport during construction, adhering to the requirements as laid out in the attached phasing sheets is imperative. To help assist all individuals with this process, it is important that all airport personnel, air traffic operation personnel, contractor personnel, and engineering personnel discuss current and upcoming phases during the required weekly construction progress meetings as mentioned in Section 1 of this document.

4. PROTECTION OF NAVIGATION AIDS (NAVAID'S)

This project will not require a shutdown of any NAVAIDS associated with Runway 12/30. NAVAID's at the airport include the medium-intensity approach lighting system (MALSR). These NAVAIDS, along with their associated critical areas, are depicted on the Construction Safety Drawings.

The Contractor shall coordinate with the Resident Engineer/Airport regarding the location of all NAVAIDS within or near the project limits. The Contractor must remain clear from all NAVAID critical areas. Any damage to existing NAVAIDS will be the responsibility of the Contractor and repaired at no cost to the Airport.

5. CONTRACTOR ACCESS

The Contractor will be required to submit to Airport Staff prior to the commencement of construction, evidence in the form of a certification letter that all of their employees who will have unescorted access to the AOA have been checked for employment, security, and criminal history for the last ten years. The letter will also certify that these employees meet all security regulations as required by the Sponsor's security program.

Haul roads used for construction access shall be designated by the Engineer. Because, the haul route access a public highway, the Contractor is responsible for providing flaggers, sweepers and whatever is deemed necessary to keep access to site safe for all tenants and the public. No deviations from these security measures shall be allowed at any time. Penalties associated with deviations from these security provisions are identified in Section 12 of this document.

A. LOCATION OF STOCKPILED CONSTRUCTION MATERIALS

The Contractor's staging area is shown on the Construction Safety Overall Phasing Plan (Sheet G050) and is located to the south of the project site and existing apron. All material storage and staging will occur in this area. Any stockpiling activities shall be conducted outside of the all runway/taxiway object free areas as well.

B. VEHICLE AND PEDESTRIAN OPERATIONS

1. Construction Site Parking

Construction employee parking will be within the staging area as shown on the Construction Safety Overall Phasing Plan.

2. Construction Equipment Parking

Construction equipment parking will be allowed at the contractor's staging area in the location as shown on the Construction Safety and Overall Safety Plan (Sheet G050), or at a location approved by the Resident Engineer. If the equipment must be parked in an Airport Operations Area (AOA), the equipment must be lighted with a beacon per AC 150/5370-2G. No equipment or material shall be parked or stored in any runway or taxiway safety area or object free area.

3. Access and Haul Roads

The access point to the project is depicted on Sheet G050. The contractor shall keep all access gates closed and locked when not in use. When a gate is open, it shall be appropriately guarded by the contractor to ensure that no unauthorized vehicles or personnel enter airport property.

The Contractor shall obtain approval from the Engineer prior to establishing haul roads within the airport property. Once established, the haul roads shall be utilized for all equipment traffic, and the equipment shall not be allowed to stray or wander away from the established routes. The haul roads shall be the responsibility of the Contractor and shall be maintained and kept in good order at all times. When required, water shall be applied at the locations and in the amounts necessary to minimize dust and dirt in the air operations area. Since construction operations will be within active airport operation areas, the airport will require additional dust control measures be used on haul roads and the work area in order not to interfere with airport operations. Haul roads that cross any active taxiway, movement areas, non-movement areas or active areas of the ramp shall be kept clean and in good order at all times. The Contractor shall be prepared at all times to repair any damage caused by the movement of equipment on any of the haul roads at the direction of the Engineer, whether in designated or undesignated areas. After completion of the project, the Contractor shall be required to regrade any unpaved portions of the haul road and to reseed the area with local native grasses to match the existing conditions of the area. The performance of any work as specified by this provision, including watering, maintenance, and repair of the haul roads, shall not be measured and paid for directly, but shall be considered as necessary and incidental to the work.

Establishment of haul roads off of Airport property shall be the sole responsibility of the Contractor.

Contractor movement shall be restricted to the pre-determined access routes as shown on the attached Construction Safety Drawings and within the work area. Work areas shall be delineated with barricades as shown on the phasing drawings. The Contractor shall not operate outside of these areas without approval of the Engineer or Airport Operations Manager. The Contractor's operators shall be aware the haul is also utilized as a perimeter road and will be shared with Airport Operation and FAA vehicles.

4. Marking and Lighting of Vehicles

All vehicles operating within the AOA and in the movement/non-movement areas must clearly identify themselves for control purposes. The identification symbols should be a minimum 8-inch 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.

To operate within the AOA during daylight hours, the vehicle must have a flag (day only) or yellow flashing light (day or night) attached to it. Any vehicle operation within the AOA during hours of darkness or reduced visibility must be equipped with a yellow flashing light. Flashing lights must be mounted on the uppermost part of the vehicle structure. Flags shall be at least 3-foot by 3-foot square having a checkered pattern of international orange and white squares at least 1 foot on each side. All flashing lights and/or flags shall be kept in good condition and immediately replaced if requested by the Engineer or Airport Operations.

5. Description of Proper Vehicle Operations

Proper vehicle operations are described as confirming to all rules and regulation for driving as directed by the Memphis Memorial Airport.

6. Required Escorts

For all normal operations, the Contractor should have no need to access active portions of the AOA. If access is necessary, the Contractor shall work with the RPR or City of Memphis staff to determine if escorts are necessary.

7. Situational Awareness

Vehicle drivers must confirm by personal observation that no aircraft is approaching their position (either in the air or on the ground) when given clearance to cross a runway, taxiway, or any other area open to airport operations. In addition, it is the responsibility of the escort vehicle driver to verify movement/position of all escorted vehicles at any given time.

The Contractor is not allowed to access open runways or taxiways including any runway or taxiway safety areas without an escort from airport personnel or the Resident Engineer. Aircraft have the right-of-way over vehicles or pedestrians at all times.

8. Two-way Radio Communication Procedures

The Contractor's superintendent and, if required, flagmen/haul route monitors shall be required to monitor transceiver radios tuned to the Memphis Memorial Airport's Unicom frequency 122.8 MHz at all times. The Contractor shall supply radios.

When any construction activities are required on active pavements, a flagman, who is monitoring a radio, shall be positioned within the work area in such a manner that they can clear construction men and equipment across the active pavement.

Further, any unusual occurrences in the flight pattern of approaching or departing aircraft shall be acknowledged by all concerned so that operation of the airport and the construction work can be safely carried on at all times.

9. Construction Site Safety

All personnel working on the construction site, including gate guards, are recommended to have personal protective equipment on at all times. This includes but is not limited to vests, hard hats, hearing protection, eye protection, and radios.

6. WILDLIFE MANAGEMENT

All wildlife management within the Airport Operations Area shall be accomplished in conformance to Advisory Circular 150/5200-33, *Hazardous Wildlife Attractants On or Near Airports*, and Certalert 98-05, *Grasses Attractive to Hazardous Wildlife*. In general, the Contractor must carefully control and continuously remove waste or loose material that might attract wildlife.

A. TRASH

The Contractor is responsible to complete a daily inspection or more frequently, if deemed necessary by the Resident Engineer, of the construction site (including the Contractor's Staging Area) for any trash or objects that might attract wildlife. The Contractor shall provide trash containers with lids in their staging site.

B. STANDING WATER

Because standing water can attract wildlife, the Contractor is responsible to complete a daily inspection of the construction site for any standing water. With the discretion of the Resident Engineer, the Contractor shall remove this hazard.

C. TALL GRASS AND SEEDS

The Contractor will install soil, seeding and hydromulch as specified in the *T-901 Seeding* specification for this project or as directed by the Engineer.

D. POORLY MAINTAINED FENCING AND GATES

The Contractor shall be required to maintain all fences and gates throughout the duration of the project, to the satisfaction of the Resident Engineer.

E. DISRUPTION OF EXISTING WILDLIFE HABITAT

The Contractor shall notify the Resident Engineer when a wildlife sighting has occurred on the project site to mitigate any disruption to the existing wildlife habitat.

7. FOREIGN OBJECT DEBRIS (FOD) MANAGEMENT

The presence of FOD on the apron is a significant safety concern, as debris can be ingested into an aircraft's engine causing extensive damage, or can be launched across the apron by jet blast, potentially causing bodily injury or damaging other aircraft. Materials capable of creating FOD must be continuously removed during the construction project. The Contractor is required to keep all taxiways and aprons, open to aircraft free from FOD at all times. The Contractor is required to maintain FOD control continually and to the satisfaction of the Resident Engineer. FOD Control measures shall include the use of power brooms, FOD boss, and manual removal as well as any other means deemed necessary. Prior to opening any pavement to aircraft, the Contractor shall conduct a sweep of the pavement to verify that it is FOD free. The apron area to the north of the limits of construction will be a high priority area during this project.

As moderate to strong winds are a frequent occurrence at Memphis Memorial Airport the contractor must secure materials that have the potential to become wind borne at all times.

8. HAZARDOUS MATERIAL (HAZMAT) MANAGEMENT

Although hazardous material is not anticipated to be present on this project, if hazardous material is encountered, the Contractor shall inform the Resident Engineer and Memphis Emergency Authorities immediately. The Contractor shall be responsible for any costs and/or mitigation associated with any spills and/or leaks. Material Safety Data Sheets (MSDS) are required for all hazardous materials used on Airport property.

9. NOTIFICATION OF CONSTRUCTION ACTIVITIES

Prior to commencing any construction activities as well as prior to beginning a new construction phase the Contractor shall notify the Resident Engineer and Airport Operations 72 hours in advance. During construction activities the Contractor shall immediately notify the Resident Engineer and Airport Operations of any conditions that may adversely affect the operational safety of the Airport.

A. LIST OF RESPONSIBLE REPRESENTATIVES/POINTS OF CONTACT

Agency Name	Type of Agency	Telephone No.
Memphis Police Department	Police Department	(660) 465-2612 Or 911
Rutledge Fire Department	Fire Department	(660) 883-5711 Or 911
Scotland County Hospital	Hospital	(660) 465-8511 Or 911
City of Memphis	City Administration	(660) 465-7285
City Manager Fred Clapp	Committee Chairman	(660) 465-2195
Aviation, Inc. Bryan Gregory	Project Manager	(573) 418-1450 Cell

B. NOTICES TO AIRMEN (NOTAM)

Only the airport operations staff may initiate or cancel NOTAM's on airport conditions, and is the only entity that can close or open a runway or taxiway. The airport operations staff must coordinate the issuance, maintenance, and cancellation of NOTAM's about airport conditions resulting from construction activities and must provide information on closed or hazardous conditions on airport movement areas to the FAA Flight Service Station (FSS) so it can issue a NOTAM. The Contractor must notify the Resident Engineer and Airport Operations Manager when scheduling/scoping for the project has changed that would require a modification to the NOTAM's.

C. EMERGENCY NOTIFICATION PROCEDURES

In an event of an emergency, the Contractor shall notify the Resident Engineer and Airport staff. If necessary, the Contractor shall contact 911 and Airport Emergency.

D. COORDINATION WITH ARFF PERSONNEL

In an event that the Contractor must coordinate construction activities with ARFF Personnel, the Contractor will notify Airport staff or Resident Engineer. The Airport staff or Resident Engineer will be responsible to notify the event to ARFF Personnel.

E. NOTIFICATION TO THE FAA

Any person proposing construction or alteration of objects that affect navigable airspace, as defined in Part 77, must notify the FAA. This includes construction equipment and proposed parking areas for this equipment.

In regards to FAA owned NAVAID's damage, the Airport shall contact the FAA's Operations Control Center at 1-866-432-2622.

No shutdowns of NAVAID's are anticipated for the duration of this project. In the event that a shutdown of a NAVAID is required of more than 24 hours or more than 4 hours daily on consecutive days a minimum notice of 45 days must be given to the FAA ATO/Technical Operations prior to the shutdown commencing.

10. INSPECTION REQUIREMENTS

A. DAILY (OR MORE FREQUENT) INSPECTIONS

Inspections shall be conducted daily and more frequently if necessary by the Resident Engineer to ensure conformance with this document. The checklist provided at the end of this report was copied from FAA AC 150/5370-2G Appendix 4, *Construction Project Daily Safety Inspection Checklist*. This checklist shall be completed by the Contractor to the Engineer's satisfaction and the Contractor shall submit a copy of all the completed checklists to the Engineer and the Airport Manager. The Contractor should fill out this checklist everyday construction operations occur on this project.

B. FINAL INSPECTIONS

Final inspections shall be conducted after every construction phase is complete as detailed in Section 2 of this document. The final inspection should be completed with the Contractor, Resident Engineer, and Airport Manager.

11. UNDERGROUND UTILITIES

Prior to beginning excavation activities the Contractor shall notify the Resident Engineer and Airport Operations at least 3 working days prior to the scheduled excavation. The FAA shall attempt to locate all of their underground cables that are located in the vicinity of the work areas, prior to construction in the area. The Contractor shall attempt to locate the Sponsor's underground cables and other sub-surface utilities prior to construction. Damage to the underground cables, whether FAA's or Sponsor's, through negligence on the part of the Contractor will require replacement by the Contractor at no cost to the Sponsor. Any splicing or replacing of damaged cable shall meet current FAA specifications. Damage to other underground utilities through Contractor's negligence shall be repaired according to the relevant utility's standards and at no cost to the Sponsor.

12. PENALTIES

Penalties are based on the Airport's policies. The Contractor is responsible for any penalties that the Airport may distribute. If a vehicle enters the Runway Safety Area while the runway is operational (runway incursion) the driver will lose his/her driving privileges and, at the

discretion of the Airport, may lose privileges accessing the AOA. Any personnel determined to be operating in an unsafe manner will be removed from airport property.

13. SPECIAL CONDITIONS

The contractor shall provide the necessary dust control to ensure that dust from the haul routes and construction areas is kept to a minimum.

14. RUNWAY AND TAXIWAY VISUAL AIDS

A. GENERAL

It is anticipated that Runway 12/30, the Taxiway and all associated taxiway connectors will remain open. Therefore, the project will not require any existing signs or lights associated with the airfield to be covered.

B. MARKINGS

The procedure to close off the apron/taxiway for construction shall consist of placing barricades and flashers on the perimeter of the construction area as shown in the phasing plan sheets at the end of this document or as directed by the Engineer.

C. LIGHTING AND VISUAL NAVAIDS

Portions of the apron will be closed for the duration of this project. The Contractor will need to install approved lighted, low-profile barricades during the various phases of work.

D. SIGNS, TEMPORARY, INCLUDING ORANGE CONSTRUCTION SIGNS, AND PERMANENT SIGNS

In addition to erecting barricades and covering lights, the Contractor will next to cover any signs that lead to closed pavements during construction.

15. MARKING AND SIGNS FOR ACCESS ROUTES

All required signs and markings shall conform to Advisory Circular 150/5340-18, *Standard for Airport Sign Systems*, and to the Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD), to the extent possible. Signs adjacent to areas used by aircraft must comply with the frangible requirements as stated in Advisory Circular, *Frangible Connections*. The location and design of any signs will be directed by the Engineer or Airport Manager and provided by the Contractor.

16. HAZARD MARKINGS AND LIGHTINGS

A. PURPOSE

The hazard marking and lighting prevents pilots from entering areas closed to aircraft, and prevents construction personnel from entering areas open to aircraft. Prior to construction on or adjacent to any taxiway or apron, the Contractor shall, upon approval by the Engineer, close the taxiway and/or apron, in accordance with the specific phasing plan associated with that phase, prior to beginning work. The Contractor shall be responsible for clearly marking and defining the closed taxiways by use of warning lights, barricades, flags and closed taxiway or runway markings in conformance with Advisory Circular 150/5370-2G. The Contractor shall be responsible for maintaining these barricades and keeping them clearly visible at all times. The Contractor's individuals responsible, as well as their contact information, for the maintenance of the hazard marking and lighting equipment are listed in Section 9 A. of this document.

Specific marking and lighting equipment details, location and other pertinent information regarding hazard marking materials including low-profile barricades are shown on the

Construction Safety Drawings, attached to the back of this document. Please note that each phase may have unique details. Additionally, prior to any deviations in location or type of hazard marking materials shall be coordinated with the Resident Engineer and Airport Operations.

B. EQUIPMENT

Approved low-profile barricades are to identify and define the limits of construction and hazardous areas on airports. Physical requirements and spacing of the barricades are specified in the construction drawings for this project. The barricades must be weighted down per the manufacturer's recommendations to prevent the barricades from moving due to wind or jet blast.

The flashing lights on the approved barricades must meet the luminance requirement of the State Highway Department. The flashing lights must be red or an approved equal. Orange flags shall be utilized on the opposite end of the barricades as well.

17. PROTECTION OF RUNWAY AND TAXIWAY AREAS

A. RUNWAY SAFETY AREA (RSA)

The Memphis Memorial Airport defines the Safety Area for Runway 12/30 as the area that is within 60 feet from the centerline of Runway 12/30. Because the vicinity of the construction project is within the apron, the construction operations should not enter into the Runway Safety Area.

If required, open trenches and excavations are not allowed in the RSA while the runway is operational. Trenches and excavations must be backfilled prior to opening the runway. If it is not possible to backfill, appropriate methods such as trench plates may be used to cover the open trench or excavations. Open trenches and excavations shall be clearly marked as approved by the Engineer and Memphis Memorial Airport Operations. All RSA's must be smoothly graded for a passage of an aircraft without causing damage to the aircraft.

B. RUNWAY OBJECT FREE AREA (ROFA)

The Memphis Memorial Airport defines the Object Free Area for Runway 12/30 as the area that is within 200 feet from the centerline of Runway 12/30. The vicinity of the construction project is located on the apron and outside of the ROFA associated with Runway 12/30.

Any embankments in the ROFA would require submitting the 7460-1 form and justification provided to the appropriate FAA Airports Regional or District Office for approval.

C. TAXIWAY SAFETY AREA (TSA)

The Memphis Memorial Airport defines the Safety Area for the Taxiway as the area that is within 24.5 feet from the centerline of the Taxiway. No work is permitted within the TSA of any active pavement.

If required, open trenches and excavations are not permitted within the TSA while the taxiway is open. If possible, backfill trenches before the taxiway is opened. If the taxiway must be opened before excavations are backfilled, cover the excavations appropriately.

Soil erosion must be controlled to maintain TSA standards, that is, the TSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations and capable, under dry conditions, of supporting aircraft rescue and fire fighting equipment, snow removal equipment, and the occasional passage of aircraft without causing structural damage to the aircraft.

D. TAXIWAY OBJECT FREE AREA (TOFA)

The Memphis Memorial Airport defines the Object Free Area for the Taxiway as the area that is within 44.5 feet from the centerline of the Taxiway. Construction activities are required within the TOFA of the Taxiway. No work is permitted within the TOFA of any active pavement.

E. OBSTACLE FREE ZONE (OFZ)

The Memphis Memorial Airport defines the Obstacle Free Zone for Runway 12/30 as the area that is within 200 feet from the centerline of Runway 12/30. Personnel, material, and/or equipment may not penetrate the OFZ while the runway is open for aircraft operations. If it is necessary to enter the OFZ, it would be necessary to coordinate with the FAA.

F. RUNWAY APPROACH/DEPARTURE SURFACES

All personnel, materials, and/or equipment must remain clear of the applicable threshold siting surfaces, as defined in Appendix 2, "Threshold Siting Requirement," of Advisory Circular 150/5300-13.

18. OTHER LIMITATIONS ON CONSTRUCTION

A. PROHIBITIONS

The use of open flame welding or torches is prohibited unless adequate fire safety precautions are provided and the Airport Operations Manager has approved their use. The use of flare pots within the AOA is prohibited at all times. The use of electrical blasting caps is prohibited on or within 1,000 feet of the Airport property.

