

BID ENVELOPE
MSCAA PROJECT NO. 23-1476-17-02

NAME OF PROJECT: SNOW REMOVAL EQUIPMENT BUILDING - BUILDING PACKAGE - CONSTRUCTION

BIDS DUE: 6/23/2026 TIME: 2:00 PM Local Time

MEMPHIS SHELBY COUNTY AIRPORT AUTHORITY (MSCAA)
PROCUREMENT DEPARTMENT
MEMPHIS INTERNATIONAL AIRPORT
4150 Louis Carruthers Drive
Memphis, TN 38118 (901) 922-8000

BIDDER IDENTIFICATION:

Bidder _____

Address _____

TENNESSEE CONTRACTOR LICENSE INFORMATION:

License Number _____

License Classification Applicable to Project _____

License Expiration Date _____

Dollar Limit _____

SUBCONTRACTORS (OR PRIME CONTRACTORS) TO BE USED ON THIS PROJECT IN THE BELOW LISTED CAPACITIES:

Note: Where applicable, one contractor/subcontractor performing electrical, plumbing, heating, ventilation, air conditioning, and masonry work must have its license number, applicable classification, expiration date and dollar limit on the BID ENVELOPE containing the BID PROPOSAL. **Prime contractors** who are to perform the electrical, plumbing, heating, ventilation, air conditioning or masonry work MUST list themselves as "Self-Perform" in the Sub-contractor list below.

	Sub-contractor List	License No.	Applicable Classification	Expiration Date	Dollar Limit
Electrical					
Plumbing					
Heating					
Ventilation					
Air Conditioning					
Masonry					

BID ENVELOPE

COMPLETE THIS FORM AND ATTACH IT TO THE OUTSIDE OF THE BID ENVELOPE. PLEASE REVIEW INSTRUCTIONS TO BIDDERS FOR BID PACKAGE DELIVERY AND FOR OTHER INFORMATION AND CONDITIONS. MSCAA RESERVES THE RIGHT, IN ITS SOLE DISCRETION, TO REJECT AND DISQUALIFY YOUR BID IF YOU, YOUR PARENT, SUBSIDIARY, AFFILIATE, OR PREDECESSOR IN INTEREST OR ANY OF YOUR SUBCONTRACTORS, SUPPLIERS, AND/OR THEIR PARENTS, SUBSIDIARIES, AFFILIATES OR PREDECESSORS IN INTEREST HAVE PENDING LITIGATION OR CLAIMS WITH THE MSCAA.

**SPECIFICATIONS
FOR
SNOW REMOVAL EQUIPMENT BUILDING - BUILDING PACKAGE -
CONSTRUCTION**

**MEMPHIS INTERNATIONAL AIRPORT
MEMPHIS, TENNESSEE**



MSCAA PROJECT NO. 23-1476-17-02

DATED: 5/26/26

ISSUED FOR BID

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SPECIFICATIONS
FOR
SNOW REMOVAL EQUIPMENT BUILDING – PHASE 2

MEMPHIS INTERNATIONAL AIRPORT
MEMPHIS, TENNESSEE

MSCAA NO. 23-1476-17-02

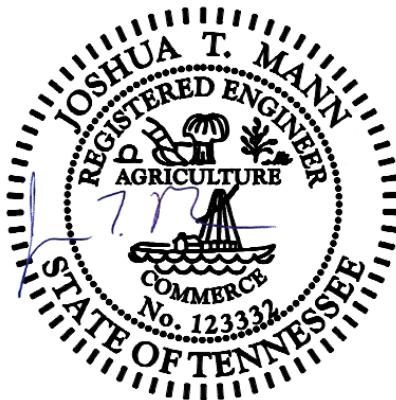
05/15/2026

TECHNICAL SPECIFICATIONS – ISSUED FOR BID/CONSTRUCTION

I hereby certify that Specifications A-100, A-102, C-100, C-105, F-162 were prepared by me or under my direct supervision and that I am a duly Registered Engineer under the laws of the State of Tennessee

Joshua T. Mann

Date 05/15/2026 Reg. No. 123332



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Attachment 1 – Construction Safety Phasing Plan (CSPP)

Attachment 2 – Safety Plan Compliance Document (SPCD)

Attachment 3 – MSCAA Comprehensive Storm Water Pollution Prevention Program

END OF SECTION 00010

DIVISION 0 – SECTION 00015**LIST OF DRAWINGS**

DRAWINGS, Entitled Snow Removal Equipment Building - Building Package - Construction, Issued for Bid, dated 5/15/26, with revisions, as noted on the drawing sheets:

GI-0.01	Title Sheet
GI-0.02	Summary of Quantities
GI-1.00	Project Overview
GC-0.01	Construction Safety & Phasing Notes
GC-2.01	Construction Safety & Phasing Plan
CD-1.01	Demolition Plan
CJ-1.01	Jointing Plan
CJ-2.01	Elevation Plan – North
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CU-1.01	Utility & Fencing Plan
CK-5.01	Civil Details
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A0.1	Abbreviations, Symbols, and Sheet Index
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A4.2	Details
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A6.1	Building Sections
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S1.0	Foundation Plan
S2.0	Details
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E3.1	Partial Site Plan – Power
E3.2	Partial Site Plan – Power

END OF SECTION 00015

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LEGAL NOTICE
Request for Bids
MSCAA Project Number 23-1476-17-02
Snow Removal Equipment Building - Building Package - Construction

Sealed bids for Snow Removal Equipment Building - Building Package - Construction will be received by the Memphis-Shelby County Airport Authority (Authority), Procurement Department, 4150 Louis Carruthers Drive, Memphis, TN 38118, until **2:00 PM Local Time on 6/23/2026**. Bids will not be received at any other location. Within 30 minutes thereafter, the bids will be opened and publicly read via phone/video conference (link/phone information available online at <https://flymemphis.com/rfps-rfqs/>). The Bid Documents, including a description of the scope of work, the required response format, and additional instructions may be obtained on or after **May 28, 2026** online at <https://flymemphis.com/rfps-rfqs/>.

A Virtual Pre-Bid Meeting will be held on Thursday June 4, 2026, at 11:00 AM local time via phone/video conference (link/phone information available online at <https://flymemphis.com/rfps-rfqs/>). The project site will be available for inspection following the meeting at 1:30 PM local time. Anyone that would like to attend the site visit must register by Wednesday, June 3, 2026. Site Visit registration is done by emailing bidquestions@flymemphis.com. Pre-bid and site visit attendance is strongly recommended. All instructions for the Pre-Bid Meeting and Site Visit can be found at <https://flymemphis.com/rfps-rfqs/>.

All Bidders are responsible for checking the Authority's website up to the submission deadline for any updates, addenda or additional information. The successful Bidder must sign a contract with the Authority that includes Federal Aviation Administration provisions, if applicable, regarding the Buy American Preference, Foreign Trade Restriction, Davis-Bacon, Affirmative Action, Debarment and Suspension, and Drug-Free Workplace, all of which are incorporated herein by reference.