B. RESTRICTIONS

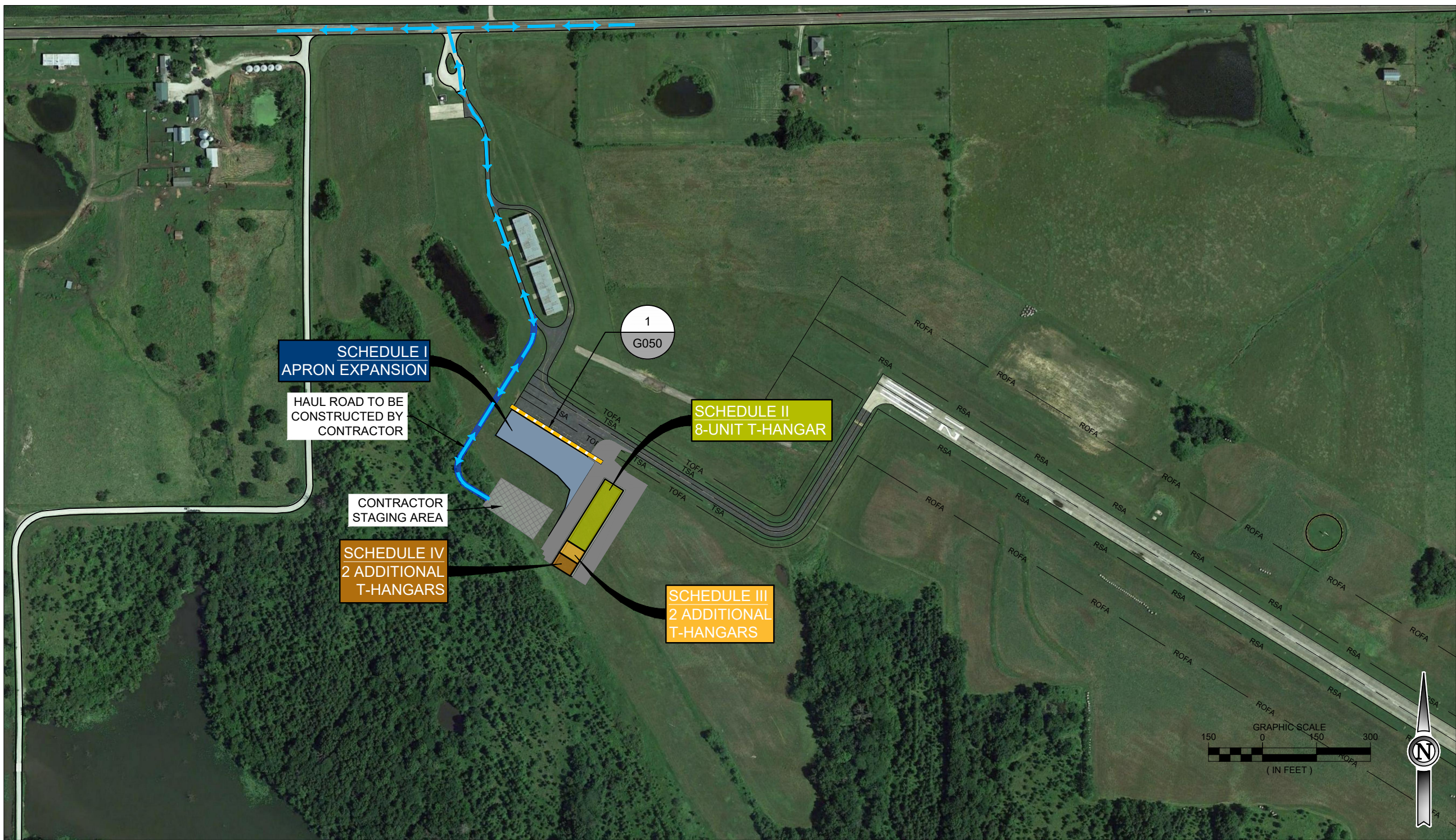
Construction suspension may be required during specific Airport operations. Project areas may be worked on simultaneously only if approved by the Resident Engineer and Airport Operations Manager. Night construction may only be performed if approved by the Resident Engineer and Airport Operations Manager. Construction operations shall only be allowed in weather conditions compliant with the project specifications.

19. DUST CONTROL

The Contractor is responsible for controlling dust from the construction site at all times. The Contractor shall have a water truck and operator available 24 hours a day to control dust since the project's locations is near active runways, taxiways, and aprons. It is critical for the contractor to keep dust to an absolute minimum both during construction and after construction until the exposed surfaces contain suitable vegetation. The Contractor shall provide the Resident Engineer and Airport Operations with a contact for 24 hour dust control.

APPENDIX A

CONSTRUCTION SAFETY DRAWINGS



OVERALL PHASING LEGEND

	CONTRACTOR HAUL ROUTE
	RSA RUNWAY SAFETY AREA
	ROFA RUNWAY OBJECT FREE AREA
	TSA TAXIWAY SAFETY AREA
	TOFA TAXIWAY OBJECT FREE AREA
	RPZ RUNWAY PROTECTION ZONE
	FLASHER BARRICADE
	CONTRACTOR STAGING AREA (25' HEIGHT RESTRICTION)

FLASHER BARRICADE DETAIL

ELEVATION

RED FLASHER (SEE NOTE 1)

LENGTH 96"

HEIGHT = 18" MAXIMUM FROM GROUND TO TOP OF BARRICADE

PLAN

SAFETY ORANGE

WHITE

WIDTH = 6"

1. FLASHER BARRICADES WILL BE PROVIDED AND MAINTAINED BY THE CONTRACTOR AT ALL TIMES. CONTRACTOR SHALL ALSO PROVIDE SPARE BARRICADES, BATTERIES, AND LIGHT BULBS FOR MAINTENANCE DURING NIGHTTIME HOURS.
2. LOW-PROFILE BARRICADES TO BE PLACED AT 10' INTERVALS ADJACENT TO CONSTRUCTION, AS DIRECTED BY THE ENGINEER.
3. BARRICADES ARE TO BE PLACED IN LOCATIONS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER THROUGHOUT ALL PHASES OF THE PROJECT. THE BARRICADE LOCATIONS PROVIDED ON THIS SHEET SHALL REMAIN THROUGHOUT CONSTRUCTION. ADDITIONAL BARRICADES WILL BE REQUIRED ACROSS PHASE SPECIFIC AREAS OF CLOSED PAVEMENT, AND ARE SHOWN ON PHASING SHEETS.
4. FLASHER BARRICADES WILL BE REQUIRED ALONG THE EDGE OF ANY VERTICAL DROP OFF GREATER THAN 3". AIRPORT OPERATIONS WILL ISSUE NOTAM TO ADVISE AIRCRAFT OF THIS CONDITION
5. FLASHER BARRICADES ARE TO BE ADEQUATELY WEIGHTED SO THEY WILL REMAIN IN PLACE DURING TIMES OF HIGH WINDS OR AS APPROVED BY THE ENGINEER.

1 FLASHER BARRICADE DETAIL

NOT TO SCALE

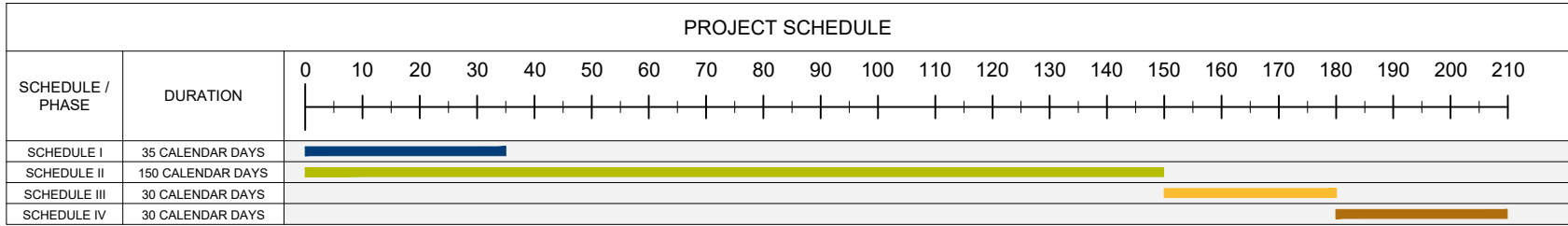
ISSUED FOR BID

THESE DRAWINGS ARE FOR BIDDING PURPOSES ONLY. THEY WERE PREPARED BY OR UNDER THE SUPERVISION OF:

BRYAN S. GREGORY 2006019659 5/4/2020

NAME REG. NO. DATE

FOR AND ON BEHALF OF JVIATION, INC.



SAFETY & OBJECT FREE AREAS	
RUNWAY 12/30	
RUNWAY SAFETY AREA (RSA)	60' FROM RW CENTERLINE
RUNWAY EXTENDED SAFETY AREA (RSA)	240' FROM RW END
RUNWAY OBJECT FREE AREA (ROFA)	200' FROM RW CENTERLINE
TAXIWAYS	
TAXIWAY SAFETY AREA (TSA)	24.5' FROM TW CENTERLINE
TAXIWAY OBJECT FREE AREA (TOFA)	44.5' FROM TW CENTERLINE

	MEMPHIS MEMORIAL AIRPORT	DES: L.K.R. DR: L.K.R. CH: C.L.G. APP: B.S.G.	ISSUE RECORD				APRON EXPANSION AND T-HANGAR CONSTRUCTION	CONSTRUCTION SAFETY PLAN OVERALL PHASING		AIP PROJ. NO. MODOT 19-026A-1	JVIATION PROJ. NO. 2019.03D.01	SHEET NAME	
			NO.	BY	DATE	DESCRIPTION						G050	
			1	B.S.G.	5/4/2020	ISSUED FOR BID							SHEET NO.
													9 of 34

1. COORDINATION

ALL COORDINATION WILL TAKE PLACE THROUGH THE RESIDENT ENGINEER AND MEMPHIS MEMORIAL AIRPORT (03D) AIRPORT MANAGER. NO CLOSURES WITHIN THE MOVEMENT AREAS WILL BE PERMITTED WITHOUT A NOTAM IN PLACE FOR EACH SPECIFIC CLOSURE. PRIOR TO COMMENCEMENT OF ANY WORK, THE CONTRACTOR SHALL GIVE 72 HOURS ADVANCE NOTICE TO THE RESIDENT ENGINEER AND AIRPORT MANAGER FOR FILING OF ALL NOTAMS.

A WEEKLY CONSTRUCTION PROGRESS MEETING WILL BE REQUIRED TO DISCUSS ALL OPERATIONAL SAFETY TOPICS THAT HAVE BEEN AFFECTED OR WILL BE AFFECTED IN THE NEAR FUTURE. IN ATTENDANCE WILL BE THE CONTRACTOR, RESIDENT ENGINEER, AND 03D PERSONNEL.

ANY CHANGES TO SCOPE OR SCHEDULE MUST BE NOTIFIED TO THE RESIDENT ENGINEER AND 03D AIRPORT MANAGER. ALL PARTIES WILL EVALUATE THE IMPACT OF THE CHANGE AND WILL DETERMINE THE MEASURES NEEDED TO MAINTAIN A SAFE CONSTRUCTION SITE.

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.

CONSTRUCTION THAT IS WITHIN THE SAFETY AREA OF AN ACTIVE RUNWAY, TAXIWAY, OR APRON MUST BE PERFORMED WHEN THE RUNWAY, TAXIWAY, OR APRON IS CLOSED OR USE-RESTRICTED AND INITIATED ONLY WITH PRIOR PERMISSION FROM THE AIRPORT OPERATOR AND WITH PROPER NOTAMS IN PLACE.

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; BARRICADE ANY OPEN TRENCHES AND STAND BY UNTIL AIRCRAFT USE IS COMPLETED.

2. PHASING

THIS PROJECT CONSISTS OF ONE PHASE. SEE CONSTRUCTION SAFETY DRAWINGS FOR PHASING REQUIREMENTS.

CONTRACTOR TO NOTIFY RESIDENT ENGINEER AND 03D AIRPORT MANAGER IF A CHANGE IN SCHEDULE IS NEEDED.

3. AREAS AND OPERATIONS AFFECTED BY CONSTRUCTION ACTIVITY

ALL WORK WITHIN AIRPORT OPERATIONS AREA (AOA) SHALL CONFORM TO ADVISORY CIRCULAR 150/5370-2G, OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION.

CONTRACTOR SHALL ADHERE TO REQUIREMENTS AS MENTIONED ON THIS SHEET, THE CONSTRUCTION SAFETY AND PHASING PLAN (CSPP), AND CONSTRUCTION SAFETY DRAWINGS. THESE REQUIREMENTS INCLUDE, BUT ARE NOT LIMITED TO, LIFE & SAFETY ACCESS ROUTES, AIRCRAFT ROUTES, PEDESTRIAN ROUTES, CONSTRUCTION ACCESS ROUTES, CONSTRUCTION LIMITS, AND BARRICADE LOCATIONS.

4. PROTECTION OF NAVIGATION AIDS (NAVAIDS)

NAVIGATIONAL AIDS INCLUDE INSTRUMENT LANDING SYSTEM COMPONENTS AND VERY HIGH-FREQUENCY OMNIDIRECTIONAL RANGE, AIRPORT SURVEILLANCE RADAR. SUCH RESTRICTED AREAS ARE DEPICTED ON CONSTRUCTION PLANS.

DURING CONSTRUCTION, NO NAVAID EQUIPMENT WILL BE RELOCATED. THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY DAMAGE TO THE EXISTING NAVAIDS AND WILL BE REPAIRED BY THE CONTRACTOR AT NO COST TO THE AIRPORT.

5. CONTRACTOR ACCESS

CONTRACTOR MOVEMENT SHALL BE RESTRICTED TO THE PRE-DETERMINED ACCESS ROUTES AS SHOWN ON CONSTRUCTION SAFETY DRAWINGS.

ALL VEHICLES AND EQUIPMENT OPERATING IN THE AOA MUST BE IDENTIFIED CLEARLY WITH 8-INCH (MINIMUM) BLOCK-TYPE CHARACTERS OF A CONTRASTING COLOR AND EASY TO READ. IN ADDITION, VEHICLES MUST DISPLAY IDENTIFICATION MEDIA, AS SPECIFIED IN THE APPROVED AIRPORT SECURITY PLAN.

ALL VEHICLES AND EQUIPMENT OPERATING IN THE AOA MUST HAVE FLAG (DAY ONLY) OR BEACON (DAY AND NIGHT) ATTACHED TO THE VEHICLE.

CONTRACTOR IS REQUIRED TO ADHERE TO ALL RULES AND REGULATIONS AS SET BY 03D AND ADVISORY CIRCULAR 150/5370-2G, OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION.

VEHICLE TRAFFIC LOCATED IN OR CROSSING AN ACTIVE MOVEMENT AREA MUST HAVE A RADIO. THE DRIVER, THROUGH PERSONAL OBSERVATION, SHOULD CONFIRM THAT NO AIRCRAFT IS APPROACHING THE VEHICLE POSITION. CONTRACTOR PERSONNEL MAY OPERATE IN THE MOVEMENT AREA WITHOUT TWO-WAY RADIO COMMUNICATION PROVIDED A NOTAM IS ISSUED CLOSING THE AREA AND THE AREA IS PROPERLY MARKED TO PREVENT INCURSIONS. CONTINUOUS MONITORING IS REQUIRED ONLY WHEN EQUIPMENT MOVEMENT IS NECESSARY IN CERTAIN AREAS.

CONTRACTOR IS REQUIRED TO NOTIFY AND COORDINATE WITH THE RESIDENT ENGINEER AND AIRPORT OPERATIONS PRIOR TO ENTERING ANY ACTIVE SURFACE SAFETY AREAS OR OBJECT FREE AREAS.

CONTRACTOR, SUBCONTRACTOR, AND SUPPLIER EMPLOYEES OR ANY UNAUTHORIZED PERSONS ARE RESTRICTED FROM ENTERING AN AIRPORT AREA THAT WOULD BE HAZARDOUS.

6. WILDLIFE MANAGEMENT

CONTRACTOR SHALL ADHERE TO ALL WILDLIFE MANAGEMENT PRACTICES AS STATED IN ADVISORY CIRCULAR 150/5200-33B, HAZARDOUS WILDLIFE ATTRACTIONS ON OR NEAR AIRPORTS, AND CERTALERT 98-08, GRASSES ATTRACTIVE TO HAZARDOUS WILDLIFE.

CONTRACTOR IS RESPONSIBLE FOR COMPLETING A DAILY INSPECTION FOR TRASH, FOREIGN OBJECTS, AND STANDING WATER ON THE CONSTRUCTION SITE THAT MIGHT ATTRACT WILDLIFE.

CONTRACTOR SHALL MAINTAIN ALL FENCES AND GATES THROUGHOUT THE PROJECT TO THE SATISFACTION OF THE RESIDENT ENGINEER.

CONTRACTOR SHALL NOTIFY THE RESIDENT ENGINEER WHEN A WILDLIFE SIGHTING HAS OCCURRED ON THE PROJECT SITE.

7. FOREIGN OBJECT DEBRIS (FOD) MANAGEMENT

CONTRACTOR SHALL KEEP ALL PAVEMENTS IN THE AOA INCLUDING APRONS, TAXIWAYS, AND RUNWAYS FREE FROM FOD AT ALL TIMES TO PREVENT ANY DEBRIS FROM BEING INGESTED INTO AN AIRCRAFT'S ENGINE OR ANY DEBRIS FROM BEING LAUNCHED DUE TO JET BLAST.

CONTRACTOR IS REQUIRED TO CONTINUOUSLY MONITOR AND MAINTAIN FOD TO THE SATISFACTION OF THE RESIDENT ENGINEER.

PRIOR TO OPENING ANY PAVEMENT TO AIRCRAFT, THE CONTRACTOR, RESIDENT ENGINEER, AND AIRPORT OPERATIONS SHALL CONDUCT A SWEEP OF THE PAVEMENT TO VERIFY THAT THE PAVEMENT IS FREE FROM FOD.

THE CONTRACTOR IS ADVISED THAT DUST CONTROL, CLEANUP OF ACTIVE PAVEMENTS, TRACKING DEBRIS ONTO ACTIVE PAVEMENT AND GENERAL JOBSITE CLEANLINESS IS A SERIOUS SAFETY CONCERN. FOREIGN OBJECT DEBRIS (FOD) IS CONSIDERED AS ANY ITEM THAT COULD POSSIBLY IMPACT THE OPERATIONS OF AN AIRPORT OR ROADWAY. FOD COULD CAUSE INJURY OR DEATH THROUGH INGESTION IN MOVING AIRCRAFT ENGINES. SPECIFIC ITEMS OF CONCERN INCLUDE, BUT ARE NOT LIMITED TO; ANY PACKAGING FROM MATERIAL INSTALLATION, GRAVEL LEFT ON ACTIVE PAVEMENTS, DUST TRACKED ONTO ACTIVE PAVEMENTS, HAND TOOLS, HARDWARE DROPPED, ETC.

8. HAZARDOUS MATERIAL (HAZMAT) MANAGEMENT

CONTRACTOR SHALL NOTIFY RESIDENT ENGINEER AND AIRPORT EMERGENCY PERSONNEL IF HAZARDOUS MATERIALS ARE ENCOUNTERED ON THIS PROJECT.

9. NOTIFICATION OF CONSTRUCTION ACTIVITIES

AGENCY NAME	AGENCY TYPE	TELEPHONE
CITY OF MEMPHIS POLICE	SHERIFF / POLICE	(660) 465-2611 OR 911
MEMPHIS FIRE DEPARTMENT	FIRE STATION	(660) 465-2121 OR 911
SCOTLAND COUNTY HOSPITAL	HOSPITAL / URGENT CARE	(660) 465-8511 OR 911
AIRPORT	AIRPORT MANAGER ALLEN CREEK	(660) 465-7285

BEFORE BEGINNING ANY CONSTRUCTION ACTIVITY, THE CONTRACTOR MUST, THROUGH THE RESIDENT ENGINEER AND AIRPORT MANAGER, GIVE NOTICE USING THE NOTICE TO AIRMEN (NOTAM) SYSTEM OF PROPOSED LOCATION, TIME, AND DATE OF COMMENCEMENT OF CONSTRUCTION. THE NOTAM SHOULD STATE THAT "PERSONNEL AND EQUIPMENT ARE WORKING ADJACENT TO THE APRON AND TAXIWAYS" ALL NOTAMS SHALL BE ISSUED BY 03D . UPON COMPLETION OF WORK AND RETURN OF ALL SUCH AREAS TO STANDARD CONDITIONS, THE CONTRACTOR MUST COORDINATE WITH THE RESIDENT ENGINEER AND VERIFY THE CANCELLATION OF ALL NOTICES ISSUED VIA THE NOTAM SYSTEM. THROUGHOUT THE PROJECT DURATION , THE CONTRACTOR MUST:

- A. BE AWARE OF AND UNDERSTAND THE SAFETY PROBLEMS AND HAZARDS DESCRIBED IN ADVISORY CIRCULAR 150/5370-2G, OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION.
- B. CONDUCT ACTIVITIES SO AS NOT TO VIOLATE ANY SAFETY STANDARDS CONTAINED IN ADVISORY CIRCULAR 150/5370-2G 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.
- E. THE CONTRACTOR SHALL ADHERE TO THE REQUIREMENTS, PROVISIONS, AND PROCEDURES OUTLINED IN CONSTRUCTION SAFETY PHASING PLAN (SEE DIV. 6 OF THE CONTRACT DOCUMENTS).

ANY CHANGES TO SCOPE OR SCHEDULE MUST BE NOTIFIED TO THE RESIDENT ENGINEER AND 03D AIRPORT MANAGER SO THAT NOTAMS CAN BE ISSUED, MAINTAINED, AND CANCELED.

IN AN EVENT OF AN EMERGENCY, CONTRACTOR SHALL NOTIFY THE RESIDENT ENGINEER AND 03D AIRPORT MANAGER.

10. INSPECTION REQUIREMENTS

CONTRACTOR SHALL COMPLETE A DAILY INSPECTION FOR SAFETY ON THE PROJECT SITE BY COMPLETING THE CHECKLIST PROVIDED IN ADVISORY CIRCULAR 150/5370-2G, APPENDIX 4, CONSTRUCTION PROJECT DAILY SAFETY INSPECTION CHECKLIST.

THE CONTRACTOR, RESIDENT ENGINEER AND AIRPORT MANAGER MUST PERFORM ONSITE INSPECTIONS THROUGHOUT THE PROJECT, WITH IMMEDIATE REMEDY OF ANY DEFICIENCIES, WHETHER CAUSED BY NEGLIGENCE, OVERSIGHT, OR SCOPE CHANGE.

CONTRACTOR SHALL COMPLETE A FINAL INSPECTION FOR SAFETY ON THE PROJECT SITE AT THE END OF EACH PHASE.

11. APPROACH CLEARANCE TO RUNWAYS

RUNWAY THRESHOLDS MUST PROVIDE AN UNOBSTRUCTED APPROACH SURFACE OVER EQUIPMENT AND MATERIALS. (REFER TO CHAPTER 3 IN ADVISORY CIRCULAR 150/5300-13A, AIRPORT DESIGN, FOR GUIDANCE.

12. RUNWAY AND TAXIWAY VISUAL AIDS

FLASHER BARRICADES TO BE PLACED AS DETAILED IN THE PLANS AND IN ALL DESIGNATED AREAS AS SHOWN ON THE CONSTRUCTION SAFETY DRAWINGS.

APPROVED FLASHER BARRICADES SHALL BE PROVIDED AND MAINTAINED BY THE CONTRACTOR.

13. MARKING AND SIGNS FOR ACCESS ROUTES

ALL REQUIRED SIGNS AND MARKINGS SHALL CONFORM TO ADVISORY CIRCULAR 150/5340-18F, STANDARD FOR AIRPORT SIGN SYSTEMS, OR THE FEDERAL HIGHWAY ADMINISTRATION MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).

ALL SIGNS ADJACENT TO AREAS USED BY AIRCRAFT MUST COMPLY WITH THE FRANGIBLE REQUIREMENTS AS STATED IN ADVISORY CIRCULAR 150/5220-23A, FRANGIBLE CONNECTIONS.

14. HAZARD MARKINGS AND LIGHTING

PRIOR TO CLOSING ANY AREAS IN THE AOA TO AIRCRAFT OR EMERGENCY TRAFFIC, CONTRACTOR MUST CLEARLY DEFINE CLOSED AREAS WITH WARNING LIGHTS, BARRICADES, CLOSED 'X' MARKINGS, RCMS, AND FLAGS TO THE APPROVAL OF THE RESIDENT ENGINEER. CONTRACTOR TO REFER TO CONSTRUCTION SAFETY DRAWINGS.

HAZARDOUS AREAS ON THE MOVEMENT AREA WILL BE MARKED WITH FLASHER BARRICADES. THESE BARRICADES 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 LIGHTS.

OPEN TRENCHES AND EXCAVATIONS MUST BE PROMINENTLY MARKED WITH RED OR ORANGE FLAGS AND LIGHTS AS APPROVED BY THE RESIDENT ENGINEER.

15. PROTECTION OF RUNWAY AND TAXIWAY AREAS

SAFETY AREAS - CONTRACTOR SHALL NOT IMPEDE ON THE SAFETY AREAS WITHOUT A CLOSURE OF THE RUNWAY/TAXIWAY BY MEANS OF A NOTAM.

OBJECT FREE AREAS - CONTRACTOR SHALL NOT PLACE EQUIPMENT, MATERIAL, OR STOCKPILES IN THIS AREA. ALL OBJECTS OR MATERIALS ADJACENT TO THIS AREA SHALL BE PROPERLY MARKED/LIT PER ADVISORY CIRCULAR 150/5370-2G. CONTRACTOR CANNOT WORK IN ACTIVE TAXIWAY OBJECT FREE AREA WITHOUT WING WALKERS TO MAINTAIN A 5' CLEARANCE FROM THE WINGSPAN OF THE AIRCRAFT TO CONSTRUCTION EQUIPMENT OR MATERIAL.

OBSTACLE FREE ZONE- CONTRACTOR TO PREVENT PERSONNEL, MATERIAL, AND/OR EQUIPMENT FROM PENETRATING THE OBSTACLE FREE ZONE AS DEFINED IN ADVISORY CIRCULAR 150/5300-13A.

16. AIRPORT SECURITY

CONTRACTOR SHALL ADHERE TO AIRPORT SECURITY REQUIREMENTS AT ALL TIMES.

17. OTHER LIMITATIONS ON CONSTRUCTION

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).

PROMINENTLY MARKING OPEN TRENCHES, EXCAVATIONS, AND STOCKPILED MATERIALS AT THE CONSTRUCTION AND LIGHTING THESE OBSTACLES DURING HOURS OF RESTRICTED VISIBILITY AND DARKNESS.

MARKING AND LIGHTING CLOSED, DECEPTIVE, AND HAZARDOUS AREAS ON AIRPORTS, AS APPROPRIATE. CONSTRAINING STOCKPILED MATERIAL TO PREVENT ITS MOVEMENT AS A RESULT OF THE MAXIMUM ANTICIPATED AIRCRAFT BLAST AND FORECAST WIND CONDITIONS.

NO USE OF TALL EQUIPMENTS (CRANES, CONCRETE PUMPS, AND SO ON) UNLESS A FAA 7460-1 DETERMINATION LETTER IS ISSUED FOR SUCH EQUIPMENT.

NO USE OF ELECTRICAL BLASTING CAPS ON OR WITHIN 1,000' OF THE AIRPORT PROPERTY.

NO USE OF FLARE POTS WITHIN THE AOA.

18. DUST CONTROL

CONTRACTOR IS RESPONSIBLE FOR CONTROLLING DUST FROM THE CONSTRUCTION SITE AT ALL TIMES. CONTRACTOR SHALL HAVE A WATER TRUCK AND OPERATOR AVAILABLE 24 HOURS A DAY TO CONTROL DUST. THE PROJECT'S LOCATION IS NEAR ACTIVE RUNWAYS AND HIGHWAYS AND IS IN A LOCATION THAT EXPERIENCES HIGH WIND. IT IS CRITICAL FOR THE CONTRACTOR TO KEEP DUST TO AN ABSOLUTE MINIMUM BOTH DURING CONSTRUCTION, AND AFTER CONSTRUCTION UNTIL THE EXPOSED SURFACES CONTAIN SUSTAINABLE VEGETATION. CONTRACTOR SHALL PROVIDE THE RESIDENT ENGINEER AND AIRPORT OPERATIONS WITH A CONTACT FOR 24 HOUR DUST CONTROL.

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BRYAN S. GREGORY	2006019659	5/4/2020
NAME	REG. NO.	DATE
FOR AND ON BEHALF OF JVIATION , INC.		



MEMPHIS MEMORIAL AIRPORT

DES: L.K.R.	ISSUE RECORD			
	NO.	BY	DATE	DESCRIPTION
DR: L.K.R.	1	B.S.G.	5/4/2020	ISSUED FOR BID
CH: C.L.G.				
APP: B.S.G.				

APRON EXPANSION AND
T-HANGAR CONSTRUCTION

CONSTRUCTION SAFETY
NOTES AND DETAILS

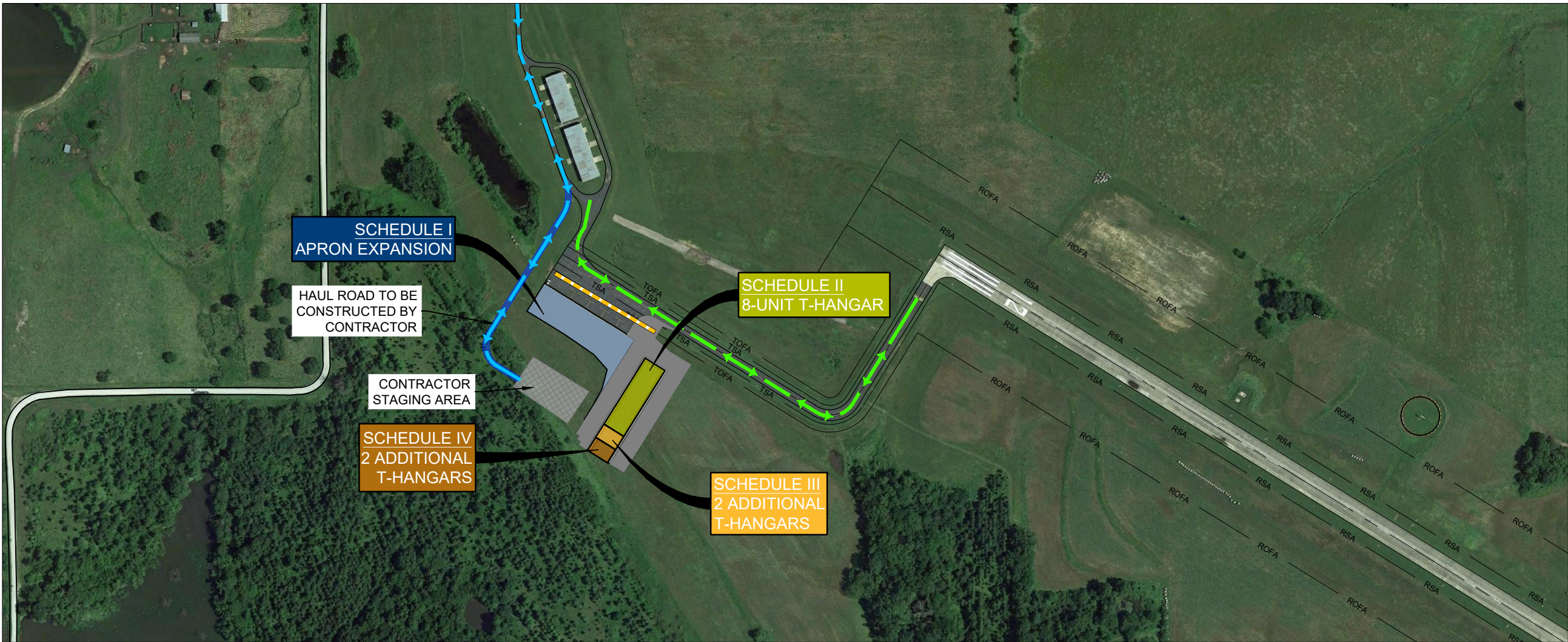
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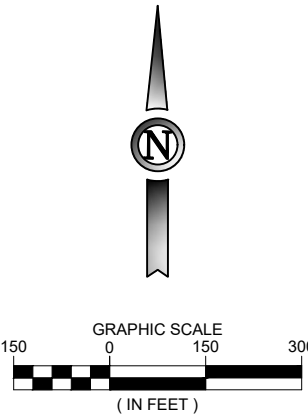
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PHASING LEGEND		
	AIRCRAFT TAXI ROUTE	
	CONTRACTOR HAUL ROUTE (2 WAY TRAFFIC)	
	CONTRACTOR HAUL ROUTE (1 WAY TRAFFIC)	
	RSA	RUNWAY SAFETY AREA
	ROFA	RUNWAY OBJECT FREE AREA
	TSA	TAXIWAY SAFETY AREA
	TOFA	TAXIWAY OBJECT FREE AREA
	RPZ	RUNWAY PROTECTION ZONE
		NAVAID CRITICAL AREA
	X	AOA FENCE
		FLASHER BARRICADE

CONSTRUCTION PHASING NOTES				
SCHEDULE / PHASE	MAJOR WORK TO BE COMPLETED	NOTES		
<u>DURATION</u> SCHEDULE I • 35 CALENDAR DAYS • CONSTRUCTION TO BE CONCURRENT WITH SCHEDULE II SCHEDULE II • 150 CALENDAR DAYS • CONSTRUCTION TO BE CONCURRENT WITH SCHEDULE I SCHEDULE III • 30 CALENDAR DAYS • CONSTRUCTION CAN START CONCURRENT WITH OTHER SCHEDULES IF THE CONTRACTOR SHALL CHOOSE SCHEDULE IV • 30 CALENDAR DAYS • CONSTRUCTION TO BE CONCURRENT WITH SCHEDULES IF THE CONTRACTOR SHALL CHOOSE <u>CONTRACTOR ACCESS TIMES</u> 24 HOUR ACCESS TO APPROVED WORK AREAS ALL AIRPORT OPERATIONS AREAS SHALL REMAIN OPEN AND UNAFFECTED DURING THIS SCHEDULE WITH THE FOLLOWING EXCEPTIONS: • EXISTING T-HANGAR TAXILANE WILL BE PART OF HAUL ROUTE AND SHALL BE CONTROLLED BY FLAGGER. AIRCRAFT HAS RIGHT-OF-WAY AT ALL TIMES	<u>SITE PREPARATION</u> 1. EROSION CONTROL MEASURES 2. PARTIAL DEPTH PAVEMENT REMOVALS <u>EARTHWORK</u> 1. RECOMPACT NATIVE MATERIAL/EMBANKMENT PREPARATION 2. CUT/FILL EARTHWORK <u>PAVEMENT SECTION</u> 1. ROCK BASE COURSE 2. ASPHALT PAVEMENT 3. PERMANENT PAINT (AFTER 30 DAY CURE PERIOD) <u>SITE RECLAMATION</u> 1. SEEDING 2. EROSION CONTROL MEASURES SCHEDULES II, III AND IV <u>HANGAR CONSTRUCTION</u> 1. HANGARS 2. ELECTRICAL 3. PAVEMENT TIE-INS	<u>IMPACTS ON OPERATIONS</u> 1. ALL AIRPORT OPERATIONS AREAS SHALL REMAIN OPEN AND UNAFFECTED DURING THIS PHASE WITH THE FOLLOWING EXCEPTIONS: 2. ALL RUNWAYS WILL REMAIN OPEN FOR THE DURATION OF THE PROJECT. 3. THE CONTRACTOR SHALL GIVE RIGHT OF WAY TO ALL AIRCRAFT AND ARFF VEHICLES AT ALL TIMES. 4. CONTRACTOR TO MAINTAIN ARFF ACCESS TO RUNWAY AT ALL TIMES. 5. DURING PAVEMENT MARKING APPLICATIONS AND CURE TIMES, CONSTRUCTION BARRICADES SHALL BE INSTALLED AS DIRECTED BY ENGINEER FOR AREAS THAT ARE TEMPORARILY CLOSED TO TRAFFIC. <u>LIQUIDATED DAMAGES</u> 1. LIQUIDATED DAMAGES IMPOSED UPON THE CONTRACTOR FOR FAILURE TO COMPLETE PROJECT WITHIN THE SPECIFIED ALLOTTED TIME WILL BE PER SECTION 80-08 OF THE CONTRACT DOCUMENTS.	<u>HAUL ROADS / STAGING AREAS</u> 1. THE CONTRACTOR SHALL KEEP ALL CONSTRUCTION TRAFFIC LIMITED TO THE APPROVED HAUL ROUTES AS SHOWN ON THE PLANS OR AS APPROVED BY THE ENGINEER. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE CAUSED ALONG THE HAUL ROUTES OR CONSTRUCTION ACCESS ROUTES TO THE PROJECT SITE. 2. CONTRACTOR SHALL PARK ALL EQUIPMENT AND VEHICLES IN STAGING AREAS AT NIGHT AND DURING PERIODS WHEN NO CONSTRUCTION ACTIVITIES ARE TAKING PLACE. 3. CONTRACTOR SHALL EXAMINE THE EXISTING PAVEMENTS THAT WILL BE USED FOR HAULING OF MATERIAL AND EQUIPMENT, AND DETERMINE THE PAVEMENTS ABILITY TO WITHSTAND CONTRACTOR OPERATIONS WITHOUT CAUSING DAMAGE TO THE PAVEMENT. ANY DAMAGE CAUSED BY THE CONTRACTOR SHALL BE REPAIRED BY THE CONTRACTOR TO THE APPROVAL OF THE ENGINEER AND AT NO ADDITIONAL COST TO THE SPONSOR.	<u>NOTIFICATIONS</u> 1. ALL CLOSURES SHALL BE COORDINATED WITH THE SPONSOR, ENGINEER AND AIRPORT OPERATIONS. 2. NOTAMS WILL BE NEEDED FOR TAXILANE CLOSURES AND CONSTRUCTION ACTIVITIES FOR THE DURATION OF PHASE I. ALL NOTAMS SHALL BE COORDINATED WITH AIRPORT OPERATIONS PER SHEET G051 SAFETY PLAN. <u>FOREIGN OBJECT DEBRIS (FOD) CONTROL</u> 1. THE CONTRACTOR SHALL HAVE A SWEEPER ON SITE AT ALL TIMES TO CLEAN DEBRIS FROM HAUL ROUTES, CONSTRUCTION ACCESS POINTS, OR AREAS ADJACENT TO CONSTRUCTION. THE CONTRACTOR SHALL IMMEDIATELY CLEAN ANY DEBRIS FROM AIRFIELD PAVEMENTS. 2. CONTRACTOR SHALL USE FLAGMEN AND SWEEPERS AT EACH ACTIVE PAVEMENT CROSSING.



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BRYAN S. GREGORY20060196595/4/2020

NAMEREG. NO. DATE

FOR AND ON BEHALF OF JVIATION , INC.

<div>JVIATION®</div>	MEMPHIS MEMORIAL AIRPORT	DES: L.K.R.	ISSUE RECORD				APRON EXPANSION AND T-HANGAR CONSTRUCTION	CONSTRUCTION SAFETY PLAN SCHEDULE I THROUGH SCHEDULE IV PHASING PLAN		SHEET NAME
		DR: L.K.R.	NO.	BY	DATE	DESCRIPTION				G052
		CH: C.L.G.	1	B.S.G.	5/4/2020	ISSUED FOR BID				SHEET NO. 11 of 34
		APP: B.S.G.								
								AIP PROJ. NO. MODOT 19-026A-1	JVIATION PROJ. NO. 2019.03D.01	

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APPENDIX B

**CONSTRUCTION PROJECT DAILY SAFETY
INSPECTION CHECKLIST**

NOTE: This Appendix: Construction Project Daily Safety Inspection Checklist was copied from FAA Advisory Circular 150/5370-2G (dated December 13, 2017) and formatted for use with individual projects.

Airport: Memphis Memorial Airport
MoDOT Project No.: 19-026A-1
Project Name: Apron Expansion and T-Hangar Construction
Date: _____

Appendix 4. Construction Project Daily Safety Inspection Checklist

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. The list below is one tool that the airport operator or contractor may use to aid in identifying and correcting potentially hazardous conditions. It should be customized as appropriate for each project.