Each bid must be made by a contractor licensed in Tennessee and be accompanied by a 5% Bid Guarantee. The successful bidder must execute a Performance Bond and a Payment Bond in the amount of 100% each of the Contract Price and meet the Small Business Participation Program (SBPP) participation goal for this project, which is **15%**.

The Authority reserves the right to reject any or all responses to this Request for Bids in whole or in part; to waive any informalities, technicalities, or omissions related to this Request for Bids; and to reject responses on any other basis authorized by the Authority's purchasing policies.

The Authority is an equal opportunity employer and prohibits discrimination based on the grounds of age, race, sex, color, national origin, disability, marital status, military service, or sexual orientation in its hiring and employment practices and in the admission to, access to, or operation of its programs, services, and activities.

By order of:
Terry Blue, A.A.E.
President and CEO
Memphis-Shelby County Airport Authority

DIVISION 0 – SECTION 00200**INSTRUCTIONS TO BIDDERS / PROPOSERS**

Instruction for the preparation of proposals and the delivery thereof to the Memphis-Shelby County Airport Authority (MSCAA) are contained in General Provision Section 20 and additionally as follows. Prepare and submit proposals accordingly.

1. RESERVATION OF RIGHTS:

MSCAA reserves the right, in its sole discretion, to reject and disqualify the bid of any bidder that has pending litigation or claims with the MSCAA and to reject the bid when a parent, subsidiary, affiliate, or predecessor in interest of the Bidder has pending litigation or claims with the MSCAA.

MSCAA also reserves the right, in its sole discretion, to reject and disqualify the bid of any bidder if the bid includes any subcontractor(s) or supplier(s) of any tier that have pending litigation or claims with MSCAA, and to reject the bid when a parent, subsidiary, affiliate, or predecessor in interest of the subcontractor or supplier has pending litigation or claims with the MSCAA.

Bidders shall request from MSCAA a list of entities that have pending claims or litigation with MSCAA to avoid including such entities or their parents, subsidiaries, affiliates, or predecessors in interest in their proposal or bid. A list of affected entities may be obtained by a written or telephone request to Development Division at MSCAA, 2491 Winchester Road, Suite 113, Memphis, TN 38116-3856, telephone number (901) 922-8033.

2. PRE-BID CONFERENCE:

A Virtual Pre-Bid Meeting will be held on Thursday June 4, 2026, at 11:00 AM local time via phone/video conference (link/phone information available online at <https://flymemphis.com/rfps-rfqs/>). The project site will be available for inspection following the meeting at 1:30 PM local time. Anyone that would like to attend the site visit must register by Wednesday, June 3, 2026. Site Visit registration is done by emailing bidquestions@flymemphis.com. Pre-bid and site visit attendance is strongly recommended. All instructions for the Pre-Bid Meeting and Site Visit can be found at <https://flymemphis.com/rfps-rfqs/>.

3. DRAWINGS AND SPECIFICATIONS FURNISHED TO CONTRACTOR:

Electronic set of contract and proposal documents are available at <https://www.flymemphis.com/rfps-rfqs> at no cost. Printed copies are not available.

4. REFUSAL OF ISSUANCE OF PROPOSAL FORM TO BIDDERS IN DEFAULT AND DISQUALIFICATION OF BIDDERS:

See General Provision Section 20 for disqualification of bidders and bidders in default.

5. SUBMIT THE FOLLOWING WITH THE BID IN THE MANNER DESCRIBED BELOW:

- A.
 - (1) Proposal
 - (2) Proposal Guarantee (Required Bid Security)
 - (3) Bidder's Qualifications
 - (4) Buy America Certificate
 - (5) SBE Assurance Statement/Letter of Intent on Bidder's / Proposer's Letterhead for each SBE subcontractor, subcontractors' signatures not required.

- (6) Written quote or proposal or other communication from each SBE upon which the scope of work and dollar value contained in your Assurance Statements is based with items included in the Proposal either circled and/or highlighted.
- (7) SBE Goals Accomplishment Statement
- (8) Information on All Firms that Provide Bids or Quotes
- (9) Signed addenda (if applicable)
- (10) Bid Envelope

B. The following must be submitted within 24 hours of the proposal submittal deadline:

- (1) SBE Assurance Statement/Letter of Intent on Bidder's / Proposer's Letterhead for each SBE subcontractor, subcontractors' signatures required.

See General Provision Section 20, PROPOSAL REQUIREMENTS AND CONDITIONS.

C. By executing the proposal submittal, the Contractor is confirming that (1) neither the Contractor nor any of Contractor's potential subcontractors or suppliers have pending claims or litigation, arbitration, or other dispute resolution proceedings where the Owner and the Contractor or potential subcontractors or suppliers are parties; or (2) the Contractor has disclosed in writing any such pending claims or proceedings to Owner through its own writing and/or the writing of Contractor's potential subcontractors or suppliers and submitted same to Owner with the proposal submittal.

D. Bids should be delivered to the following address:

Memphis-Shelby County Airport Authority
Procurement Department
Memphis International Airport
4150 Louis Carruthers Drive
Memphis, TN 38118
Project No. 23-1476-17-02

The bid must be sealed and the project number must be included in the address.

Within 30 minutes thereafter, the bids will be opened and publicly read at the Procurement Department Conference Room (at the above address) as well as via phone/video conference (link/phone information available online at <https://flymemphis.com/rfps-rfqs/>).

6. **CONSIDERATION OF BID:**

The Owner reserves the right to reject any or all bids in whole or in part and to waive any informalities, technicalities, or omissions therein.

It is intention of the Owner to award a contract based upon the lowest responsive bid on the lump sum base bid. Bidder understands and agrees that, after a review of all the bids, the Owner will select the lump sum base bid that best suits the Owner's needs within the sole discretion of the Owner.

7. **NO FINANCIAL INTEREST:**

Respondent understands and agrees that no Airport Authority employee or member of the Board of Commissioners shall receive any financial benefit arising out of this proposal or its contract, if awarded, either directly or indirectly. Further, any fees paid to any person or entity by contractor for assistance in obtaining this contract, if awarded, with the Authority must be fully disclosed to the Authority.

8. PROTEST:

- A. Any protest must be filed in writing and received by the Authority within seven (7) calendar days of the date of the occurrence of the event that is the subject of the protest, e.g., the opening of responses, the award, or a determination that a respondent is not responsible or that a response is not responsive. Any protest must be actually delivered to the Authority during the business hours of 7:00 AM – 3:30 PM Local Time in order to be deemed to be received by the Authority as required under this Section. A protest must be submitted in hard copy and addressed as follows:

Memphis-Shelby County Airport Authority
Attention: Director of Procurement
4150 Louis Carruthers Drive
Memphis, Tennessee 38118-6613

Any protest sent by telegraphic or facsimile transmission or by email or other electronic means will not meet the filing requirements set forth herein and will not be deemed to be received by the Authority.