Potentially Hazardous Conditions

Item	Action Required	or	None
Excavation adjacent to runways, taxiways, and aprons improperly backfilled.			<input type="checkbox"/>
Mounds of earth, construction materials, temporary structures, and other obstacles near any open runway, taxiway, or taxi lane; in the related Object Free area and aircraft approach or departure areas/zones; or obstructing any sign or marking.			<input type="checkbox"/>
Runway resurfacing projects resulting in lips exceeding 3 in (7.6 cm) from pavement edges and ends.			<input type="checkbox"/>
Heavy equipment (stationary or mobile) operating or idle near AOA, in runway approaches and departures areas, or in OFZ.			<input type="checkbox"/>
Equipment or material near NAVAIDs that may degrade or impair radiated signals and/or the monitoring of navigation and visual aids. Unauthorized or improper vehicle operations in localizer or glide slope critical areas, resulting in electronic interference and/or facility shutdown.			<input type="checkbox"/>
Tall and especially relatively low visibility units (that is, equipment with slim profiles) — cranes, drills, and similar objects — located in critical areas, such as OFZ and approach zones.			<input type="checkbox"/>

Item	Action Required	or	None
Improperly positioned or malfunctioning lights or unlighted airport hazards, such as holes or excavations, on any apron, open taxiway, or open taxi lane or in a related safety, approach, or departure area.			<input type="checkbox"/>
Obstacles, loose pavement, trash, and other debris on or near AOA. Construction debris (gravel, sand, mud, paving materials) 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.			<input type="checkbox"/>
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 AOA create aviation hazards.			<input type="checkbox"/>
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 AOA create aviation hazards.			<input type="checkbox"/>
Wildlife attractants — such as trash (food scraps not collected from construction personnel activity), grass seeds, tall grass, or standing water — on or near airports.			<input type="checkbox"/>
Obliterated or faded temporary markings on active operational areas.			<input type="checkbox"/>
Misleading or malfunctioning obstruction lights. Unlighted or unmarked obstructions in the approach to any open runway pose aviation hazards.			<input type="checkbox"/>
Failure to issue, update, or cancel NOTAMs about airport or runway closures or other construction related airport conditions.			<input type="checkbox"/>
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 navigation, visual, or approach aids; disruption of weather reporting services; and/or loss of communications.			<input type="checkbox"/>
Restrictions on ARFF access from fire stations to the runway / taxiway system or airport buildings.			<input type="checkbox"/>
Lack of radio communications with construction vehicles in airport movement areas.			<input type="checkbox"/>

Item	Action Required	or	None
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.			<input type="checkbox"/>
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.			<input type="checkbox"/>
Spillage from vehicles (gasoline, diesel fuel, oil) on active pavement areas, such as runways, taxiways, aprons, and airport roadways.			<input type="checkbox"/>
Failure to maintain drainage system integrity during construction (for example, no temporary drainage provided when working on a drainage system).			<input type="checkbox"/>
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.			<input type="checkbox"/>
Failure to control dust. Consider limiting the amount of area from which the contractor is allowed to strip turf.			<input type="checkbox"/>
Exposed wiring that creates an electrocution or fire ignition hazard. Identify and secure wiring, and place it in conduit or bury it.			<input type="checkbox"/>
Site burning, which can cause possible obscuration.			<input type="checkbox"/>
Construction work taking place outside of designated work areas and out of phase.			<input type="checkbox"/>

APPENDIX C

GEOTECHNICAL REPORT

REPORT OF SUBSURFACE EXPLORATION AND GEOTECHNICAL ENGINEERING EVALUATION

MEMPHIS MEMORIAL AIRPORT-
IMPROVEMENTS
MEMPHIS, MISSOURI
TSI PROJECT No. 20201006.00

JVIATION, INC.
931 Wildwood Drive, Suite 101
Jefferson City, Missouri 65109



1340 North Price Road
St. Louis, Missouri 63132

February 28, 2020



1340 North Price Road
St. Louis, MO 63132
314.373.4000 T
314.227.6622 F

www.tsigeotech.rocks

February 28, 2020

Mr. Bryan Gregory
JVATION, INC.
931 Wildwood Drive, Suite 101
Jefferson City, Missouri 65109

**Re: Report of Subsurface Exploration and Geotechnical Engineering Evaluation
Memphis Memorial Airport Improvements
Memphis, Missouri
TSi Project No. 20201006.00**

Dear Mr. Gregory:

TSi Geotechnical, Inc. (TSi) has completed the authorized Subsurface Exploration and Geotechnical Engineering Evaluation for the Memphis Memorial Airport Improvements project and is pleased to submit this report of our findings to Jvation, Inc. (Jvation) The purpose of our work was to determine subsurface conditions at specific boring locations, and to gather data on which to prepare geotechnical recommendations for use in the design and construction of the project. This report describes the exploration procedures used, exhibits the data obtained, and presents our evaluations and recommendations relative to certain geotechnical engineering aspects of the project.

We appreciate the opportunity to assist you with this project. If you have any questions, or if we may be of further service to you, please call us.

Respectfully submitted,
TSi GEOTECHNICAL, INC.

Fred H. Held III
Project Manager

Morris Dimberger, PE
Senior Geotechnical Engineer



Denise B. Hervey, PE
Principal

PROFESSIONAL SERVICES SINCE 1989

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SUBSURFACE EXPLORATION AND
GEOTECHNICAL ENGINEERING EVALUATION
MEMPHIS MEMORIAL AIRPORT IMPROVEMENTS
MEMPHIS, MISSOURI

1.0 SCOPE OF WORK

This report summarizes the results of a geotechnical study performed for use in the construction of proposed box hangars and apron expansion at the Memphis Memorial Airport in Memphis, Missouri. The study was performed in general accordance with the TSi proposal to Aviation, dated August 27, 2020. Based on TSi's understanding of the project, the following items have been identified for inclusion in the study report:

- subsurface conditions including material types at the boring locations;
- laboratory test results for soil samples;
- recommendations for use in the design of shallow spread footing foundations, including allowable bearing pressure and depth to suitable stratum for the proposed building;
- settlement estimates for spread footing foundations based on the general character of the soil and the anticipated structural loads;
- general comments on pavement design considerations;
- subgrade stabilization recommendations;
- location and description of any deleterious materials encountered at the boring locations that could impact design or construction;
- potential impact of groundwater on design and construction; and
- recommendations for engineering observation and testing during construction.

2.0 SITE AND PROJECT DESCRIPTIONS

The project involves the construction of a new hangar building and expansion of the existing apron. The proposed expansion of apron will be constructed on south side of the existing apron and the proposed hangar building will be located on east side of the new apron expansion. The project area for these improvements is relatively level and consists of a grass lawn area adjacent to the existing apron. Moreover, there is existing asphaltic pavement area around the proposed hangar building connected to the existing paved taxi lane. We assume this pavement will be used for aircraft movement to the hangar building. Approximately 12 inches of lime treated soil was reportedly placed in the project area.

We understand that the new apron will be used for aircraft parking of 12,500 lbs or less. The hangar building will be approximately 275 feet long and 70 feet wide with box hangars facing east west direction and will be used for nonoperational aircraft maintenances. It is assumed that the maximum column loads and wall loads from the hangars will be no more than 100 kips and 5 kips per lineal feet, respectively. We are assuming that the site grading operations will be limited to no more than 3 feet of cut and fill.

The general location of the airport site is shown on the Vicinity Map, Figure 1 in Appendix A. General site features and the location of the test borings performed for this study are provided on the Site and Boring Location Plan, Figure 2 in Appendix A.

3.0 FIELD EXPLORATION AND LABORATORY TESTING

3.1 FIELD EXPLORATION

The field exploration for this project consisted of completing six (6) borings at south of the existing apron designated as B-1 through B-6. Borings B-1 through B-3 were drilled to a depth of approximately 10 feet below the ground surface at the proposed apron expansion area. Borings B-4 through B-6 were drilled to a depth of approximately 20 feet in the proposed footprint of the new hangar building. The exploration was performed on February 10 and 11, 2020. The borings were drilled with Geoprobe 7822DT using hollow stem augers and SPT auto hammer. The boring locations were selected by Jviation and marked in the field by TSi. Ground surface elevations were not provided.

A geotechnical specialist from TSi observed drilling and sampling procedures for the borings. Split-spoon samples were recovered from the borings using a 2-inch outside-diameter, split-barrel sampler, in accordance with ASTM D 1586. Shelby tube samples were obtained in accordance with ASTM D 1587. The split-spoon samples were placed in glass jars and saved for later testing in the laboratory. The Shelby tube samples were preserved by sealing the entire sample in the tube. The sampling sequence for each boring is summarized on the Logs of Borings in Appendix B of this report.

The results of the field tests and measurements were recorded on field logs and appropriate data sheets. Those data sheets and logs contain information concerning the boring methods, samples attempted and recovered, indications of the presence of various subsurface materials, and the observation of groundwater. The field logs and data sheets contain the geotechnical specialist's interpretations of the conditions between samples, based on the performance of the drilling equipment and the cuttings brought to the surface by the drilling tools.

3.2 LABORATORY TESTING

A laboratory testing program was conducted by TSi to determine selected engineering properties of the obtained soil samples. The results of the individual tests are presented on the Logs of Boring and in Appendix B. The following laboratory tests were performed on the samples in general accordance with the applicable ASTM standards:

- visual descriptions by color and texture of each sample;
- natural moisture content of each sample;
- Atterberg limits on selected samples; and
- dry unit weight;

Data and observations from laboratory tests were recorded on laboratory data sheets during the course of the testing program. The logs represent considered interpretation of the field and laboratory data. The analyses and conclusions contained in this report are based on field and

laboratory test results and on the interpretations of the subsurface conditions as reported on the logs. Only data pertinent to the objectives of this report have been included on the logs; therefore, these logs should not be used for other purposes.

4.0 SUBSURFACE CONDITIONS

Details of the subsurface conditions encountered at the boring locations are shown on the Logs of Boring in Appendix B. The general subsurface conditions encountered and their pertinent engineering characteristics are described in the following paragraphs. Conditions represented by the borings should be considered applicable only at the boring locations on the date shown; the reported conditions may be different at other locations or at other times.

4.1 GENERAL GEOLOGY

The site is located in northern Missouri near the Iowa border. The bedrock formation in the area is the Cherokee Formation of the Pennsylvanian System. The bedrock consists primarily of cyclic deposits of shale, sandstone, clay, and several coal beds. The bedrock is overlain by overburden layer of glacial drift to depths of more than 100 feet. The drift has formed by glacial deposits and generally consists of lean and fat clays with varying amounts of sand and gravel.

4.2 GENERALIZED SUBSURFACE PROFILE

Borings B-1 and B-2 at the proposed apron expansion area encountered primarily of native lean clay (CL, according to the unified soil classification system), with soft to medium stiff consistency to a depth of about 5.5 feet. Below 5.5 feet, native fat clay was encountered and extended to boring termination depth of about 10 feet. However, Boring B-3 was located on the proposed apron area encountered possibly lime-treated fat clay (CH) at the surface extended to depth of about 1 foot; underlain by native untreated fat clay of medium to stiff consistency and extended to boring termination depth of about 10 feet. Standard penetration test (N) values in the native lean and fat clays ranged from 4 to 10 blows per foot (bpf) and moisture content ranged from 18 to 28%.

Borings B-4 through B-6 located at the proposed hangar building area encountered native lean clays at surface and extended to a depth of approximately 2.5 to 8 feet; underlain by native fat clays to boring termination depth of about 20 feet. However, in Boring B-6, lime-treated fill layer of lean clay with trace amount of gravel was encountered and extended to depth of about 2.5 feet. Another native lean clay layer of approximately 2 feet thick was encountered in between fat clays at depth approximately 5.5 feet in Boring B-6. Standard penetration test (N) values in the native lean and fat clays were recorded from 5 to 29 blows per foot (bpf) and moisture content ranged from 11 to 30%. On the other hand, N-value in the fill layer was recorded 4 bpf with a moisture content of 30%.

4.3 GROUNDWATER

Groundwater was not encountered in any of the borings at the time of drilling. However, the presence or absence of groundwater at a particular location does not necessarily mean that groundwater will be present or absent at that location at other times. Seasonal variations and

other unknown considerations could cause fluctuations in the water level and the presence of water in the soils.

5.0 ENGINEERING ASSESSMENTS AND RECOMMENDATIONS

5.1 HIGH PLASTIC CLAYS

Based on the laboratory tests, the liquid limits of the fat clays ranged from 57 to 105, and the plasticity index values ranged from 38 to 77. Support of the new apron pavement or hangar foundations directly on the fat clay (CH) is not recommended due to the relatively high expansion potential. It is recommended that where high plasticity clays (CH) are found at the subgrade levels of the proposed apron and foundations, they should be overexcavated to a depth of approximately 2 to 3 feet below the subgrade levels. These materials should be replaced with Low Volume Change (LVC) fill material. LVC fill should consist of approved, well-graded granular materials or low plasticity cohesive soil. Low plasticity cohesive materials used as LVC fill should consist of inorganic clay with a liquid limit less than 45 and a plasticity index of less than 25. Granular fill should be well-graded and have a maximum particle size of 1.0 inch. If the on-site high plastic soils are treated with lime, the modified clay could meet the requirements of an LVC fill material. Typically the addition of lime, properly blended, will result in an increased CBR value for the compacted clay as well. A minimum thickness of 2 feet of lime-modified soil would be appropriate for the pavements and floor slab subgrade and about 3 feet below the hangar shallow foundation bearing levels. If requested, TSi can perform the laboratory testing for lime percentage determination as an additional service.

Local authorities should be contacted for permission to use lime, because it is a fine-grained and somewhat caustic material that is easily windborne.

In addition to the removal and replacement or treatment, some relatively simple design and construction considerations are recommended that will help to maintain the natural moisture content of the fat clay. Avoiding conditions that could result in excessive wetting or drying of the fat clay will reduce its potential for volume change. The following design and construction precautions are recommended:

1. Positive surface drainage should be provided during construction to prevent ponding of water in and around any excavations or the exposed subgrade.
2. Stormwater runoff should be collected and carried away from the apron to avoid saturating the subgrade under the pavement.
3. Excessive watering of grass adjacent to the apron should be avoided.

5.2 SHALLOW FOUNDATIONS

The proposed box hangars may be supported by individual footings bearing completely on new structural fill compacted in accordance with the recommendations in this report or native lean clays. Proposed hangar foundations should not be supported on fat clays due to high swell potential. TSi recommends removal of the fat clay at least 3 feet below the foundation bearing

level and place the bottom of footings on structural LVC fill compacted in accordance with the recommendations in this report.

Shallow foundations wholly supported on LVC structural fill as recommended in this report or native lean clays may be designed for a net allowable bearing pressure (pressure in excess of adjacent overburden pressure) of up to 2,000 pounds per square foot (psf) for structural dead load plus maximum live load. Support of footings on existing fill or fat clay is not recommended.

Individual footings for proposed box hangar columns should be at least 3 feet square and wall footing width should be at least 3 feet regardless of the applied structural load in order to provide a bearing area that will account for minor variations in the bearing material. Foundations should bear at least 30 inches below the exterior grade to provide protection against detrimental effects of seasonal moisture variations and frost penetration. The settlement of structures supported on shallow footings designed for the recommended allowable bearing pressure should be less than 1 inch. Differential settlement between footings should be about half of the maximum settlement. The majority of this settlement should take place during construction as the structural loads are applied to the foundations.

5.3 SLAB-ON-GRADE

Based on the anticipated subgrade of compacted, structural fills or native lean clays, a modulus-of-subgrade reaction, k_s , of 55 pounds per cubic inch (pci) is recommended for the subgrade soils of the proposed structures. TSi recommends that floor slabs constructed be underlain by 6 inches of well-graded, compacted granular material in order to achieve more uniform support. A maximum particle size of 1 inch is recommended for the granular base material. Support of floor slab on any existing fill or fat clay is not recommended.

On many projects, there is a significant time lag between the subgrade excavation and the point when concrete is placed for the floor slab. Although the soil subgrade may have been properly prepared during the initial construction, the exposure to weather, equipment, traffic, and other construction activities can damage the integrity of the subgrade soil. Frequently, this becomes an issue when remedial work is required for proper floor slab support. Prior to the construction of the concrete floor slab, the subgrade should be thoroughly recompacted to the specified density. TSi suggests that provisions be included in the project specifications for the contractor to restore the subgrade soils to an acceptable condition immediately prior to the construction of the floor slab.

5.4 APRON DESIGN RECOMMENDATIONS

Based on the soil encountered in the borings and laboratory tests indicate that the proposed apron pavement will be supported mostly on lean clay. However, fat clay was encountered in Boring B-3 at the new apron expansion area that extended from the ground surface to the boring termination depth and, may be evident at other locations within the apron area. Moreover, it was

reported that about 12 inches of soil at the surface in the project area was treated with lime previously. However, this treatment may not be adequate to address the issues associated with the fat clays at this site. Therefore, TSi suggests removal of fat clay to a depth of about 2 feet and replace with LVC fill as described in Section 5.1. We recommend, using a California Bearing Ratio (CBR) value of 3.0 to be appropriate for design of the new apron pavement. The CBR value is for soils compacted to a minimum of 95% of the standard Proctor maximum dry density. In accordance with the Federal Aviation Administration Advisory Circular 150/5320-6F, a CBR of 3.0 equates to a modulus-of-subgrade reaction, k_s , for the soil of approximately 55 pounds per cubic inch (pci). Based on the soils encountered in this exploration, the soil frost group for subgrade soils is FG-3. These values are based on the assumption that the subgrade is prepared in accordance with the recommendations provided in Section 6 of this report.

5.5 REGIONAL SEISMICITY

Based on the general soil characteristics as determined by field and laboratory tests and the estimated depth to bedrock, the project area is designated as Site Class D, in accordance with the ASCE7-10. The standard penetration test (N) values suggest that the soil has adequate density to resist liquefaction, in consideration of the distance to known seismic sources. Thus, the site soil is not considered to be susceptible to liquefaction, or to substantial settlement or loss in strength when subject to the design earthquake loading.

6.0 SITE PREPARATION AND EXCAVATION CONSIDERATIONS

6.1 SUBGRADE PREPARATION

Prior to construction the project area should be stripped of any grass, root mass, organic soil, existing pavements, existing fill, and any deleterious materials. The exposed subgrade should be proofrolled under the observation of TSi to identify any areas of soft subgrade. Any such areas observed should be overexcavated and recompacted or replaced with compacted crushed limestone. If fill is to be placed to raise the existing grade, prior to placing fill over the natural soil, the subgrade should be scarified to a depth of about 6 inches, the moisture content of the soil adjusted to near its optimum moisture content, and the subgrade recompacted in accordance with the recommendations presented in later sections of this report. This recommended scarification and recompaction may be waived if in the opinion of a representative of TSi this procedure appears to be detrimental or unnecessary, based on the response of the subgrade.

Soils consisting of fat clays (CH) should follow the design and construction recommendations in Section 5.1 above. Field observations should be performed during removal and replacement of fat clays within 2 feet of pavements and floor slabs; and within 3 feet of shallow footings.

6.2 SUBGRADE PROTECTION

Construction areas should be properly drained in order to reduce or prevent surface runoff from collecting on the pavement subgrade. Any ponded water on the exposed subgrade should be removed immediately. The soils encountered at the site are easily disturbed by construction equipment if driven over them and may be hard to compact once disturbed. To prevent unnecessary disturbance of the subgrade soils, heavy construction vehicles should be restricted from traveling through the finished subgrade. If areas of disturbed subgrade develop, they should be properly repaired in accordance with the recommendations in this report.

6.3 FILL AND BACKFILL MATERIALS

The fat clay soils encountered at the boring locations are not suitable to be used as structural fill and backfill materials without lime modification. On site lean clays would be suitable for support of structures, but appears to be limited on this site. Based on Boring B-6, existing fill materials, if encountered in the project area, is not suitable for structural support, but may be reused as fill if properly lime modified and properly compacted. Depending on the design finish grade or other factors, it may be expedient to import crushed limestone aggregate for use as fill and backfill. Off-site fill, if cohesive soils are used, should consist of lean clay having a plasticity index of less than 25. Off-site fill should be approved by TSi prior to being imported to the job site. If this facility is constructed during the winter season, fill materials should be carefully observed to see that no ice or frozen soils are placed as fill or remain in the base materials upon which fill is placed.

6.4 FILL AND BACKFILL PLACEMENT

Generally, granular or cohesive soils for fill and backfill for proposed box hangars and paved taxilane should be compacted to a dry density of at least 95% of the standard Proctor maximum dry density (ASTM D 698) of the soil. The moisture content of these materials at the time of compaction should generally be within $\pm 3\%$ of the optimum moisture content of the materials as determined by the standard Proctor compaction test. Moisture conditioning and recompaction is typically limited to the upper 8 to 12 inches of the profile, unless deeper unsuitable zones are identified through the previously discussed proofrolling procedure.