No objections with regard to the application, meaning, or interpretation of the specifications contained herein will be considered after the opening of the subject bid.

END OF SECTION 00200

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DIVISION 0 – SECTION 00405**PROPOSAL**

Project Identification: **Snow Removal Equipment Building - Building Package - Construction**

Contract Number: MSCAA Project No. **23-1476-17-02**

**For Overnight Courier
or Hand Delivery Submit to:**

Memphis-Shelby County Airport Authority
Memphis International Airport
Procurement Department
4150 Louis Carruthers Drive
Memphis, Tennessee 38118

1. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an agreement with Owner in the form included in the Contract Documents to perform and furnish all Work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Bid and in accordance with other terms and conditions of the Contract Documents.
2. Bidder accepts all of the terms and conditions of the Legal Notice to Bidders and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for seventy-five (75) days after the day of Bid opening. Bidder will sign and submit the Construction Contract with the Bonds and other documents required by the Bidding Requirements, within ten (10) days after the date of Owner's Notice of Award.
3. In submitting this Bid, Bidder represents, as more fully set forth in the Contract that:
 - (a) Bidder has examined copies of all the Bidding Documents and of the following Addenda (receipt of all which is hereby acknowledged):

Date	Number
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

- (b) Bidder has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance or furnishing of the Work.

- (c) Bidder has studied carefully all reports and drawings of subsurface conditions and drawings of physical conditions which are identified in Division 0 and Division 1 Specifications, and accepts the determination set forth in General Provision Section 20 paragraph 20-06 of the extent of the technical data contained in such reports and drawings upon which Bidder is entitled to rely.
- (d) Bidder has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) all such examinations, investigations, explorations, tests and studies (in addition to or to supplement those referred to in (c) above) which pertain to the subsurface or physical conditions at the site or otherwise may affect the cost, progress, performance or furnishing of the Work at the Contract Price, within the Contract Time and in accordance with other terms and conditions of the Contract Documents, including specifically the provisions of General Provision Section 20 paragraph 20-06; and no additional examination, investigations, explorations, tests, reports or similar information or data are or will be required by Bidder for such purposes.
- (e) Bidder has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing Underground Facilities at or contiguous to the site and assumes responsibility for the accurate location of said Underground Facilities. No additional examinations, investigations, explorations, tests, reports or similar information or data in respect of said Underground Facilities are or will be required by Bidder in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents.
- (f) Bidder has correlated the results of all such observations, examinations, investigations, explorations, tests, reports and studies with the terms and conditions of the Contract Documents.
- (g) Bidder has given Owner or Engineer written notice of all conflicts, errors or discrepancies that it has discovered in the Contract Documents and the written resolution thereof by Owner or Engineer is acceptable to Bidder.
- (h) This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any person, firm or corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner.

4. Bidder will complete Base Bid Work for the following price(s).

UNIT PRICE SCHEDULE – BASE BID

SPECIFICATIONS						
ITEM NO.	ITEM CODE	ITEM	UNIT	EST. QTY	UNIT PRICE	TOTAL EST. PRICE
1	A-100-5.1	SNOW REMOVAL EQUIPMENT BUILDING	LS	1	\$	\$
2	A-102-3.1	CONSTRUCTION ACCESS, PROJECT SECURITY, AND STAGING AREA (5%)	LS	1	\$	\$
3	A-102-3.2	MAINTENANCE OF TRAFFIC (5%)	LS	1	\$	\$
4	C-100-14.1	CONTRACTOR QUALITY CONTROL PROGRAM	LS	1	\$	\$
5	C-105-6.1	MOBILIZATION (10%)	LS	1	\$	\$
6	F-162-5.1	CHAIN LINK FENCE (PERMANENT AOA FENCE) (10' TALL W/DBL ARM, 6 STRAND BARB WIRE & RAZOR RIBBON)	LF	600	\$	\$
CONTRACT BASE BID TOTAL (TOTAL OF LINES 1-6)						\$

CONTRACT BASE BID TOTAL (TOTAL OF LINE ITEMS 1-6):

(use words)

(\$ _____)

5. The Owner reserves the right to reject any or all bids in whole or in part and to waive any informalities, technicalities, or omissions therein.

It is intention of the Owner to award a contract based upon the lowest responsive bid on the lump sum base bid. Bidder understands and agrees that, after a review of all the bids, the Owner will select the lump sum base bid that best suits the Owner's needs within the sole discretion of the Owner.

6. Bidder agrees that the Work: will be completed and ready for final payment within the calendar days (as described in Section 01100) after the date when the Contract Time commences to run. Bidder accepts the provisions of the Contract as to liquidated damages in the event of failure to complete the Work on time.

7. See Section 00200, INSTRUCTIONS TO BIDDERS, for a complete list of documents that are made a condition of this Bid.

8. Communications concerning this Bid shall be addressed to: _____
- (Printed Name)

The address of Bidder indicated above, or

the following address: _____

email address: _____

9. The terms used in this Bid which are defined in General Provision Section 10 of the Specifications included as part of the Contract Documents have the meanings assigned to them in the Division 0 and Division 1 Specifications.

Submitted on _____, 20____.

10. The undersigned Bidder confirms that (1) neither Bidder nor any of Bidder's potential subcontractors or suppliers have pending claims or litigation, arbitration, or other dispute resolution proceedings where the Owner and Bidder or Bidder's potential subcontractors or suppliers are parties; or (2) such claims or proceedings are pending and Bidder is disclosing same through its own writing and/or the writing of Bidder's potential subcontractors or suppliers and submitting same to Owner with this proposal submittal.

If Bidder is:

An Individual

(Individual's Printed Name)

(Individual's Signature)

doing business as: _____

Business address: _____

Phone No.: _____ FAX No. _____ E-Mail _____

A Partnership

(Firm Name)

By: _____
(Signature of General Partner and Printed Name)

Business address: _____

Phone No.: _____ FAX No. _____ E-Mail _____

A Corporation

(Corporation Name)

By: _____ Title: _____
(Signature of person authorized to sign)

(Printed Name)

(Corporate Seal)

Attest: _____
(Signature of Secretary) (Printed Name)

(State of Incorporation)

Business address: _____

Phone No.: _____ FAX No. _____ E-Mail _____

A Joint Venture

(Joint Venture)

By: _____
(Signature of Joint Venturer) (Printed Name)

(Address)

Phone No.: _____ FAX No. _____ E-Mail _____

By: _____
(Signature of Joint Venturer) (Printed Name)

(Address)

Phone No.: _____ FAX No. _____ E-Mail _____

(Each joint venturer must sign. The manner of signing for each individual, partnership and corporation that is a party to the joint venture should be in the manner indicated above).