Well-graded granular material, such as crushed limestone base, should be compacted to at least 100% of the standard Proctor maximum dry density. The moisture content of these materials at the time of compaction should generally be within $\pm 3\%$ of the optimum moisture content of the materials as determined by the standard Proctor compaction test.

Materials should be placed in loose lifts not in excess of 8 inches thick, and compacted with a vibratory smooth drum roller to the aforementioned criterion. However, it may be necessary to place materials in thinner lifts to achieve the recommended compaction when using small hand-operated equipment.

Crushed limestone available from local quarries is a common construction material in the general region. There is a misconception among some builders that open-graded (also known as “clean”) limestone does not require compaction when placed as fill or backfill. Settlement of open-graded crushed rock that had not been compacted when placed is a common cause of damage to pavements, including the development of substantial gaps beneath the concrete caused by the settlement.

Any crushed rock placed as structural fill or backfill that will underlie future concrete slabs or pavements must be placed in lifts (layers) of controlled loose thickness and compacted in accordance with the recommendations that appear in this report. Both open-graded and well-graded stone should be compacted with a vibratory compactor, whether a self-propelled roller, backhoe-mounted plate, or walk-behind sled.

6.5 GROUNDWATER CONSIDERATIONS

Groundwater was not encountered during drilling. Groundwater seepage is not anticipated at the depths of the proposed hangar foundation bearing and paved apron subgrade level; however, if it occurs, it is likely that the condition could be handled by shallow swales, with a sump and pump arrangement, as necessary. If groundwater seepage or moist conditions become evident within the subgrade area, care must be taken not to disturb the exposed saturated soil. Equipment should not operate directly on the saturated areas. TSi should be consulted for specific recommendations to address such conditions. The excavations should be kept as dry as possible.

7.0 CONSTRUCTION OBSERVATION AND TESTING

It is recommended that TSi be retained during construction to perform testing and observation services for the following items:

- proofrolling, recompaction, and preparation of the soil subgrade that will support new fill;
- evaluation of the suitability and compaction of fill and backfill materials;
- compaction of the existing subgrade and base course and any additional materials;
- placement and compaction of fill and backfill materials;
- placement and quality assurance testing for concrete materials and apron pavement wearing surface.

These quality assurance services should help to verify the design assumptions and maintain construction procedures in accordance with the project plans, specifications, and good engineering practice.

8.0 REPORT LIMITATIONS

This report has been prepared for the exclusive use of **JVIATION, INC.** for specific application to the subject project. The recommendations contained in this report have been made in accordance with generally accepted soil and foundation engineering practices; no other warranties are implied or expressed.

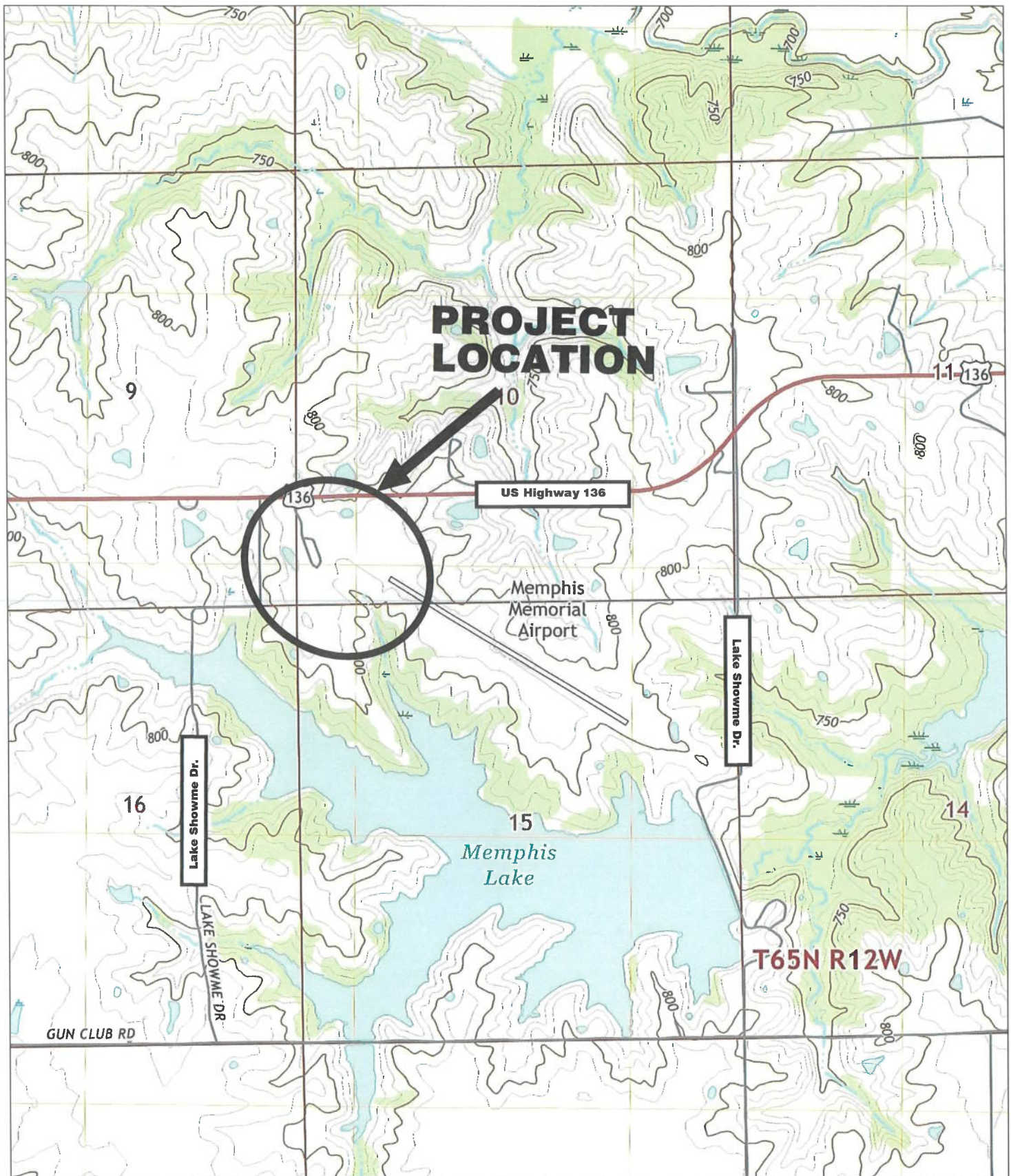
The assessments and recommendations submitted in this report are based in part upon the data obtained from the test borings. The nature and extent of variations away from the borings may not become evident until construction. If variations then appear evident, it may be necessary to re-evaluate the recommendations of this report.

This report was prepared for design purposes only and may not be sufficient to prepare an accurate construction bid. Contractors reviewing this report should acknowledge that the information and recommendations contained herein are for design purposes.

If conditions at the site have changed due to natural causes or construction operations, this report should be reviewed by TSi to determine the applicability of the analyses and recommendations considering the changed conditions. The report should also be reviewed by TSi if changes occur in the apron expansion and hangar locations, widths, and types, or in the planned elevations or project concepts.

TSi requests the opportunity to review the final plans and specifications for the project prior to construction to verify that the recommendations in this report are properly interpreted and incorporated in the design and construction documents. If TSi is not accorded the opportunity to make this recommended review, we can assume no responsibility for the misinterpretation of our recommendations.

APPENDIX A



NOT TO SCALE

NOTE:

DRAWING PREPARED FROM AN IMAGE
OBTAINED FROM USGS TOPOGRAPHIC MAP
ON 2/19/2020



1340 NORTH PRICE ROAD
ST. LOUIS, MISSOURI 63132

VICINITY MAP

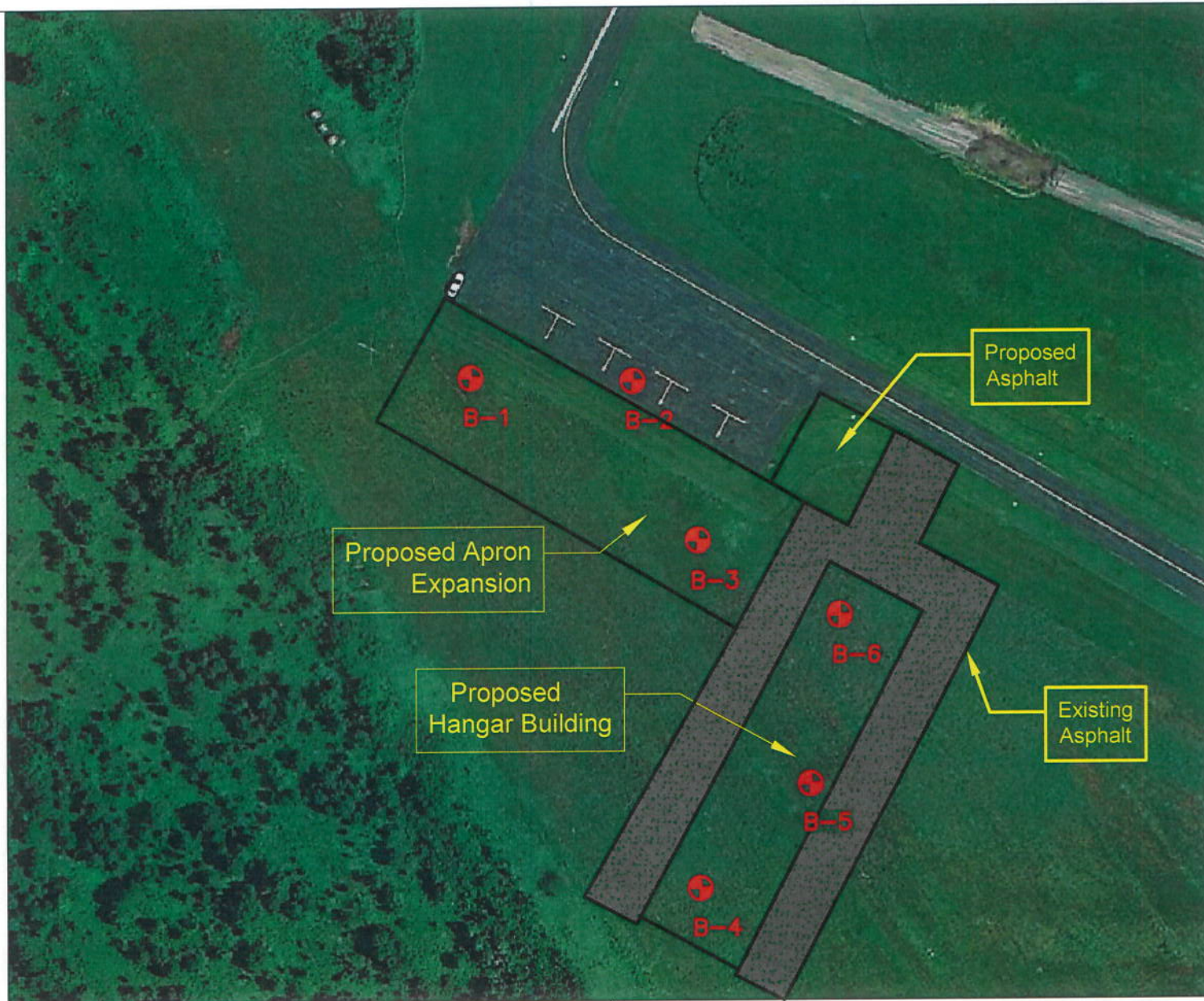
MEMPHIS MEMORIAL AIRPORT IMPROVEMENTS
MEMPHIS, MISSOURI

Drawn By: HNG

Checked By: FHH

Project No. 20201006.00

Date: 2/19/2020 Figure 1



NOT TO SCALE

LEGEND

B-1  APPROXIMATE BORING LOCATION AND NUMBER

NOTE: THIS PLAN WAS PREPARED FROM AN IMAGE OBTAINED FROM GOOGLE MAPS ON 2/19/2020



1340 NORTH PRICE ROAD
ST. LOUIS, MISSOURI 63132

SITE AND BORING LOCATION PLAN

MEMPHIS MEMORIAL AIRPORT IMPROVEMENTS
MEMPHIS, MISSOURI

Drawn By: HNG

Checked By: FHH

Project No. 20201006.00

Date: 2/19/2020

Figure 2

APPENDIX B

LOG OF BORING NO. B-1

Project Description: **Memphis Memorial Airport Improvements**
Memphis, Missouri

TSi Geotechnical Inc.
 1340 North Price Road
 St. Louis, Missouri 63132
 (314) 373-4000 (314) 227-6622 FAX



Depth, feet	Samples	Sample #	Graphic Log	Surface El. Not Provided Location: See Site and Boring Location Plan	Recovery %	RQD	Penetration Blows Per 6 inches Hand Penetrometer, Qu TSF	Undrained Shear Strength, TSF	Unit Dry Weight, lb/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
MATERIAL DESCRIPTION													
		SS-1		Brown and gray, lean CLAY (CL)	94		1 2 2	1.50		28			
5		SS-2		-trace organics from 3.5 to 5.0 ft.	100		1 2 4	2.00		21			
		SS-3		Gray and brown, fat CLAY (CH), trace sand	100		2 4 6	3.75		23			
		ST-4		-gray below 8.0 ft.	100			3.00	103	24			
10				Boring terminated at 10.0 ft.									
15													
20													
25													

LOG WITH LAB MEMPHIS AIRPORT GINT.GPJ 2/28/20

Completion Depth: 10.0
 Date Boring Started: 2/10/20
 Date Boring Completed: 2/10/20
 Engineer/Geologist: J Beavers
 Project No.: 20201006.00

Remarks: Boring drilled using Geoprobe-7822 DT using HSA and Auto SPT.
 Groundwater not encountered during drilling.

The stratification lines represent approximate strata boundaries.
 In situations, the transition may be gradual.

Project Description: **Memphis Memorial Airport Improvements**
Memphis, Missouri

LOG WITH LAB MEMPHIS AIRPORT GINT.GPJ 2/28/20

Remarks: Boring drilled using Geoprobe-7822 with HSA and Auto SPT. Groundwater not encountered during drilling.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

LOG OF BORING NO. B-3

Project Description: **Memphis Memorial Airport Improvements**
Memphis, Missouri

TSi Geotechnical Inc.
 1340 North Price Road
 St. Louis, Missouri 63132
 (314) 373-4000 (314) 227-6622 FAX



Depth, feet	Samples	Sample #	Graphic Log	Surface El. Not Provided Location: See Site and Boring Location Plan	Recovery %	RQD	Penetration Blows Per 6 inches Hand Penetrometer, Qu TSF	Undrained Shear Strength, TSF	Unit Dry Weight, lb/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
MATERIAL DESCRIPTION													
		ST-1		Brown and gray, fat CLAY (CH) (possible lime-treated from 0 to 1 ft.) -trace organics from 1.0 to 3.0 ft.	96		2.50		95	28	57	19	38
5		SS-2			100		1 2 3 2.00			20			
		SS-3			94		2 3 4 3.00			26			
		SS-4		-trace sand below 8.5 ft.	100		2 3 4 4.00			25			
10				Boring terminated at 10.0 ft.									
15													
20													
25													

LOG WITH LAB MEMPHIS AIRPORT GINT.GPJ 2/28/20

Completion Depth: 10.0
 Date Boring Started: 2/11/20
 Date Boring Completed: 2/11/20
 Engineer/Geologist: H. Hennessy
 Project No.: 20201006.00

Remarks: Boring drilled using Geoprobe-7822 with HSA and Auto SPT.
 Groundwater not encountered during drilling.



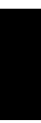





The stratification lines represent approximate strata boundaries.
 In situations, the transition may be gradual.

LOG OF BORING NO. B-4

Project Description: **Memphis Memorial Airport Improvements**
Memphis, Missouri

TSi Geotechnical Inc.
 1340 North Price Road
 St. Louis, Missouri 63132
 (314) 373-4000 (314) 227-6622 FAX



Depth, feet	Samples	Sample #	Graphic Log	Surface El. Location: Not Provided See Site and Boring Location Plan	Recovery %	RQD	Penetration Blows Per 6 inches	Hand Penetrometer, Qu TSF	Undrained Shear Strength, TSF	Unit Dry Weight, lb/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
				MATERIAL DESCRIPTION										
		SS-1		Brown and gray, lean CLAY (CL)	100		2 2 3	3.00			18			
		ST-2		Brown and gray, fat CLAY (CH)	88			3.50	0.47	105	22	70	19	51
5														
		SS-3			89		1 4 6	4.50			23			
		SS-4		-trace sand below 8.5 ft.	78		2 4 6	>4.5			18			
10														
		SS-5			100		2 5 5	3.50			15			
15														
		SS-6		-trace gravel below 18.5 ft.	100		3 6 7	>4.5			13			
20				Boring terminated at 20.0 ft.										

LOG WITH LAB MEMPHIS AIRPORT GINT.GPJ 2/28/20

Completion Depth: 20.0
 Date Boring Started: 2/10/20
 Date Boring Completed: 2/10/20
 Engineer/Geologist: H. Hennessy
 Project No.: 20201006.00

Remarks: Boring drilled using Geoprobe-7822 with HSA and Auto SPT.
 Groundwater not encountered during drilling.

The stratification lines represent approximate strata boundaries.
 In situations, the transition may be gradual.

LOG OF BORING NO. B-5

Project Description: **Memphis Memorial Airport Improvements**
Memphis, Missouri

TSi Geotechnical Inc.
 1340 North Price Road
 St. Louis, Missouri 63132
 (314) 373-4000 (314) 227-6622 FAX



Depth, feet	Samples	Sample #	Graphic Log	Surface El. Not Provided Location: See Site and Boring Location Plan	Recovery %	RQD	Penetration Blows Per 6 inches Hand Penetrometer, Qu TSF	Undrained Shear Strength, TSF	Unit Dry Weight, lb/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
				MATERIAL DESCRIPTION									
		ST-1		Brown and gray, lean CLAY (CL)	88		>4.5		96	24			
5		SS-2			50		6 12 17	>4.5		11			
		SS-3			33		4 6 10	>4.5		17			
		SS-4		Brown and gray, fat CLAY (CH)	83		3 5 6	4.50		21	78	15	63
15		SS-5		-trace gravel below 13.5 ft.	83		3 4 5	3.50		21			
20		SS-6		-brown, trace sand below 18.5 ft.	89		2 2 5	4.00		16			
				Boring terminated at 20.0 ft.									
25													

LOG WITH LAB MEMPHIS AIRPORT GINT.GPJ 2/28/20

Completion Depth: 20.0
 Date Boring Started: 2/10/20
 Date Boring Completed: 2/10/20
 Engineer/Geologist: J Beavers
 Project No.: 20201006.00

Remarks: Boring drilled using Geoprobe-7822 with HSA and Auto SPT.
 Groundwater not encountered during drilling.

The stratification lines represent approximate strata boundaries.
 In situations, the transition may be gradual.

LOG OF BORING NO. B-6

Project Description: **Memphis Memorial Airport Improvements**
Memphis, Missouri

TSi Geotechnical Inc.
 1340 North Price Road
 St. Louis, Missouri 63132
 (314) 373-4000 (314) 227-6622 FAX



Depth, feet	Samples	Sample #	Graphic Log	Surface El. Not Provided Location: See Site and Boring Location Plan	Recovery %	RQD	Penetration Blows Per 6 inches	Hand Penetrometer, Qu TSF	Undrained Shear Strength, TSF	Unit Dry Weight, lb/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
MATERIAL DESCRIPTION														
		SS-1		FILL: Gray, lean CLAY (CL), trace gravel and organics (possible lime-treated)	72		WH 1 3	1.50			30			
		ST-2		Brown and gray, fat CLAY (CH)	63			3.50	0.68	90	30	105	28	77
5		SS-3		Brown and gray, lean CLAY (CL), trace sand	100		2 3 3	2.50			19			
		SS-4		Brown and gray, fat CLAY (CH)	100		2 3 4	3.00			22			
10		SS-5		-trace sand below 13.5 ft.	100		2 4 6	4.00			21			
15		SS-6		-trace gravel below 18.5 ft.	100		2 3 4	2.50			20			
20				Boring terminated at 20.0 ft.										
25														

LOG WITH LAB. MEMPHIS AIRPORT GINT.GPJ 2/28/20

Completion Depth: 20.0
Date Boring Started: 2/11/20
Date Boring Completed: 2/11/20
Engineer/Geologist: J Beavers
Project No.: 20201006.00

Remarks: Boring drilled using Geoprobe-7822 with HSA and Auto SPT. Groundwater not encountered during drilling.