END OF SECTION 00405

ISSUED FOR BID

00405
Page 5

DIVISION 0 – SECTION 00410**PROPOSAL GUARANTEE**

KNOW ALL MEN BY THESE PRESENT, that we, the undersigned, _____

_____ as Principal, and

_____ as Surety, are

hereby held and firmly bound unto Memphis-Shelby County Airport Authority as Owner, in the sum of _____ for the payment of which, well and truly to be made, the said Principal and Surety hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns.

Whereas the Principal has submitted to Memphis-Shelby County Airport Authority a certain bid, attached hereto and hereby made a part hereof, to enter into a contract in writing for the Snow Removal Equipment Building - Building Package - Construction, MSCAA Project No. 23-1476-17-02.

NOW, THEREFORE, if said bid shall be rejected, or in the alternate, if said bid shall be accepted and the Principal shall execute and deliver a contract in accordance with the terms of the Contract Documents and shall furnish a bond for its faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said bid, then this obligation shall be void, otherwise the same shall remain in full force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligation of said Surety and its bond shall be in no way impaired or affected by any extension of the time within which the Owner may accept such bid; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers,

this _____ day of _____, 20_____.

PRINCIPAL

By: _____

(Name and Title)

SURETY

SEAL

By: _____

(Attorney-in-Fact)

END OF SECTION 00410

ISSUED FOR BID

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DIVISION 0 – SECTION 00440**BUY AMERICAN CERTIFICATION**

The Contractor certifies that its bid/offer is in compliance with 49 U.S.C. § 50101, BABA and other related Made in America Laws, U.S. statutes, guidance, and FAA policies, which provide that Federal funds may not be obligated unless all iron, steel and manufactured goods used in AIP funded projects are produced in the United States, unless the Federal Aviation Administration 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.

The bidder or offeror must complete and submit the certification of compliance with FAA's Buy American Preference, BABA and Made in America laws included herein with their bid or offer. The Airport Sponsor/Owner will reject as nonresponsive any bid or offer that does not include a completed certification of compliance with FAA's Buy American Preference and BABA.

The bidder or offeror certifies that all constructions materials, defined to mean an article, material, or supply other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives that are or consist primarily of: non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber; or drywall used in the project are manufactured in the U.S.

The bidder or offeror certifies procurement of certain rolling stock using FAA grant funds will prohibit airports from using Federal financial assistance to procure buses or rail car vehicle rolling stock from covered entities.

Certification of Compliance with FAA Buy American Preference – Construction Projects

As a matter of bid responsiveness, the bidder or offeror must complete, sign, date, and submit this certification statement with its proposal. The bidder or offeror must indicate how it intends to comply with 49 U.S.C. § 50101, BABA and other related Made in America Laws, U.S. statutes, guidance, and FAA policies, 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 (ü) or the letter "X".

- ☐ Bidder or offeror hereby certifies that it will comply with 49 U.S.C. § 50101, BABA and other related U.S. statutes, guidance, and policies of the FAA by:
- a) Only installing iron, steel and manufactured products produced in the United States;
 - b) Only installing construction materials defined as: an article, material, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives that are or consist primarily of non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber or drywall that have been manufactured in the United States.
 - c) Installing manufactured products for which the Federal Aviation Administration (FAA) has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing; or
 - d) 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:

- a) To provide to the Airport Sponsor or the FAA evidence that documents the source and origin of the iron, steel, and/or manufactured product.
 - b) To faithfully comply with providing U.S. domestic products.
 - c) To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.
 - d) Certify that all construction materials used in the project are manufactured in the U.S.
- ☐ The bidder or offeror hereby certifies it cannot comply with the 100 percent Buy American Preferences of 49 U.S.C. § 50101(a) but may qualify for 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:
- a) To submit to the Airport Sponsor or FAA within 15 calendar days of being selected as the responsive bidder, a formal waiver request and required documentation that supports the type of waiver being requested.
 - b) That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination that may result in rejection of the proposal.
 - c) To faithfully comply with providing U.S. domestic products at or above the approved U.S. domestic content percentage as approved by the FAA.
 - d) To furnish U.S. domestic product for any waiver request that the FAA rejects.
 - e) To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

Required Documentation

Type 2 Waiver (Nonavailability) - The iron, steel, manufactured goods or construction materials or manufactured goods are not available in sufficient quantity or quality in the United States. The required documentation for the Nonavailability waiver is

- a) Completed Content Percentage Worksheet and Final Assembly Questionnaire
- b) Record of thorough market research, consideration where appropriate of qualifying alternate items, products, or materials including;
- c) A description of the market research activities and methods used to identify domestically manufactured items capable of satisfying the requirement, including the timing of the research and conclusions reached on the availability of sources.

Type 3 Waiver – The cost of components and subcomponents produced in the United States is more than 60 percent of the cost of all components and subcomponents of the “facility/project.” The required documentation for a Type 3 waiver is:

- a) Completed Content Percentage Worksheet and Final Assembly Questionnaire including;
- b) Listing of all manufactured products that are not comprised of 100 percent U.S. 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).
- c) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly and installation at project location.
- d) 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 (Unreasonable Costs) - Applying this provision for iron, steel, manufactured goods or construction materials would increase the cost of the overall project by more than 25 percent. The required documentation for this waiver is:

- a) A completed Content Percentage Worksheet and Final Assembly Questionnaire from
- b) At minimum two comparable equal bids and/or offers;
- c) Receipt or record that demonstrates that supplier scouting called for in Executive Order 14005, indicates that no domestic source exists for the project and/or component;
- d) Completed waiver applications for each comparable bid and/or offer.

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

END OF SECTION 00440

1 SECTION 00445 - SMALL BUSINESS PARTICIPATION PROGRAM (SBPP) REQUIREMENTS

1.1 Overview

The Authority operates a Small Business Participation Program (SBPP) to ensure full and fair opportunities in Authority contracting for small businesses. The Authority administers the SBPP program consistent with 49 CFR Part 26 as outlined below and otherwise indicated in the SBPP requirements. Only firms that are certified consistent with 13 CFR Part 121 or 49 CFR Part 26 will be certified as a Small Business Enterprise (SBE) or reevaluated/certified Disadvantaged Business Enterprise (DBE), **as required by Interim Final Rule effective October 3, 2025 ("IFR") for 49 CFR Part 26**, may be considered as an eligible Small Business Enterprise (SBE) for the purpose of SBPP requirements.

This section, entitled "Small Business Participation Program" is provided to assist Respondents. The information contained in this section is not intended to supplement or amend any federal regulation. All Respondents are responsible for compliance with all applicable rules and requirements.

1.2 SBPP Required Forms

It is a requirement that all Respondents providing services for the Authority take all reasonable steps to ensure that SBEs, including DBEs reevaluated or certified pursuant to the IFR for 49 CFR Part 26 have a full and fair opportunity to compete for and perform contract work without discrimination based on age, race, sex, color, national origin. To satisfy this requirement, Respondents will be expected to timely submit documentation as identified below and throughout the contract period if selected and cooperate with the Authority. Failure to timely submit requested documentation, cooperate with the Authority or answer inquiries truthfully will be considered a material contract breach and may result in termination.

The following documents must be submitted with your response to this solicitation:

1.2.1 Assurance Statement/Letter of Intent

The Respondent must submit an Assurance Statement for each SBE, which includes DBEs reevaluated or certified pursuant to the IFR for 49 CFR Part 26 whose participation the Respondent is counting toward the goal. This may include first, second, third and so on tier subcontractors, and the Respondent and all subcontractors between the Respondent and the SBE should sign the Assurance Statement. The Respondent must submit the prescribed form in Section 17.1 below on Company Letterhead.

For each Assurance Statement, the Respondent must also provide the written quote or proposal from the SBE or other communication from the SBE upon which the scope of work and dollar value contained in your Assurance Statement is based ("quote/proposal").

All portions of the Assurance Statement must be completed (including the description of work, the estimated contract amount, and the estimated dollar value of SBE participation for counting and goal purposes) before the Assurance Statement is signed by either the SBE or the Respondent. If the SBEs, and if applicable the 2nd/3rd Tier Subcontractor's, signature(s) can be obtained on the completed Assurance Statement before the bid submission deadline, the Respondent should submit the fully-

completed and fully signed Assurance Statement. If the Respondent submits an Assurance Statement that is completed except for the SBEs, and if applicable, the 2nd/3rd Tier Subcontractor's signature(s) and a quote/proposal from the SBE as described above, the Respondent will be given 24 hours from the bid submission deadline to submit the completed Assurance Statement signed by the SBE and, if applicable, the 2nd/3rd Tier Subcontractor. Each Assurance Statement submitted during this 24-hour window must conform to the previously submitted Assurance Statement except for SBE signature. These signed Assurance Statements must be submitted pursuant to the same location and time restrictions that applied to the solicitation response.

The Authority reserves the right to ask questions of the Respondent, investigate and require additional information as it determines necessary in its sole discretion to ensure that the regulations and the Authority's rules are followed as it relates to SBE participation.

1.2.2 *Respondent SBE Goals Accomplishment Statement*

The prescribed form provided below must be submitted on Respondent's company letterhead.

1.2.3 *Small Business Participation Plan (SBPP) Bidder's List*

The prescribed form provided below must be completed by Respondent.

1.3 *SBE Voluntary Form*

We ask, but do not require, that each Respondent submit the following information with the response to this solicitation:

1.3.1 *Voluntary Disclosure of Respondent Data*

If submitted, the prescribed form provided below must be completed by Respondent.

1.4 *SBPP Qualifications*

To qualify as an eligible SBE for this solicitation, a firm must meet the following requirements:

- a. A firm (including affiliates) must be an existing small business as defined by Small Business Administration (SBA) regulations, 13 C.F.R. Part 121, for the appropriate type(s) of work that a firm performs and corresponding size standards.
- b. The personal net worth of the qualified owner(s) of the firm must be less than \$2.047 million.
- c. Said qualified owner(s) must own 51% of the subject firm.
- d. Said qualified owner(s) must be U.S. citizen or lawfully admitted permanent residency.
- e. The firm must be certified by the Authority for the SBPP program or granted certification reciprocity by the Authority for an acceptable existing certification.

DBEs reevaluated or certified pursuant to, or in accordance with, the IFR for 49 C.F.R. Part 26 meet the required small business element criteria stated and may qualify for the Authority's SBPP program.

1.5 *Liaison Officer*

For questions or information related to the SBPP, contact ReGina Armstrong, the Senior Manager of Business Diversity Development at (901) 922-0255.

1.6 *SBE Certification*

In order to be considered as meeting the SBE goal for this solicitation, each business wishing to participate as a SBE must be certified by the Authority for participation in the Authority's SBPP program. The Authority is a certifying member of the Tennessee Department of Transportation Unified Certification Program (TNUCP). Given that DBEs certified or reevaluated pursuant to the IFR for 49 C.F.R. Part 26 satisfy the required small business criteria for the SBPP program, DBEs certified or reevaluated pursuant to the IFR for 49 CFR Part 26 by TNUCP or a TNUCP certifying member do not have to apply for SBE certification with the Authority and qualify to be considered to meet the SBE goal for this Contract.

The Authority compiles a directory of SBE firms who have met the criteria for SBPP program eligibility, which can be searched here: www.memvendor.com. If you do not see a firm's name on this list that you believe to be certified, please contact the Office of Business Diversity Development by email at certification@flymemphis.com or by phone at 901-922-0255.

The Authority may grant certification reciprocity to firms with certifications from a Department of Transportation Unified Certification Program of any other state, SBA 8(a) certifications, or SBE certifications from another state, county, local government, or other agency **ONLY IF** the personal net worth requirement and SBA size standards have been met. Certifications from self-certification programs are not acceptable. A business must apply for certification reciprocity with the Authority for an acceptable existing certification outlined above in order to be considered as meeting the SBE goal in this solicitation. Unless a firm is granted certification reciprocity by the Authority by the time the responses to this solicitation are due, its participation will not be considered as meeting the SBE goal.

Each business wishing to participate as a SBE must be certified by the time the responses are due. A business is seeking SBE certification (or certification reciprocity) with the Authority can contact the Office of Business Opportunity Development by email at certification@flymemphis.com or by phone at 901-922-0255. The online certification application can be found here: <https://mscaa.mwdbe.com/>. The certification process may take up to ninety (90) days.

1.7 *Identification of Contract Goal and Requirements*

For this Contract, the SBPP goal is established as **15%**. In order to be responsive, a Respondent must either meet the goal or make good faith efforts to do so. Good faith efforts are defined in Appendix A to 49 CFR Part 26 and discussed in the following section.

If a Respondent's Assurance Statement proposes a SBE percentage less than the established goal, the Respondent must, at the time of making the response, submit appropriate documentation showing good faith efforts to meet the established goal. The Authority reserves the right to request additional documentation or information from Respondent regarding its Assurance Statement and; if applicable, any good faith efforts documentation. If the Authority enters into a contract based on the Respondent's Goals Accomplishment Statement and documentation, the SBE percentage accepted by the Authority

will become a contractual requirement. If the Respondent's Assurance Statement proposes to attain a SBE percentage higher than the established goal, the established goal will remain the contractual requirement.

Respondents shall not contract with, demand, require or coerce a SBE into any agreement or into the signing of any Assurance Statement or any other document which prohibits the SBE from providing subcontracting quotations or doing business with other Respondents. The SBE shall be free to provide their services to any number of Respondents. To ensure that all obligations under sub-contracts awarded to a SBE are met, the Authority will review the agreement between the Respondent and SBE, and Respondent's SBE involvement efforts during the performance of the Contract.