LOG WITH LAB MEMPHIS AIRPORT GINT.GPJ 2/28/20

Completion Depth: 20.0
 Date Boring Started: 2/11/20
 Date Boring Completed: 2/11/20
 Engineer/Geologist: J Beavers
 Project No.: 20201006.00

Remarks: Boring drilled using Geoprobe-7822 with HSA and Auto SPT.
 Groundwater not encountered during drilling.

The stratification lines represent approximate strata boundaries.
 In situations, the transition may be gradual.

GENERAL NOTES

The number of borings is based on: topographic and geologic factors; the magnitude of structure loading; the size, shape, and value of the structure; consequences of failure; and other factors. The type and sequence of sampling are selected to reduce the possibility of undiscovered anomalies and maintain drilling efficiency. Attempts are made to detect and/or identify occurrences during drilling and sampling such as the presence of water, boulders, gas, zones of lost circulation, relative ease or resistance to drilling progress, unusual sample recovery, variation in resistance to driving split-spoon samplers, unusual odors, etc. However, lack of notation regarding these occurrences does not preclude their presence.

Although attempts are made to obtain stabilized groundwater levels, the levels shown on the Logs of Boring may not have stabilized, particularly in more impermeable cohesive soils. Consequently, the indicated groundwater levels may not represent present or future levels. Groundwater levels may vary significantly over time due to the effects of precipitation, infiltration, or other factors not evident at the time indicated.

Unless otherwise noted, soil classifications indicated on the Logs of Boring are based on visual observations and are not the result of classification tests. Although visual classifications are performed by experienced technicians or engineers, classifications so made may not be conclusive.

Generally, variations in texture less than one foot in thickness are described as layers within a stratum, while thicker zones are logged as individual strata. However, minor anomalies and changes of questionable lateral extent may appear only in the verbal description. The lines indicating changes in strata on the Logs of Boring are approximate boundaries only, as the actual material change may be between samples or may be a gradual transition.

Samples chosen for laboratory testing are selected in such a manner as to measure selected physical characteristics of each material encountered. However, as samples are recovered only intermittently and not all samples undergo a complete series of tests, the results of such tests may not conclusively represent the characteristics of all subsurface materials present.

NOTATION USED ON BORING LOGS

APPROXIMATE PROPORTIONS

TRACE	<15%
WITH	15-30%
MODIFIER	>30%

Clay or clayey may be used as major material or modifier, regardless of relative proportions, if the clay content is sufficient to dominate the soil properties.

PARTICLE SIZE

BOULDERS	>12 Inches
COBBLES	12 Inches – 3 Inches
GRAVEL	
Coarse	3 Inches – ¾ Inch
Fine	¾ Inch – No. 4 Sieve (4.750 mm)
SAND	
Coarse	No. 4 – No. 10 Sieve (2.000 mm)
Medium	No. 10 – No. 40 Sieve (0.420 mm)
Fine	No. 40 – No. 200 Sieve (0.074 mm)
SILT	No. 200 Sieve - 0.002 mm
CLAY	< 0.002 mm

PENETRATION – BLOWS







Number of impacts of a 140-pound hammer falling a distance of 30 inches to cause a standard split-barrel sampler, 1 3/8 inches I.D., to penetrate a distance of 6 inches. The number of impacts for the first 6 inches of penetration is known as the seating drive. The sum of the impacts for the last 12 inches of penetration is the Standard Penetration Test Resistance or “N” value, blows per foot. For example, if blows = 6-8-9, “N” = 8+9 or 17.

OTHER NOTATIONS

Recovery % – length of recovered soil divided by length of sample attempted.

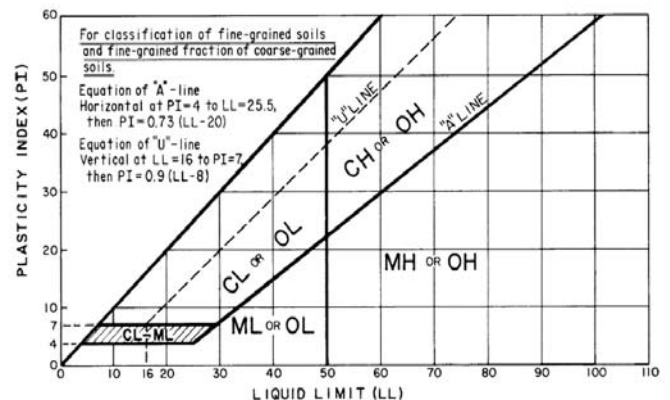
50/2”	Impacts of hammer to cause sampler to penetrate the indicated number of inches
WR	Sampler penetrated under the static loading of the weight of the drill rods
WH	Sampler penetrated under the static loading the weight of the hammer and drill rods
HSA	Hollow stem auger drilling method
FA	Flight auger drilling method
RW	Rotary wash drilling methods with drilling mud
AH	Automatic hammer used for Standard Penetration Test sample
SH	Safety hammer with rope and cathead used for Standard Penetration Test sample

GRAPHIC SYMBOLS

	Depth at which groundwater was encountered during drilling
	Depth at which groundwater was measured after drilling
	Standard Penetration Test Sample, ASTM D1586
	3-inch diameter Shelby Tube Sample, ASTM D1587
	Sample grabbed from auger
	NX Size rock core sample

UNIFIED SOIL CLASSIFICATION SYSTEM, (ASTM D-2487)

Major Divisions			Group Symbols		Typical Names	Laboratory Classification Criteria										
<div>Coarse-grained soils (More than half of materials is larger than No. 200 sieve size)</div> <div>Gravels (More than half of coarse fraction is larger than No. 4 sieve size)</div> <div>Sands (More than half of coarse fraction is smaller than No. 4 sieve size)</div>						Clean gravels (Little or no fines)		GW		Well-graded gravels, gravel-sand mixtures, little or no fines		$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3				
						Gravels with fines (Appreciable amount of fines)		GP		Poorly graded gravels, gravel-sand mixtures, little or no fines		Atterberg limits below “A” line or P.I. less than 4		Above “A” line with P.I. between 4 and 7 are <i>borderline</i> cases requiring use of dual symbols		
								GM ^a	d	Silty gravels, gravel-sand-silt mixtures						
									u							
						Clean sands (Little or no fines)		GC		Clayey gravels, gravel-sand-clay mixtures		Atterberg limits below “A” line with P.I. greater than 7				
								SW		Well-graded sands, gravelly sands, little or no fines		$C_u = \frac{D_{60}}{D_{10}}$ greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3				
								SP		Poorly graded sands, gravelly sands, little or no fines		Not meeting all gradation requirements for SW				
						Sands with fines (Appreciable amount of fines)	SM ^a	d	Silty sands, sand-mix mixtures		Atterberg limits about “A” line or P.I. less than 4			Limits plotting in hatched zone with P.I. between 4 and 7 are <i>borderline</i> cases requiring use of dual symbols		
								u								
						SC				Clayey sands, sand-clay mixtures		Atterberg limits about “A” line with P.I. greater than 7				
<div>Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows: Less than 5 per cent More than 12 per cent 5 to 12 per cent</div> <div>GW, GP, SW, SP GM, GC, SM, SC Borderline cases requiring dual symbols^b</div>						<div>For classification of fine-grained soils and fine-grained fraction of coarse-grained soils</div> <div></div>										



^aDivision of GM and SM groups into subdivisions of d and u are for roads and airfields only. Subdivision is based on Atterberg limits; suffix d used when L.L. is 26 or less and the P.I. is 6 or less; the suffix u used when L.L. is greater than 28.

^bBorderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group symbols. For example: GW-GC, well-graded gravel-sand mixture with clay binder.

PROPOSAL FORM

City of Memphis

State Block Grant Project No. 19-026A-1

TO:City of Memphis

The undersigned, in compliance with the request for bids for construction of the following Project:

Schedule I - Apron Expansion

Schedule II - 8-Unit T-Hangar

Schedule III - 2-Unit T-Hangar

Schedule IV - 2-Unit T-Hangar

hereby proposes to furnish all labor, permits, material, machinery, tools, supplies and equipment to faithfully perform all work required for construction of the Project in accordance with the project manual, project drawings and issued Addenda within the specified time of performance for the following prices:

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BID PROPOSAL SUMMARY

Bidder Name: _____

SCHEDULE I TOTAL \$ _____

SCHEDULE II TOTAL \$ _____

SCHEDULE III TOTAL \$ _____

SCHEDULE IV TOTAL \$ _____

TOTAL ALL SCHEDULES \$ _____

Bidder has examined the proposed site and is familiar with all site conditions.

Signature

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SCHEDULE I						
Item No.	Description		Units	Estimated Quantity	Unit Price	Total
C-100a	Contractor Quality Control Program	at the unit price of: _____ dollars and _____ cents.	LS	1	\$	\$
C-102a	Temporary Erosion Control	at the unit price of: _____ dollars and _____ cents.	LS	1	\$	\$
C-105a	Mobilization	at the unit price of: _____ dollars and _____ cents.	LS	1	\$	\$
P-101a	Partial Depth Pavement Removal	at the unit price of: _____ dollars and _____ cents.	SY	100	\$	\$
P-101b	Removal of Drainage	at the unit price of: _____ dollars and _____ cents.	LS	1	\$	\$
P-152a	Unclassified Excavation	at the unit price of: _____ dollars and _____ cents.	CY	2,500	\$	\$
P-152b	Subgrade Preparation - 24 Inches	at the unit price of: _____ dollars and _____ cents.	SY	3,700	\$	\$
P-208a	Aggregate Base Course	at the unit price of: _____ dollars and _____ cents.	CY	705	\$	\$
P-208b	Separation Geotextile	at the unit price of: _____ dollars and _____ cents.	SY	3,700	\$	\$
P-401a	Asphalt Surface Course	at the unit price of: _____ dollars and _____ cents.	TON	830	\$	\$
P-401b	Asphalt Binder	at the unit price of: _____ dollars and _____ cents.	TON	55	\$	\$
P-603a	Emulsified Asphalt Tack Coat	at the unit price of: _____ dollars and _____ cents.	GAL	500	\$	\$
P-620a	Airport Pavement Marking - Permanent	at the unit price of: _____ dollars and _____ cents.	SF	1,500	\$	\$
P-620b	Airport Pavement Marking (Black)	at the unit price of: _____ dollars and _____ cents.	SF	2,450	\$	\$
P-640a	Aircraft Tiedown Anchor	at the unit price of: _____ dollars and _____ cents.	EA	21	\$	\$
T-901a	Seeding	at the unit price of: _____ dollars and _____ cents.	AC	2	\$	\$
DIV-26b	Install 3/0 AWG, 600V Insulated Copper Wire	at the unit price of: _____ dollars and _____ cents.	LF	930	\$	\$
DIV-26c	Install #6 AWG, 600V Insulated Copper Wire	at the unit price of: _____ dollars and _____ cents.	LF	310	\$	\$
L-110a	Install 1-2.5" Schedule 40 PVC Conduit (DEB)	at the unit price of: _____ dollars and _____ cents.	LF	280	\$	\$
L-126a	Retroreflective Marker	at the unit price of: _____ dollars and _____ cents.	EA	20	\$	\$

SCHEDULE I TOTAL \$ _____

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SCHEDULE II						
Item No.	Description		Units	Estimated Quantity	Unit Price	Total
C-105a	Mobilization	at the unit price of: _____ dollars and _____ cents.	LS	1	\$	\$
P-152a	Unclassified Excavation	at the unit price of: _____ dollars and _____ cents.	CY	1,500	\$	\$
P-152d	Import and Place Low Volume Change (LVC) Granular Fill	at the unit price of: _____ dollars and _____ cents.	CY	1,350	\$	\$
DIV-26a	T-Hangar Building Electrical	at the unit price of: _____ dollars and _____ cents.	LS	1	\$	\$
A-100a	Concrete Foundation and Slab - 8 Unit T-Hangars	at the unit price of: _____ dollars and _____ cents.	LS	1	\$	\$
A-100b	Pre-Engineered Metal Building - 8 Unit T-Hangars (Complete)	at the unit price of: _____ dollars and _____ cents.	LS	1	\$	\$
A-100c	Bi-Fold Hangar Door	at the unit price of: _____ dollars and _____ cents.	EA	8	\$	\$
A-100d	Insulate Exterior Walls, Roof, and Door with Minimum R-13 Insulation	at the unit price of: _____ dollars and _____ cents.	LS	1	\$	\$

SCHEDULE II TOTAL \$ _____

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SCHEDULE III						
Item No.	Description		Units	Estimated Quantity	Unit Price	Total
C-105a	Mobilization	at the unit price of: _____ dollars and _____ cents.	LS	1	\$	\$
P-152a	Unclassified Excavation	at the unit price of: _____ dollars and _____ cents.	CY	462	\$	\$
P-152d	Import and Place Low Volume Change (LVC) Granular Fill	at the unit price of: _____ dollars and _____ cents.	CY	420	\$	\$
DIV-26a	T-Hangar Building Electrical	at the unit price of: _____ dollars and _____ cents.	LS	1	\$	\$
A-100c	Bi-Fold Hangar Door	at the unit price of: _____ dollars and _____ cents.	EA	2	\$	\$
A-100d	Insulate Exterior Walls, Roof, and Door with Minimum R-13 Insulation	at the unit price of: _____ dollars and _____ cents.	LS	1	\$	\$
A-101a	Additional Concrete Foundation and Slab - 2 Unit T-Hangars	at the unit price of: _____ dollars and _____ cents.	LS	1	\$	\$
A-101b	Additional Pre-Engineered Metal Building - 2 Unit T-Hangars	at the unit price of: _____ dollars and _____ cents.	LS	1	\$	\$

SCHEDULE III TOTAL \$ _____

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SCHEDULE IV						
Item No.	Description		Units	Estimated Quantity	Unit Price	Total
C-105a	Mobilization	at the unit price of: _____ dollars and _____ cents.	LS	1	\$	\$
P-152a	Unclassified Excavation	at the unit price of: _____ dollars and _____ cents.	CY	462	\$	\$
P-152d	Import and Place Low Volume Change (LVC) Granular Fill	at the unit price of: _____ dollars and _____ cents.	CY	420	\$	\$
DIV-26a	T-Hangar Building Electrical	at the unit price of: _____ dollars and _____ cents.	LS	1	\$	\$
A-100c	Bi-Fold Hangar Door	at the unit price of: _____ dollars and _____ cents.	EA	2	\$	\$
A-100d	Insulate Exterior Walls, Roof, and Door with Minimum R-13 Insulation	at the unit price of: _____ dollars and _____ cents.	LS	1	\$	\$
A-101a	Additional Concrete Foundation and Slab - 2 Unit T-Hangars	at the unit price of: _____ dollars and _____ cents.	LS	1	\$	\$
A-101b	Additional Pre-Engineered Metal Building - 2 Unit T-Hangars	at the unit price of: _____ dollars and _____ cents.	LS	1	\$	\$

SCHEDULE IV TOTAL \$ _____

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ACKNOWLEDGEMENTS BY BIDDER

- a. By submittal of a proposal, the BIDDER acknowledges and accepts that the quantities established by the OWNER are an approximate estimate of the quantities required to fully complete the Project and that the estimated quantities are principally intended to serve as a basis for evaluation of bids. The BIDDER further acknowledges and accepts that payment under this contract will be made only for actual quantities and that quantities will vary in accordance with the General Provisions subsection entitled "Alteration of Work and Quantities".
- b. The BIDDER acknowledges and accepts that the Bid Documents are comprised of the documents identified within the General Provisions. The BIDDER further acknowledges that each the individual documents that comprise the Bid Documents are complementary to one another and together establishes the complete terms, conditions and obligations of the successful BIDDER.
- c. As evidence of good faith in submitting this proposal, the undersigned encloses a bid guaranty in the form of a certified check, cashier's check or bid bond in the amount of 5% of the bid price. The BIDDER acknowledges and accepts that refusal or failure to accept award and execute a contract within the terms and conditions established herein will result in forfeiture of the bid guaranty to the owner as a liquidated damage.
- d. The BIDDER acknowledges and accepts the OWNER'S right to reject any or all bids.
- e. The BIDDER acknowledges and accepts the OWNER'S right to hold all Proposals for purposes of review and evaluation and not issue a notice-of-award for a period not to exceed 90 calendar days from the stated date for receipt of bids.
- f. The undersigned agrees that upon written notice of award of contract, he or she will execute the contract within thirty (30) days of the notice-of-award, and furthermore, and provide executed payment and performance bonds within thirty (30) days from the date of contract execution. The undersigned accepts that failure to execute the contract and provide the required bonds within the stated timeframe shall result in forfeiture of the bid guaranty to the owner as a liquidated damage.
- g. Time of Performance: By submittal of this proposal, the undersigned acknowledges and agrees to commence work within ten (10) calendar days of the date specified in the written "Notice-to-Proceed" as issued by the OWNER. The undersigned further agrees to complete the Project within 210 Calendar days from the commencement date specified in the Notice-to-Proceed.
- h. The undersigned acknowledges and accepts that for each and every Calendar day the project remains incomplete beyond the contract time of performance, the Contractor shall pay the non-penal amount of \$750 per Calendar day as a liquidated damage to the OWNER.
- i. The undersigned prime contractor, if not a MoDOT certified DBE, hereby assures that they will subcontract **6.0** percent of the dollar value of the prime contract to DBE firms or make good faith efforts to meet the DBE contract goal. In addition, the prime contractor will include the DBE clauses (see Supplementary Provision No. 6 of the Federal and State Provisions) required by the DBE Program adopted by MoDOT and the city in all contracts and subcontracts relating to this project. The undersigned will complete the DBE Participation information included herein, when a DBE goal has been established, including a demonstration of good faith efforts if the DBE goal is not met. If the undersigned prime contractor is a MoDOT certified DBE firm, then the prime contractor must perform at least thirty percent (30%) of the total contract value work with its own forces, and will receive DBE credit for all work which the prime contractor and any other MoDOT certified DBE firm performs directly.

- j. The BIDDER, by submission of a proposal, acknowledges that award of this contract is subject to the provisions of the David Bacon Act and the Missouri Prevailing Wage Law. The BIDDER accepts the requirement to pay prevailing wages for each classification and type of worker as established in the attached wage rate determinations as issued by the United States Department of Labor and the Missouri Division of Labor Standards. The BIDDER further acknowledges and accepts their requirement to incorporate the provision to pay the established prevailing wages in every subcontract agreement entered into by the Bidder under this project. The highest rate between the two (Federal and State) for each job classification shall be considered the prevailing wage.
- k. Compliance Reports (41 CFR Part 60-1.7): Within 30 days after award of this contract, the Contractor/Subcontractor shall file a compliance report (Standard Form 100) if s/he has not submitted a complete compliance report within 12 months preceding the date of award. This report is required if the Contractor/Subcontractor meets all of the following conditions:
- a. Contractors/Subcontractors are not exempt based on 41 CFR 60-1.5.
 - b. Has 50 or more employees.
 - c. Is a prime contractor or first tier subcontractor.
 - d. There is a contract, subcontract, or purchase order amounting to \$50,000 or more
- l. The undersigned acknowledges receipt of the following addenda:

Addendum No. _____, dated _____	Date Received _____
Addendum No. _____, dated _____	Date Received _____
Addendum No. _____, dated _____	Date Received _____
Addendum No. _____, dated _____	Date Received _____
Addendum No. _____, dated _____	Date Received _____

REPRESENTATIONS BY BIDDER

By submittal of a proposal (bid), the BIDDER represents the following:

- a. The BIDDER has read and thoroughly examined the bid documents including all authorized addenda.
- b. The BIDDER has a complete understanding of the terms and conditions required for the satisfactory performance of project work.
- c. The BIDDER has fully informed themselves of the project site, the project site conditions and the surrounding area.
- d. The BIDDER has familiarized themselves of the requirements of working on an operating airport and understands the conditions that may in any manner affect cost, progress or performance of the work
- e. The BIDDER has correlated their observations with that of the project documents.
- f. The BIDDER has found no errors, conflicts, ambiguities or omissions in the project documents, except as previously submitted in writing to the owner that would affect cost, progress or performance of the work.
- g. The BIDDER is familiar with all applicable Federal, State and local laws, rules and regulations pertaining to execution of the contract and the project work.
- h. The BIDDER has complied with all requirements of these instructions and the associated project documents.