1.8 *Good Faith Efforts Statement and Requirements*

Respondents must either meet the SBPP goal or make good faith efforts to meet the goal. Respondents who do not meet the goal must establish adequate good faith efforts by submitting documentation along with the Respondent's Goals Accomplishment Statement. This statement should show that they took all necessary and reasonable steps to achieve the SBE goal, which could reasonably be expected to obtain sufficient SBE participation, even if they were not fully successful. The Respondent's Goals Accomplishment Statement and supporting documents should conform to the good faith requirements outlined in Appendix A of 49 CFR Part 26.

The following is a list of types of actions that may be part of a Respondent's efforts to obtain SBE participation and may be included in the Respondent's Goals Accomplishment Statement and documentation. This list is not intended to be a mandatory checklist, nor is it intended to be exclusive or exhaustive. Other factors or types of efforts may be relevant in appropriate cases:

- a. Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising and/or written notices) the interest of all certified as a SBE who have the capability to perform the work of the Contract. The Respondent must solicit this interest within sufficient time to allow the SBE to respond to the solicitation and take appropriate steps to follow-up on initial solicitations to determine interest.
- b. Selecting portions of the work to be performed by a SBE to increase the likelihood that the goals of the SBE will be achieved.
- c. Providing any interested SBE with adequate information about the plans, specifications, and requirements of the Contract in a timely manner to assist them in responding to a solicitation.
- d. Negotiating in good faith with any interested SBE. It is the Respondent's responsibility to make a portion of the work available to SBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available SBE subcontractors and suppliers, to facilitate SBE participation.
- e. Not rejecting any SBE as being unqualified without sound reasons based on a thorough investigation of their capabilities.
- f. Making efforts to assist any interested SBE in obtaining bonding, lines of credit, or insurance as required by the recipient or contractor.

g. Making efforts to assist any interested SBE in obtaining necessary equipment, supplies, materials, or related assistance or services.

h. Effectively using the services of available small business organizations and groups; local, state, and Federal small business assistance offices; and other organizations as allowed on a case-by-case basis to aid in the recruitment and placement of any SBE.

For each SBE listed as a regular dealer or distributor the Authority will make a preliminary counting determination to assess the SBE's eligibility for 60 or 40 percent credit, respectively, of the cost of materials and supplies based on its demonstrated capacity and intent to perform as a regular dealer or distributor, as defined in § 26.55(e)(2)(iv)(A), (B), and (C) and (e)(3) under the contract at issue. The Authority's preliminary determination shall be made based on the SBE's written responses to relevant questions and its affirmation that its subsequent performance of a commercially useful function will be consistent with the preliminary counting of such participation. Where the SBE supplier does not affirm that its participation will meet the specific requirements of either a regular dealer or distributor, the Authority is required to make appropriate adjustments in counting such participation toward the Bidders' good faith efforts to meet the contract goal. The Bidder is responsible for verifying that the information provided by the SBE supplier is consistent with the counting of such participation toward the contract goal.

If a Respondent has not met the SBE goal and submits Respondent's Goals Accomplishment Statement and documentation, the Respondent should summarize in detail all good faith efforts taken by the Respondent, including, but not limited to, the activities listed above in A through I, and supporting documentation. While the Respondent should submit documentation to support its good faith efforts at the time of the Response submission, the Authority may ask questions of Respondent or request additional documentation after review of Respondent's Goals Accomplishment Statement and any documentation. In submitting the information required under this section, Respondent understands and agrees that the determination of whether Respondent has met the SBE goal or established good faith efforts to meet the goal is a judgment call that the Authority will make.

1.9 *Administrative Reconsideration*

Within five (5) business days of being informed by the Authority that it is not responsive because it has not documented sufficient good faith efforts, a Respondent may request administrative reconsideration. Respondent should make this request in writing to the following reconsideration official: Terry Blue, President and CEO, Memphis Shelby County Airport Authority, 2491 Winchester Road, Suite 113, Memphis, Tennessee 38116, (901) 922-8000, tblue@flymemphis.com. The reconsideration official will not have played any role in the original determination that the Respondent did not document sufficient good faith efforts.

As part of this reconsideration, the Respondent will have the opportunity to provide written documentation or argument concerning the issue of whether it met the goal or made adequate good faith efforts to do so. The bidder/offeree will have the opportunity to meet in person with our reconsideration official to discuss the issue of whether it met the goal or made adequate good faith efforts to do. The Authority will send the Respondent a written decision on reconsideration, explaining the basis for finding that the Respondent did or did not meet the goal or make adequate good faith

efforts to do so. The result of the reconsideration process is not administratively appealable to the Department of Transportation.

1.10 Counting SBE Participation

SBE participation shall be counted toward meeting the SBPP goal consistent with the regulations outlined in 49 CFR Part 26, specifically 26.55. When the Respondent completes an Assurance Statement, the Respondent must include not only the total value of the work to be performed and/or the materials to be supplied by the SBE but also the total amount of SBE participation that should be counted toward meeting the goal. If you have any questions about counting, we strongly urge you to consult 49 CFR Part 26. The following may be helpful to you in counting SBE participation and in determining which sections of Part 26.55 you need to review in more detail:

a. When a SBE participates in a contract, you count only the value of the work actually performed by the SBE toward SBE goals.

1) Count the entire amount of that portion of a construction contract (or other contract not covered by paragraph (a)(2) of this section) that is performed by the SBE's own forces. Include the cost of supplies and materials obtained by the SBE for the work of the contract, including supplies purchased or equipment leased by the SBE (except supplies and equipment the SBE subcontractor purchases or leases from the prime contractor or its affiliate).

2) Count the entire amount of fees or commissions charged by a SBE firm for providing a bona fide service, such as professional, technical, consultant, or managerial services, or for providing bonds or insurance specifically required for the performance of a DOT-assisted contract, toward SBE goals, provided you determine the fee to be reasonable and not excessive as compared with fees customarily allowed for similar services.

3) When a SBE subcontracts part of the work of its contract to another firm, the value of the subcontracted work may be counted toward SBE goals only if the SBE's subcontractor is itself a SBE. Work that a SBE subcontracts to a non-SBE firm does not count toward SBE goals. a. When a SBE participates in a contract, you count only the value of the work actually performed by the SBE toward SBE goals.

4) Count the entire amount of that portion of a construction contract (or other contract not covered by paragraph (a)(2) of this section) that is performed by the SBE's own forces. Include the cost of supplies and materials obtained by the SBE for the work of the contract, including supplies purchased or equipment leased by the SBE (except supplies and equipment the SBE subcontractor purchases or leases from the prime contractor or its affiliate).

5) Count the entire amount of fees or commissions charged by a SBE firm for providing a bona fide service, such as professional, technical, consultant, or managerial services, or for providing bonds or insurance specifically required for the performance of the contract, toward SBE goals, provided you determine the fee to be reasonable and not excessive as compared with fees customarily allowed for similar services.