CERTIFICATIONS BY BIDDER

- a. The undersigned hereby declares and certifies that the only parties interested in this proposal are named herein and that this proposal is made without collusion with any other person, firm or corporation.

The undersigned further certifies that no member, officer or agent of OWNER'S has direct or indirect financial interest in this proposal.

- b. Prohibition of Non-Segregated Facilities** (41 CFR Part 60-1.8) The BIDDER agrees that it does not maintain or provide, for its employees, any segregated facilities at any of its establishments and that it does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The BIDDER agrees that a breach of this clause is a violation of the Equal Opportunity Clause in this contract.

"Segregated facilities" as used in this clause, means any waiting rooms, work areas, restrooms, and washrooms, restaurants and other eating areas, timeclocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin because of written or oral policies or employee custom. The term does not include separate or single-user rest rooms or necessary dressing or sleeping areas provided to assure privacy between the sexes.

The Bidder shall include this clause in every subcontract and purchase order that is subject to the Equal Employment Opportunity clause of this contract.

- c. Trade Restriction Certification** (49 U.S.C. § 50104, 49 CFR Part 30)

By submission of an offer, the Offeror certifies that with respect to this solicitation and any resultant contract, the Offeror--

1. is not owned or controlled by one or more citizens of a foreign country included in the list of countries that discriminate against U.S. firms published by the Office of the United States Trade Representative (USTR);
2. has not knowingly entered into any contract or subcontract for this project with a person that is a citizen or national of a foreign country included on the list of countries that discriminate against U.S. firms as published by the USTR; and
3. has not entered into any subcontract for any product to be used on the Federal project that is produced in a foreign country included on the list of countries that discriminate against U.S. firms published by the USTR.

This certification concerns a matter within the jurisdiction of agency of the United States of America and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18 USC Section 1001.

The offer/contractor must provide immediate written notice to the Owner if the Offeror/Contractor learns that its certification or that of a subcontractor was erroneous when submitted or has become erroneous by reason of changed circumstances. The Contractor must require subcontractor provide immediate written notice to the Contractor if at any time it learns that its certification was erroneous by reason of changed circumstances.

Unless the restrictions of this clause are waived by the Secretary of Transportation in accordance with 49 CFR 30.17, no contract shall be awarded to an Offeror or subcontractor:

- 1) who is owned or controlled by one or more citizens or nationals of a foreign country included on the list of countries that discriminate against U.S. firms published by the USTR or
- 2) whose subcontractors are owned or controlled by one or more citizens or nationals of a foreign country on such USTR list or

- 172 3) who incorporates in the public works project any product of a foreign country on such USTR
173 list.
174

175 Nothing contained in the foregoing shall be construed to require establishment of a system of records
176 in order to render, in good faith, the certification required by this provision. The knowledge and
177 information of a contractor is not required to exceed that which is normally possessed by a prudent
178 person in the ordinary course of business dealings.
179

180 The Offeror agrees that, if awarded a contract resulting from this solicitation, it will incorporate this
181 provision for certification without modification in all lower tier subcontracts. The Contractor may rely
182 on the certification of a prospective subcontractor that it is not a firm from a foreign county included
183 on the list of countries that discriminate against U.S. firms as published by USTR, unless the Offeror
184 has knowledge that the certification is erroneous.
185

186 This certification is a material representation of fact upon which reliance was placed when making an
187 award. If it is later determined that the Contractor or subcontractor knowingly rendered an erroneous
188 certification, the Federal Aviation Administration may direct through the Owner cancellation of the
189 contract or subcontract for default at no cost to the Owner or the FAA.
190

191 **d. Certification of Offeror/Bidder Regarding Debarment (2 CFR Part 180 (Subpart C), 2 CFR Part**
192 **1200, DOT Order 4200.5)**
193

194 By submitting a bid/proposal under this solicitation, the Bidder or Offeror certifies that neither it nor its
195 principals are presently debarred or suspended by any Federal department or agency from participation
196 in this transaction
197

198 **e. Certification of Lower Tier Contractors Regarding Debarment (2 CFR Part 180 (Subpart C), 2**
199 **CFR Part 1200, DOT Order 4200.5)**
200

201 The successful Bidder, by administering each lower tier subcontract that exceeds \$25,000 as a “covered
202 transaction”, must verify each lower tier participant of a “covered transaction” under the project is not
203 presently debarred or otherwise disqualified from participation in this federally assisted project. The
204 successful bidder will accomplish this by:
205

- 206 1. Checking the System for Award Management at website: <http://www.sam.gov>;
207 2. Collecting a certification statement similar to the Certificate Regarding Debarment and
208 Suspension (Bidder or Offeror), above; and
209 3. Inserting a clause or condition in the covered transaction with the lower tier contract.
210

211 If the FAA and/or MoDOT later determines that a lower tier participant failed to disclose to a higher
212 tier participant that it was excluded or disqualified at the time it entered the covered transaction, the FAA
213 and/or MoDOT may pursue any available remedies, including suspension and debarment of the non-
214 compliant participant.
215

216 **f. Certification of Offeror/Bidder Regarding Tax Delinquency and Felony Convictions (Section**
217 **415 and 416 of Title IV, Division L of the Consolidated Appropriations Act, 2014 and DOT**
218 **Order 4200.6)**
219

220 The applicant must complete the following two certification statements. The applicant must indicate
221 its current status as it relates to tax delinquency and felony conviction by inserting a checkmark (✓) in
222 the space following the applicable response. The applicant agrees that, if awarded a contract resulting
223 from this solicitation, it will incorporate this provision for certification in all lower tier subcontracts.
224

1. The applicant represents that it is ☐ is not ☐ a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.
2. The applicant represents that it is ☐ is not ☐ is not a corporation that was convicted of a criminal violation under any Federal law within the preceding 24 months.
3. The undersigned shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly.

g. Certification Regarding Lobbying (31 U.S.C. § 1352, 2 CFR § 200 Appendix II(J), 49 CFR Part 20, Appendix A)

The Bidder or Offer certifies by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

4. No Federal appropriated funds have been paid or will be paid, by or on behalf of the Bidder or Offeror, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employer of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
5. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
6. The undersigned shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, United States Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for such failure.

h. Buy American Certification: (Title 49 U.S.C. § 50101)

The Contractor agrees to comply with 49 U.S.C. § 50101, which provides that Federal funds may not be obligated unless all steel and manufactured goods used in AIP-funded projects are produced in the United States, unless the FAA has issued a waiver for the product; the product is listed as an Excepted Article, Material Or Supply in Federal Acquisition Regulation subpart 25.108; or is included in the FAA Nationwide Buy American Waivers Issued List.

A bidder or offeror must submit the appropriate Buy America certification included herein with their bid or offer. The Owner will reject as nonresponsive any bid or offer that does not include a completed Certificate of Buy American Compliance.

Type of Certification is based on Type of Project:

There are two types of Buy American certifications.

- For projects for a facility, the Certificate of Compliance Based on Total Facility (Terminal or Building Project) must be submitted.
- For all other projects, the Certificate of Compliance Based on Equipment and Materials Used on the Project (Non-building construction projects such as runway or roadway construction; or equipment acquisition projects) must be submitted.

CERTIFICATE OF BUY AMERICAN COMPLIANCE FOR TOTAL FACILITY

As a matter of bid responsiveness, the bidder or offeror must complete, sign, date, and submit this certification statement with their proposal. The bidder or offeror must indicate how they intend to comply with 49 USC § 50101 by selecting one of the following certification statements. These statements are mutually exclusive. Bidder must select one or the other (i.e. not both) by inserting a checkmark (✓) or the letter "X".

☐ Bidder or offeror hereby certifies that it will comply with 49 USC. 50101 by:

- a) Only installing steel and manufactured products produced in the United States; or
- b) Installing manufactured products for which the FAA has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing; or
- c) Installing products listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation Subpart 25.108.

By selecting this certification statement, the bidder or offeror agrees:

1. To provide to the Owner evidence that documents the source and origin of the steel and manufactured product.
2. To faithfully comply with providing US domestic products
3. To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

☐ The bidder or offeror hereby certifies it cannot comply with the 100% Buy American Preferences of 49 USC § 50101(a) but may qualify for either a Type 3 or Type 4 waiver under 49 USC § 50101(b). By selecting this certification statement, the apparent bidder or offeror with the apparent low bid agrees:

1. To submit to the Owner within 15 calendar days of the bid opening, a formal waiver request and required documentation that support the type of waiver being requested.
2. That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination that may results in rejection of the proposal.
3. To faithfully comply with providing US domestic products at or above the approved US domestic content percentage as approved by the FAA.
4. To furnish US domestic product for any waiver request that the FAA rejects.
5. To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

Required Documentation

Type 3 Waiver - The cost of components and subcomponents produced in the United States is more than 60% of the cost of all components and subcomponents of the "facility". The required documentation for a Type 3 Waiver is:

- a) Listing of all manufactured products that are not comprised of 100% US domestic content (excludes products listed on the FAA Nationwide Buy American Waivers Issued listing and products excluded by Federal Acquisition Regulation Subpart 25.108; products of unknown origin must be considered as non-domestic products in their entirety).
- b) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly and installation at project location.
- c) Percentage of non-domestic component and subcomponent cost as compared to total "facility" component and subcomponent costs, excluding labor costs associated with final assembly and installation at project location.

Type 4 Waiver – Total cost of project using US domestic source product exceeds the total project cost using non-domestic product by 25%. The required documentation for a Type 4 Waiver is:

- a) Detailed cost information for total project using US domestic product
- b) Detailed cost information for total project using non-domestic product

False Statements: Per 49 USC § 47126, this certification concerns a matter within the jurisdiction of the Federal Aviation Administration and the making of a false, fictitious or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code.

Date

Signature

Company Name

Title

BUY AMERICA WAIVER REQUEST

Title 49 U.S.C Section 50101 (b)

For Airfield Development Projects funded under the Airport Improvement Program

Instructions for Permissible Waivers

Nationwide Waivers: The FAA Office of Airports publishes national waivers for equipment and products that meet Buy American requirements under 49 USC 50101. Nationwide waivers are published at: http://www.faa.gov/airports/aip/buy_american/ website

Section 50101(b)(1) & (b)(2) Waivers:

The bidder may request a waiver based upon the best interests of the public, Section 50101 (b)(1) or request a waiver based upon insufficient supply of U.S. manufactured products, Section 50101 (b)(2), however approval is rare and waivers may only be approved by the FAA Office of Airports in Washington DC.

Section 50101(b)(3) Waiver:

The bidder may request a waiver if 60% or more of the components are produced in the United States and final assembly occurs in the U.S. Bidder is hereby advised that the Owner's approval with the bidder's waiver request is contingent upon FAA approval.

1. "Equipment" in Section 50101 shall mean the following:
 - a) Individual type "L" items (Airfield Lighting Equipment) as listed in FAA Advisory Circular 150/5345-53.
 - b) Individual bid items as established within FAA Advisory Circular 150/5370-10.
 - c) A waiver request may only address one specific equipment item. Submit separate requests for each equipment item.
 - d) Items listed under the Nationwide Waiver referenced above do not require further review.
2. The bidder must base the U.S. percentage upon the value that results from completing a component cost calculation table similar to the attached format. The Bidder must submit the component cost calculation table as an attachment to the waiver request.
3. Components/subcomponents are the material and products composing the "equipment".
4. The final assembly of the AIP-funded "equipment" must be within the USA (*Section 50101(b)(3)(B)*). Final assembly is the substantial transformation of the components and subcomponents into the end product.
5. All steel used in the "Equipment" must be produced in the United States.
6. The Buy American requirements apply to all tier contractors and subcontractors. All contractors/subcontractors are required to provide appropriate documentation that indicates origin of manufacturer and percentage of domestic made product.
7. The bidder is hereby advised there is no implied or expressed guarantee that a requested waiver will be issued by the Federal Aviation Administration (FAA). Less than 60% USA component/subcomponent proposed for this facility CANNOT be waived. Products made with foreign steel are not eligible for a waiver.
8. North America Free Trade Act (NAFTA): Free Trade Agreements such as NAFTA do not apply to the AIP. Products and material made in Canada or Mexico must be considered as foreign made products.

9. Preparation of a Component Cost Calculation Table is not necessary for equipment listed on the FAA national listing: http://www.faa.gov/airports/aip/buy_american/. Bidder however shall submit a listing of any equipment it proposes to install on the project that is included on the National Buy American conformance list.
10. In any calculation of Buy American percentage, the labor for the final assembly is excluded. This is because the Buy American statute is based on the cost of materials and equipment, not Labor.

Instructions for Section 50101(b)(4) Waiver:

1. The bidder may request a waiver if application of Buy America preferences results in a 25% cost increase in the overall project. This waiver is rarely applicable. Consult the Owner before making this request.

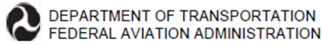
358

359

BUY AMERICA WAIVER REQUEST

Title 49 U.S.C Section 50101 (b)(3)

For Airfield Development Projects funded under the Airport Improvement Program



OMB CONTROL NUMBER: #####
EXPIRATION DATE: MM/DD/YYYY

Buy American Content Percentage Calculation Worksheet

Company Name:

Date:

Address:

Point of Contact:

Telephone:

Fax:

Email:

Product Structure: Multi-Level Bill of Materials (through level 2 only)

Item Description:

Total Material Cost:

Address of Final Assembly Location:

US Content (%):

FAA Item Number (if applicable):

Other (%):

The undersigned certifies that this information is true and accurate to the best of their knowledge.¹

Signature: _____

Name:

Level (0, 1, 2)	Part Number	Description	Quantity Per Unit	Unit of Measure	Price/Unit of Measure	US Origin Price/Unit of Measure ²	US Origin* Cost/Each	Other Price/Unit of Measure	Other Cost/Each

¹ A false certification represents a violation of 18 U.S.C § 1001 and 49 U.S.C § 47126. Signatory has the burden of proof to establish compliance.

² Items listed in Federal Acquisition Regulation Part 25.104 may be counted as US Origin, however should include note stating that item is exempt in 25.104.

FAA Form 5100-136 (1/16)

Certification Signature

Bidder hereby requests a waiver to Buy America preferences based upon Section 50101(b)(3) for the equipment identified above. The bidder certifies that _____% of the cost of components and subcomponents comprising the equipment are produced in the United States and that final assembly occurs within the United States.

I hereby certify the above information is accurate and complete.

Bidder's Firm Name

Date

Signature

Buy American Preferences – Final Assembly Questionnaire

To assist the Federal Aviation Administration (FAA) in making the determination of whether final assembly of the product occurs in the United States, please complete and submit this questionnaire when requesting a Buy American Waiver under 49 USC § 50101(b)(3)(A).

1. Please provide a description of the assembly process occurring at the specified final location in the United States.
2. Please describe the final assembly process and its various operations.
3. How long does the final assembly process take to complete?
4. Please provide a description of the resources used to conduct the assembly of the product at the specified location in the United States.
5. How many employees are involved in the final assembly process and what is the general skill level of those employees?
6. What type of equipment is used during the final assembly process?
7. What is a rough estimate of the associated cost to conduct final assembly of the product at the specified location in the United States?

The undersigned certifies that this information is true and accurate to the best of their knowledge. A false certification represents a violation of 18 U.S.C § 1001 and 49 U.S.C § 47126. Signatory has the burden of proof to establish compliance.

Signature: _____

Name:

FAA Form 5100-137 (4/19) SUPERSEDES PREVIOUS EDITION

BUY AMERICA CONFORMANCE LISTING

Title 49 U.S.C Section 50101 (b)

For Airfield Development Projects funded under the Airport Improvement Program

- Preparation of a Component Cost Calculation Table is not necessary for equipment listed on the FAA national listing: http://www.faa.gov/airports/aip/buy_american/media/nationwide-buy-american-waivers-issued.pdf
- Bidder shall submit a listing of equipment it proposes to install on the project that is included on the current National Buy American conformance list.

Equipment Type	Name of Manufacturer	Product Number

Certification Signature:

Bidder hereby certifies that the above listed equipment, which we propose for installation on the subject project, is on the current National Buy America Conformance list as established at:

http://www.faa.gov/airports/aip/buy_american/

I hereby certify the above information is accurate and complete.

Bidder's Firm Name

Date

Signature

i. Compliance with the Work Authorization Law (as required by Section 285.530 Revised Statutes of Missouri)

For all contracts where the total bid amount is in excess of \$50,000 (local match in excess of \$5,000), the Bidder, by submission of an offer and by signing the Worker Eligibility Verification Affidavit for All Contract Agreements in Excess of \$50,000, certifies that it:

1. does not knowingly employ any person who is an unauthorized alien in connection with the contracted services;
1. has enrolled and actively participates in a federal work authorization program;

A general contractor or subcontractor of any tier shall not be liable under sections 285.525 to 285.550 when such general contractor or subcontractor contracts with its direct subcontractor who violates subsection 1 of this section, if the contract binding the contractor and subcontractor affirmatively states that the direct subcontractor is not knowingly in violation of subsection 1 of this section and shall not henceforth be in such violation and the contractor or subcontractor receives a sworn affidavit under the penalty of perjury attesting to the fact that the direct subcontractor's employees are lawfully present in the United States

**WORKER ELIGIBILITY VERIFICATION AFFIDAVIT FOR ALL
CONTRACT AGREEMENTS IN EXCESS OF \$100,000
(Local match in excess of \$5,000)**

(for joint ventures, a separate affidavit is required for each business entity)

STATE OF _____)
) ss
COUNTY OF _____)

On this ____ day of _____, 20__, before me appeared _____, personally known to me or proved to me on the basis of satisfactory evidence to be a person whose name is subscribed to this affidavit, who being by me duly sworn, deposed as follows:

My name is _____, and I am of sound mind, capable of making this affidavit, and personally certify the facts herein stated, as required by Section 285.530, RSMo, to enter into any contract agreement with the state or any of its political subdivisions to perform any job, task, employment, labor, personal services, or any other activity for which compensation is provided, expected, or due, including but not limited to all activities conducted by business entities:

I am the _____ of _____, and I am duly authorized, directed, (title name) (business name)
and/or empowered to act officially and properly on behalf of this business entity.

I hereby affirm and warrant that the aforementioned business entity is enrolled in a federal work authorization program operated by the United States Department of Homeland Security, and the aforementioned business entity shall participate in said program to verify information (employment eligibility) of newly hired employees working in connection to work under the within contract agreement. I have attached documentation to this affidavit to evidence enrollment/participation by the aforementioned business entity in a federal work authorization program, as required by Section 285.530, RSMo.

In addition, I hereby affirm and warrant that the aforementioned business entity does not and shall not knowingly employ, in connection to work under the within contract agreement, any alien who does not have the legal right or authorization under federal law to work in the United States, as defined in 8 U.S.C. § 1324a(h)(3).

I am aware and recognize that, unless certain contract and affidavit conditions are satisfied pursuant to Section 285.530, RSMo, the aforementioned business entity may be held liable under Sections 285.525 through 285.550, RSMo, for subcontractors that knowingly employ or continue to employ any unauthorized alien to work within the state of Missouri.

I acknowledge that I am signing this affidavit as a free act and deed of the aforementioned business entity and not under duress.

(Affiant Signature)

Subscribed and sworn to before me this ____ day of _____, 20__.

(Notary Public)

My commission expires:

[Documentation of enrollment/participation in a federal work authorization program is attached. Acceptable enrollment and participation documentation consists of the following two pages of the E- Verify Memorandum of Understanding: (1) A valid, completed copy of the first page identifying the business entity; and (2) A valid copy of the signature page completed and signed by the business entity, the Social Security Administration, and the Department of Homeland Security – Verification Division.]

DISADVANTAGED BUSINESS ENTERPRISE (DBE) PARTICIPATION

The information shown in this section must be completed when a DBE contract goal has been established. The percentage must equal or exceed the DBE contract goal. If the percentage is below the contract goal, then the bidder must submit complete written documentation of good faith efforts taken to meet the DBE contract goal.