6) When a SBE subcontracts part of the work of its contract to another firm, the value of the subcontracted work may be counted toward SBE goals only if the SBE's subcontractor is itself a SBE. Work that a SBE subcontracts to a non-SBE firm does not count toward SBE goals.

b. When a SBE performs as a participant in a joint venture, count a portion of the total dollar value of the contract equal to the distinct, clearly defined portion of the work of the contract that the SBE performs with its own forces toward SBE goals.

c. Count expenditures to a SBE contractor toward SBE goals only if the SBE is performing a commercially useful function on that contract. For the definition and explanation of a commercially useful function, see 49 CFR Part 26.55(c).

d. To determine whether a SBE trucking company is performing a commercially useful function see 49 CFR Part 26.55(d).

e. Count expenditures with SBEs for materials or supplies toward SBE goals as provided in 49 CFR Part 26.55(e). Please note that materials or supplies obtained from a SBE manufacturer are counted differently toward SBE goals than a SBE regular dealer. It is imperative that the Bidder consult federal regulations for counting differences.

f. If a firm is not currently certified as a SBE in accordance with the standards of 49 CFR Part 26 Subpart D at the time of the execution of the contract, do not count the firm's participation toward any SBE goals, except as provided for in § 26.87(i)).

g. Do not count the dollar value of work performed under a contract with a firm after it has ceased to be certified toward your overall goal.

h. Do not count the participation of a SBE subcontractor toward a contractor's final compliance with its SBE obligations on a contract until the amount being counted has actually been paid to the SBE.

1.11 Sanctions for Non-Compliance

In case of the Respondent's non-compliance with SBE requirements as applicable, including, but not limited to, documentation, cooperation, and truthfulness, the Authority shall impose such Contract sanctions as it may determine to be appropriate. This may include but is not limited to:

a. Withholding of payments to the Respondent under the Contract until the Respondent complies; and/or

b. Cancellation, termination, or suspension of the Contract, in whole or in part; and/or

c. Assessing sanctions; and/or

d. Payment by the Respondent to the Authority of an amount equal to the difference in the SBE dollar value contracted for and the dollar value achieved in documented SBE participation, which dollar value shall be considered liquidated damages if the Authority determines that Respondent failed to make good faith efforts in meeting the Contract's SBE goal.

1.12 Contract Assurance

The successful Respondent, any successful subrecipient or successful subcontractor shall not discriminate based on race, color, national origin, or sex in the performance of this prime contract. The successful Respondent shall carry out SBPP requirements in the award and administration of Authority contracts. Failure by the successful Respondent 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, which may include, but is not limited to:

- a. Withholding monthly progress payments;
- b. Assessing sanctions;
- c. Liquidated damages; and/or
- d. Disqualifying the Contractor from future bidding as non-responsible.

1.13 Prompt Payment / Retainage

The successful Respondent agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than fifteen (15) days from the receipt of each payment the successful Respondent receives from MSCAA. 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 MSCAA. When MSCAA 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. Any delay or postponement of payment from the above referenced timeframe may occur only for good cause following written approval of the MSCAA. This clause applies to both SBE and non-SBE subcontractors.

Retainage will not be withheld on this project. No retainage will be withheld by MSCAA from progress payments due to the successful Respondent. Retainage by the successful Respondent or subcontractors is prohibited, and no retainage will be held by the successful Respondent from progress payments due to subcontractors.

1.14 Termination of SBE Subcontracts

The successful Respondent must not terminate a SBE subcontractor listed in response to this solicitation (or an approved substitute SBE firm) without prior written consent of Authority. This includes, but is not limited to, instances in which the successful Respondent seeks to perform work originally designated for a SBE subcontractor with its own forces or those of an affiliate, a non-SBE firm, or with another SBE firm.

The successful Respondent shall utilize the specific SBEs listed to perform the work and supply the materials for which each is listed unless the contractor obtains prior written consent as provided in 49 CFR §26.53(f). Unless prior written consent is provided pursuant to 49 CFR §26.53(f), the successful Respondent shall not be entitled to any payment for work or material unless it is performed or supplied by the listed SBE.

The Authority may provide such written consent only if the Authority agrees, for reasons stated in the concurrence document, that the successful Respondent has good cause to terminate the SBE firm. For purposes of this paragraph, good cause includes the circumstances listed in 49 CFR §26.53.

Before transmitting to the Authority its request to terminate and/or substitute a SBE subcontractor, the prime contractor must give notice in writing to the SBE subcontractor, with a copy to the Authority, of its intent to request to terminate and/or substitute, and the reason for the request.

The successful Respondent must give the SBE five days to respond to the successful Respondent's notice. In response, the SBE must advise the Authority and the successful Respondent of the reasons, if any, why it objects to the proposed termination of its subcontract and why the Owner should not approve the prime contractor's action. If required in a particular case as a matter of public necessity (e.g., safety), Owner may provide a response period shorter than five days.

In addition to post-award terminations, the provisions of this section apply to reward deletions of or substitutions for SBE firms put forward by offerors in negotiated procurements. Forms are provided below

1.15 SBPP Requirements

The Respondent shall carry out the SBPPP requirements, including applicable requirements of 49 CFR Part 26, in the award and administration of Authority contracts. Respondent agrees to provide all its subcontractors and suppliers and to require all its subcontractors and suppliers on this project to provide a complete copy of the Business Diversity Development Program Requirements of the Contract to all those who provide supplies or work related to the Contract and to require all those providing supplies or work to be bound by these requirements as it relates to their work related to the Contract. The form provided below must be completed by the Proposal.

Memphis-Shelby County Airport Authority
Memphis, Tennessee

SBE Assurance Statement/Letter of Intent (Required)

Submit on Company Letterhead for each SBE Subcontractor

SBE ASSURANCE STATEMENT/LETTER OF INTENT		
<u>RESPONDENT:</u>		
Name of Firm: _____		
Address: _____		
City: _____	State: _____	Zip: _____
Telephone: _____		
Local Yes _____ No _____		
<u>SUBCONTRACT:</u>		
Name of Firm: _____		
Address: _____		
City: _____	State: _____	Zip: _____
Local Yes _____ No _____		
Description of work to be performed by SBE:		

The Respondent is committed to utilizing the above-named for the work described above. The estimated dollar value \$ _____, which is _____% of the total base bid proposal.		
AFFIRMATION		
The above-named SBE affirms that it will perform the portion of the contract for the estimated dollar value as stated above		
By: _____		
Signature of SBE and Title	Date	Name
By: _____		
Signature of 2 nd /3 rd Tier Subcontractor and Title	Date	Name
If the Respondent does not receive award of the prime contract, any and all representations in this letter of Intent and Affirmation shall be null and void. If Respondent does receive award of the prime contract, Respondent commits to using the SBE contractor listed and described to meet the SBE contract goal.		
By: _____		
Signature of Respondent and Title	Date	Name