Only those firms currently certified as DBEs by the Missouri Department of Transportation (MoDOT), City of St. Louis, Metro, City of Kansas City, and Kansas City Area Transportation Authority are eligible to participate as DBEs on this contract. A list of these firms is available on MoDOT's Office of External Civil Rights webpage at the following address:

<http://www.modot.org/dbe-program>

- a. The undersigned submits the following list of DBEs to be used in accomplishing the work of this contract. The work, supplies or services, applicable value and percent of total federal contract each DBE is to perform or furnish is as follows:
- b. Joint venture with a DBE. The undersigned submits the following list of bid items the DBE prime is responsible for and any items that will be subcontracted out are noted with an asterisk or a similar notation. The work, applicable value and percentage of total federal contract the DBE prime is responsible for are as follows:

(A) DBE Name and Address	(B) Bid Item Number(s) Or Work Performed	(C) Dollar Value of DBE Work **	(D) Percent Applicable to DBE Goal (100%, 60%)	(E) Dollar Amount Applicable to DBE Goal (C x D)	(F) Percent of Total Contract (C / Total Contract Amount)
TOTAL DBE PARTICIPATION				\$	%

**Cannot exceed contract amount for given item of work.

Truck services credited at 100% if the DBE owns the trucks or is leasing from a DBE firm.

Merchant wholesalers (supply) are credited at 60%.

Brokered services will only receive credit for fees.

(Please reproduce the above sheet if additional space is needed.)

CONTRACTOR'S STATEMENT OF QUALIFICATIONS

Qualifications shall be furnished with the bid proposal as described in Section 20 of the General Provisions, including resumes of all key personnel detailing experience on similar airfield construction projects as stated in paragraph 2 of Section 2, Instructions to Bidders.

Name of firm, address with zip code

Project Contact Name.....

Area Code/Telephone Number

Area Code/Fax Number

Federal I.D. Number

The Contractor is **required** to perform an amount equal to or at least **50 percent** of the total contract cost.

% of work by Contractor

No. of permanent employees

No. of years in business

Have you done business under different name? If so, please give name and location.

- Provide list of equipment available for the work.
- Provide resumes of all key personnel that would be available.
- Provide list of projects completed within last five years that are similar in scope to the one being bid, including cost of each, and owner contact information.
- Provide list of projects currently under construction, including costs of each, and owner contact information.
- Provide “evidence of competency” and “evidence of financial responsibility” in accordance with Section 20-02 of the General Provisions. If the Bidder is presently pre-qualified with the Missouri Department of Transportation (MoDOT), evidence of this pre-qualification may serve as evidence of financial responsibility in lieu of the certified financial statements and reports.

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**THIS EXECUTED PROPOSAL FORM MUST BE SUBMITTED
WITH SECTIONS B-12 THROUGH B-21 FILLED OUT COMPLETELY**

SIGNATURE OF BIDDER

The undersigned states that the correct LEGAL NAME AND ADDRESS of (1) the individual bidder, (2) each partner or joint venturer (whether individuals or corporations, and whether doing business under a fictitious name), or (3) the corporation (with the state in which it is incorporated) are shown below; that (if not signing with the intention to bind themselves to become responsible and sole bidder) they are the agent of, and they are signing and executing this (as indicated in the proper spaces below) as the bid of a

() sole individual () partnership () joint venture
() corporation, incorporated under the laws of state of _____.

Executed by bidder this _____ day of _____, 20_____.

Name of individual,
all partners
or joint venturers:

Address of each:

doing business under the name of:

Address of principal place of business in
Missouri:

(If using a fictitious name, show this
name above in addition to legal names)

(If a corporation, show its name above)

ATTEST: (SEAL)

(Signature) Secretary

(Signature) (Title)

Please print name

Please print name

NOTE: If bidder is doing business under a fictitious name, the bid shall be executed in the legal name of the individual partners, joint ventures, or corporation, with the legal address shown, and registration of fictitious name filed with the secretary of state, as required by sections 417.200 to 417.230 RSMo. If the bidder is a corporation not organized under the laws of Missouri, it shall procure a certificate of authority to do business in Missouri, as required by section 351.572 et seq RSMo.

Intentionally Left Blank

PERFORMANCE BOND	BOND NUMBER
PRINCIPAL <i>(Legal Name and Business Address)</i>	
SURETY <i>(Legal Name and Business Address)</i>	STATE OF INCORPORATION
PENAL SUM OF BOND <i>(Expressed in words and numerals)</i>	CONTRACT DATE

OBLIGATION

KNOW ALL PERSONS BY THESE PRESENTS, that the above named PRINCIPAL, hereinafter referred to and called CONTRACTOR, and the above named SURETY hereby bind themselves unto City of Memphis, 135 S. Main Street, MO 63555 as OBLIGEE, hereinafter referred to and called OWNER, in the penal sum stated above, in lawful money of the United States of America to be paid to OWNER. For payment of the penal sum, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS,

CONTRACTOR has entered into the written contract agreement identified hereinabove with the OWNER for the following project:

Schedule I - Apron Expansion
Schedule II - 8-Unit T-Hangar
Schedule III - 2-Unit T-Hangar
Schedule IV - 2-Unit T-Hangar

which said contract and associated contract documents, including any present or future amendment thereto, is incorporated herein by reference and is hereinafter referred to as the Contract.

CONDITION

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if CONTRACTOR shall promptly and faithfully perform all undertakings, covenants, terms, conditions and agreements of the Contract during the original term of the Contract and any extensions thereof that are granted by the OWNER, with or without notice to the SURETY, and during the period of any guarantee or warranties required under the Contract, and if CONTRACTOR shall perform and fulfill all undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of the Contract that hereafter are made, then this obligation shall be void; otherwise it shall remain in full force and effect subject to the following additional conditions:

1. SURETY, for value received, hereby stipulates and agrees that no change, extension of time, modification, omission, addition or change in or to the Contract, or the work performed thereunder or the specifications accompanying the same, shall in any way affect the SURETY'S obligation on this bond; and SURETY hereby agrees to waive notice of any and all such extensions, modifications, omissions, alterations, and additions to the terms of the Contract, work or specifications.

- 630 2. Whenever CONTRACTOR shall be and declared by the OWNER to be in default under the Contract,
631 the Surety shall promptly and at the SURETY'S expense remedy the default by implementing one or
632 more of the following actions:
633
- 634 a. Arrange for the CONTRACTOR, with consent of the OWNER, to perform and complete the
635 Contract; or
636
- 637 b. Undertake to perform and complete the Contract itself, through its agents or through independent
638 contractors; or
639
- 640 c. Obtain bids or negotiated proposals from qualified contractors acceptable to the OWNER for a
641 contract for performance and completion of the Contract; arrange for a contract to be prepared
642 for execution by the OWNER and the contractor selected with the OWNER'S concurrence, to be
643 secured with performance and payment bonds executed by a qualified surety equivalent to the
644 Bonds issued on the Contract; and make available as work progresses (even though there should
645 be a default or a succession of defaults under the contract or contracts of completion arranged
646 under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract
647 price; but not exceeding, including other costs and damages for which the Surety may be liable
648 hereunder, the penal sum of the bond. The term "balance of the contract price", as used in this
649 paragraph, shall mean the total amount payable by OWNER to CONTRACTOR under the
650 Contract and any amendments thereto, disbursed at the rate provided in the original contract, less
651 the amount properly paid by OWNER to CONTRACTOR.
652
- 653 d. With written consent of the OWNER, SURETY may waive its right to perform and complete,
654 arrange for completion or obtain a new contractor and with reasonable promptness, investigate
655 and determine the amount the SURETY is liable to the OWNER and tender payment therefor to
656 the OWNER.
657
- 658 3. CONTRACTOR and SURETY agree that if in connection with the enforcement of this Bond, the
659 OWNER is required to engage the services of an attorney, that reasonable attorney fees incurred by
660 the OWNER, with or without suit, are in addition to the balance of the contract price.
661
- 662 4. No right of action shall accrue on this bond to or for the use of any person or corporation other than
663 the OWNER named herein or the successors or assigns of the OWNER.
664

WITNESS

In witness whereof, this instrument is executed this the ____ day of _____, 20____.

INDIVIDUAL PRINCIPAL:

Company Name: _____

Signature: _____

Name and Title: _____

CORPORATE PRINCIPAL:

ATTEST:

Corporate Name: _____

Signature: _____

Signature: _____

Name and Title: _____
(Affix Corporate Seal)

Name and Title: _____

SURETY:

ATTEST:

Surety Name: _____

Signature: _____

Signature: _____

Name and Title: _____
(Affix Seal)

Name and Title: _____
(Attach Power of Attorney)

OWNER ACCEPTANCE:

The OWNER approves the form of this Performance Bond.

Date: _____

Signature: _____

Signature: _____

Name and Title: _____
(Affix Seal)

Name and Title: _____

Intentionally Left Blank

PAYMENT BOND	BOND NUMBER
PRINCIPAL <i>(Legal Name and Business Address)</i>	
SURETY <i>(Legal Name and Business Address)</i>	STATE OF INCORPORATION
PENAL SUM OF BOND <i>(Expressed in words and numerals)</i>	CONTRACT DATE

OBLIGATION

KNOW ALL PERSONS BY THESE PRESENTS, that the above named PRINCIPAL, hereinafter referred to and called CONTRACTOR, and the above named SURETY hereby bind themselves unto City of Memphis, 135 S. Main Street MO as OBLIGEE, hereinafter referred to and called OWNER, in the penal sum stated above, in lawful money of the United States of America to be paid to OWNER. For payment of the penal sum, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS,

CONTRACTOR has entered into the written contract agreement identified hereinabove with the OWNER for the following project:

Schedule I - Apron Expansion
Schedule II - 8-Unit T-Hangar
Schedule III - 2-Unit T-Hangar
Schedule IV - 2-Unit T-Hangar

which said contract and associated contract documents, including any present or future amendment thereto, is incorporated herein by reference and is hereinafter referred to as the Contract.

CONDITION

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if CONTRACTOR shall promptly make payment to all employees, persons, firms or corporations for all incurred indebtedness and just claims for labor, supplies, materials and services furnished for or used in connection with the performance of the Contract, then this obligation shall be void; otherwise it shall remain in full force and effect subject to the following additional conditions:

1. CONTRACTOR and SURETY indemnify and hold harmless the OWNER for all claims, demands, liens or suits that arise from performance of the Contract
2. SURETY, for value received, hereby stipulates and agrees that no change, extension of time, modification, omission, addition or change in or to the Contract, or the work performed thereunder or the specifications accompanying the same, shall in any way affect the SURETY'S obligation on this bond; and SURETY hereby agrees to waive notice of any and all such extensions, modifications, omissions, alterations, and additions to the terms of the Contract, work or specifications.

- 748 **3.** No final settlement between the OWNER and the CONTRACTOR shall abridge the right of any
749 beneficiary hereunder, whose claim may be unsatisfied.
750
- 751 **4.** The amount of this bond shall be reduced by and to the extent of any payments made in good faith
752 hereunder.
753
- 754 **5.** Amounts owed by the OWNER to the CONTRACTOR under the Contract shall be used for the
755 performance of the Contract and to satisfy claims, if any, under any Performance Bond. By the
756 CONTRACTOR furnishing and the OWNER accepting this Bond, they agree that all funds earned by
757 the CONTRACTOR in the performance of the Contract are dedicated to satisfy obligations of the
758 CONTRACTOR and the SURETY under this Bond, subject to the OWNER'S priority to use the
759 funds for the completion of the project.
760

WITNESS

In witness whereof, this instrument is executed this the ____ day of _____, 20____.

INDIVIDUAL PRINCIPAL:

Company Name: _____

Signature: _____

Name and Title: _____

CORPORATE PRINCIPAL:

ATTEST:

Corporate Name: _____

Signature: _____

Signature: _____

Name and Title: _____

Name and Title: _____

(Affix Corporate Seal)

SURETY:

ATTEST:

Surety Name: _____

Signature: _____

Signature: _____

Name and Title: _____

Name and Title: _____

(Affix Seal)

(Attach Power of Attorney)

OWNER ACCEPTANCE:

The OWNER approves the form of this Payment Bond.

Date: _____

Signature: _____

Signature: _____

Name and Title: _____

Name and Title: _____

(Affix Seal)

Intentionally Left Blank

805 **FORM OF CONTRACT AGREEMENT**

806 City of Memphis

807 State Block Grant Project No. 19-026A-1

808
809
810 **THIS AGREEMENT**, made as of this _____ day of _____, 20_____, is

811
812 **BY AND BETWEEN**

813 the OWNER: Name: _____

814 Address: _____

815
816 City/State/Zip Code: _____

817
818
819 And the CONTRACTOR: Name: _____

820 Address: _____

821
822 City/State/Zip Code: _____

823
824
825
826 **WITNESSETH:**

827
828 WHEREAS it is the intent of the Owner to make improvements at Memphis Memorial generally described as

829 follows;

830 Schedule I - Apron Expansion

831 Schedule II - 8-Unit T-Hangar

832 Schedule III - 2-Unit T-Hangar

833 Schedule IV - 2-Unit T-Hangar

834 hereinafter referred to as the Project.

835
836
837
838 NOW THEREFORE in consideration of the mutual covenants hereinafter set forth, OWNER and

839 CONTRACTOR agree as follows:

840
841 **Article 1 – Work**

842 It is hereby mutually agreed that for and in consideration of the payments as provided for herein to the

843
844
845
846 **Article 2 – Contract Documents**

847 CONTRACTOR agrees that the Contract Documents consist of the following: this Agreement, General

848 Provisions, Supplementary Provisions, Specifications, Drawings, all issued addenda, Notice-to-Bidders,

849 Instructions-to-Bidders, Proposal and associated attachments, Performance Bond, Payment Bond, Wage Rate

850 Determinations, Insurance certificates, documents incorporated by reference, documents incorporated by

851 attachment, and all OWNER authorized change orders issued subsequent to the date of this agreement. All

852 documents comprising the Contract Documents are complementary to one another and together establish the

853 complete terms, conditions and obligations of the CONTRACTOR. All said Contract Documents are

854 incorporated by reference into the Contract Agreement as if fully rewritten herein or attached thereto.

855
856

857 **Article 3 – Contract Price**

858 In consideration of the faithful performance and completion of the Work by the CONTRACTOR in
859 accordance with the Contract Documents, OWNER shall pay the CONTRACTOR an amount equal to:

860
861
862 (Amount in Written Words)

(Amount in Numerals)

863 subject to the following;

- 864
865
- 866 **a.** Said amount is based on the schedule of prices and estimated quantities stated in
867 CONTRACTOR'S Bid Proposal, which is attached to and made a part of this Agreement;
 - 868
869 **b.** Said amount is the aggregate sum of the result of the CONTRACTOR'S stated unit prices
870 multiplied by the associated estimated quantities;
 - 871
872 **c.** CONTRACTOR and OWNER agree that said estimated quantities are not guaranteed and that
873 the determination of actual quantities is to be made by the OWNER'S ENGINEER;
 - 874
875 **d.** Said amount is subject to modification for additions and deductions as provided for within the
876 Contract General Provisions.
- 877

878 **Article 4 – Payment**

879 Upon the completion of the work and its acceptance by the OWNER, all sums due the CONTRACTOR by
880 reason of faithful performance of the work, taking into consideration additions to or deductions from the
881 Contract price by reason of alterations or modifications of the original Contract or by reason of "Extra Work"
882 authorized under this Contract, will be paid to the CONTRACTOR by the OWNER after said completion and
883 acceptance.

884
885 The acceptance of final payment by the CONTRACTOR shall be considered as a release in full of all claims
886 against the OWNER, arising out of, or by reason of, the work completed and materials furnished under this
887 Contract.

888
889 OWNER shall make progress payments to the CONTRACTOR in accordance with the terms set forth in the
890 General Provisions. Progress payments shall be based on estimates prepared by the ENGINEER for the value
891 of work performed and materials completed in place in accordance with the Contract Drawings and
892 Specifications. Progress payments are subject to retainage requirements as set forth in the General Provisions.

893
894 **Article 5 – Contract Time**

895 The CONTRACTOR agrees to commence work within ten (10) calendar days of the date specified in the
896 OWNER'S Notice-to-Proceed. CONTRACTOR further agrees to complete said work within 210 calendar
897 days of the commencement date stated within the Notice-to-Proceed.

898
899 It is expressly understood and agreed that the stated Contract Time is reasonable for the completion of the
900 Work, taking all factors into consideration. Furthermore, extensions of the Contract Time may only be
901 permitted by execution of a formal modification to this Contract Agreement in accordance with the General
902 Provisions and as approved by the OWNER.

903
904 **Article 6 – Liquidated Damages**

905 The CONTRACTOR and OWNER understand and agree that time is of essence for completion of the Work
906 and that the OWNER will suffer additional expense and financial loss if said Work is not completed within the
907 authorized Contract Time. Furthermore, the CONTRACTOR and OWNER recognize and understand the
908 difficulty, delay, and expense in establishing the exact amount of actual financial loss and additional expense.
909 Accordingly, in place of requiring such proof, the CONTRACTOR expressly agrees to pay the OWNER as
910 liquidated damages the non-penal sum of \$750 per day for each calendar day required in excess of the authorized

Contract Time. In addition, up to 1800/calendar day(s) for the construction manager plus up to 1400/calendar day(s) for each additional resident engineer plus any incurred expenses (per diem, lodging, etc.) will be charged to the Contractor for that time which exceeds the number of Calendar days allowed in this paragraph. Further, each phase of work under the project has additional liquidated damage clauses, as outlined in Section 80-08 FAILURE TO COMPLETE ON TIME.

Furthermore, the CONTRACTOR understands and agrees that;

- a. the OWNER has the right to deduct from any moneys due the CONTRACTOR, the amount of said liquidated damages;
- b. the OWNER has the right to recover the amount of said liquidated damages from the CONTRACTOR, SURETY or both.

Article 7 – CONTRACTOR’S Representations

The CONTRACTOR understands and agrees that all representations made by the CONTRACTOR within the Proposal Form shall apply under this Agreement as if fully rewritten herein.

Article 8 – CONTRACTOR’S Certifications

The CONTRACTOR understands and agrees that all certifications made by the CONTRACTOR within the Proposal shall apply under this Agreement as if fully rewritten herein. The CONTRACTOR further certifies the following;

a. Certification of Eligibility (29 CFR Part 5.5)

- i. By Entering into this contract, the CONTRACTOR certifies that neither he or she nor any person or firm who has an interest in the CONTRACTOR’S firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1);
- ii. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1);
- iii. The penalty for making false statements is prescribed in the U.S. Criminal Code 18 U.S.C.

b. Certification of Non-Segregated Facilities (41 CFR Part 60-1.8)

The federally-assisted construction CONTRACTOR, certifies that it does not maintain or provide, for its employees, any segregated facilities at any of its establishments and that it does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The BIDDER certifies that it will not maintain or provide, for its employees, segregated facilities at any of its establishments and that it will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The Bidder agrees that a breach of this certification is a violation of the Equal Opportunity Clause, which is to be incorporated in the contract.

As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms, and washrooms, restaurants and other eating areas, timeclocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated on the basis of race, color, religion, or national origin because of habit, local custom, or any other reason. The Bidder agrees that (except where it has obtained identical certifications from proposed subcontractors for specific time periods) it will obtain identical certifications from proposed subcontractors prior to the award of

subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity Clause and that it will retain such certifications in its files.

Article 9 – Miscellaneous

- a.** CONTRACTOR understands that it shall be solely responsible for the means, methods, techniques, sequences and procedures of construction in connection with completion of the Work;
- b.** CONTRACTOR understands and agrees that it shall not accomplish any work or furnish any materials that are not covered or authorized by the Contract Documents unless authorized in writing by the OWNER or ENGINEER;
- c.** The rights of each party under this Agreement shall not be assigned or transferred to any other person, entity, firm or corporation without prior written consent of both parties;
- d.** OWNER and CONTRACTOR each bind itself, their partners, successors, assigns and legal representatives to the other party in respect to all covenants, agreements, and obligations contained in the Contract Documents.

Article 10 – OWNER’S Representative

The OWNER’S Representative, herein referred to as ENGINEER, is defined as follows:

Jviation, Inc.
900 S. Broadway, Suite 350
Denver, CO 80209

Said ENGINEER will act as the OWNER’S representative and shall assume all rights and authority assigned to the ENGINEER as stated within the Contract Documents in connection with the completion of the Project Work.

IN WITNESS WHEREOF, OWNER and CONTRACTOR have executed five (5) copies of this Agreement on the day and year first noted herein.

OWNER

CONTRACTOR

Name: _____

Name: _____

Address: _____

Address: _____

By: _____

Signature

By: _____

Signature

Title of Representative

Title of Representative

ATTEST:

ATTEST:

By: _____

Signature

By: _____

Signature

Title

Title