Memphis-Shelby County Airport Authority
Memphis, Tennessee

Respondent SBE Goals Accomplishment Statement (Required)

Submit on Company Letterhead

RESPONDENT SBE GOALS ACCOMPLISHMENT STATEMENT

The undersigned Respondent has satisfied the requirements of the bid/proposal specification in the following manner (please complete the appropriate spaces):

- ☐ The Respondent is committed to a minimum of 15% SBE utilization on this contract.
- ☐ The Respondent is unable to meet the SBE goal of 15% but is committed to a minimum of _____%

SBE utilization on this contract and submits the attached narrative and documentation demonstrating good faith efforts consistent with Appendix A of 49 CFR 26. **The Respondent should attach as many pages as necessary to provide a full and complete narrative and supporting documentation of good faith efforts made. This narrative must be written on company letterhead and signed.**

Please provide an explanation for the percentage quoted above:

Provide an explanation of the SBE's participation and how this has been determined to meet the specific goal requirements of this solicitation in whole or part.

If SBE and the company enter into a Joint Venture, please describe the terms of the relationship and attach a copy of the contract between the parties. If the Respondent does receive award of the prime contract, Respondent commits to using the SBE subcontractor listed and described above to meet the SBE contract goal, pursuant to 49 CFR Part 26.

It is the present intent of the Respondent to utilize the specific SBE firms identified in this proposal in the execution of this contract. If for any reason, one or more of the SBE identified here are unable or unwilling to participate, the Respondent will make good faith efforts to replace the SBE with a similar SBE. The Authority SBE Good Faith Procedures are provided in this package and apply to this proposal.

Respondent's Name: _____

State Registration No.: _____

Federal Tax ID No.: _____

By: _____
Signature and Title Date

SMALL BUSINESS ENTERPRISE (SBE) BIDDER'S LIST

The Memphis Airport Authority (MEM) maintains bidding statistics, regarding ALL firms bidding on prime contracts and subcontracts on Non Federal projects in accordance to The The U.S. Department of Transportation's (DOT) Interim Final Ruling (IFR) of 49 CFR Par 26, effective October 10, 2025. **This information will only be used for statistical purposes per the IFR.** This requirement applies to all firms, regardless of whether they are subs or primes, regardless of the gender or race of their owners, and regardless of whether they are ultimately chosen to participate in the contract. Please list below the name, address, phone number and contact person for every firm that provided you a bid or a quote on this project – even if you ultimately decided not to use the firm in pre paring your final bid. The first line should be used for the **prime contractor** on this project. All sections must be completed to the best of your ability.

Firm Name	PRIME /SUB	POC	SBE Y/N	ADDRESS 1	CITY	STATE	ZIP	TELEPHONE	SCOPE OF WORK	EMAIL ADDRESS	NAICS CODE	FIRM AGE YRS	AGR A= Less \$500k B=\$500K- \$1M; etc

*Footnote: Please enter the letter for the category that best identifies your annual gross revenue.

AGRR =Annual Gross Revenue Ranges:

A = Less than \$500,000 **B** = \$500,000 - \$1 Million **C** = \$1 - \$2 Million **D** = \$2 - \$5 Million **E** = Over \$5 Million

Voluntary Disclosure of Respondent Data

Do **not** submit this form on company letterhead

VOLUNTARY DISCLOSURE OF RESPONDENT DATA

For Title VI Compliance, the Authority asks for **voluntary disclosure** of the following information:

Gender:	Male	_____
	Female	_____
Race:	Caucasian	_____
	Black American	_____
	Hispanic American	_____
	Native American	_____
	Subcontinent Asian American	_____
	Asian-Pacific American	_____
	Other (please specify)	_____

Memphis-Shelby County Airport Authority

Memphis, Tennessee

Small Business Participation Plan (SBPP) Termination Request

Prior to submitting this form to Memphis-Shelby County Airport Authority (MSCAA), you must notify the SBPP Firm in writing of your intent and allow the Firm five (5) days to respond. MSCAA must be copied on the notice to the firm. NOTE: The prime contractor may not submit a substitution request until after receiving an approved SBPP termination.

Project ID:	Contract Amount:	Goal:
Prime Contractor:	Requestor:	
Email:	Phone:	

Committed SBPP Firm:			
Original Contract Amount:		Remaining Contract Amount:	
SBPP Type:	☐ Subcontractor/Subconsultant ☐ Material Supplier (60% credit)	☐ Professional Services ☐ Trucking/ Hauling Firm	☐ Manufacturer ☐ Distributor
Scope of Work Description:			
Has SBPP Firm been paid for completed work?		☐ Yes ☐ No / Remaining amount owed:	

Is this request due to an MSCAA Change Order?	☐ Yes (provide info and statement of impact on SBPP participation) ☐ No (see below)
If NO above, select the reason for the request: <i>(must attach a statement of facts and supporting documentation)</i>	
☐ SBPP Firm requests removal ☐ SBPP Firm fails or refuses to perform work or furnish materials ☐ SBPP Firm is not a responsible contractor ☐ Owner died or becomes disabled resulting in the SBPP inability to complete the work on the contract	☐ SBPP Firm is ineligible to receive DBE credit for the type of work required ☐ Work performed by SBPP Firm was unsatisfactory and not in accordance with plans and specifications ☐ Other documented good cause
Date determined SBPP Firm unwilling, unable or ineligible:	
Will this request result in a SBPP goal shortfall:	☐ No (provide SBPP utilization summary) Yes / ☐ Shortfall Amt:

SBPP Response

NAICS CODES:	DESCRIPTION:

Memphis-Shelby County Airport Authority
Memphis, Tennessee

The undersigned acknowledges that they are authorized to submit this request as a representative of the stated prime contractor.		
Requestor Signature:		Date:
For MSCAA Use Only		
Notice of Intent provided to SBE:	Yes (date sent _____)	No (must be sent to SBE 5 days prior to Request)
All required documentation submitted with Request ☐ Yes ☐ No (all documents must be submitted for review)		
Request Approved: ☐ Yes ☐ No	Reason:	
DBELO Signature:		Date:

Memphis-Shelby County Airport Authority
Memphis, Tennessee

Small Business Participation Plan (SBPP) Program Substitution Request

Prior to submitting this form to Memphis-Shelby County Airport Authority (MSCAA), you must have an approved Termination form signed by the DBELO. Without an approved SBPP termination request, a prime contractor shall not be entitled to any payment for work or material unless it is performed or supplied by the committed SBPP.

Project ID:	Contract Amount:	Goal:
Prime Contractor:	Requestor:	
Email:	Phone:	
New Committed SBPP Firm:		
Original Contract Amount:		Remaining Contract Amount:
SBBP type:	☐ Subcontractor/Subconsultant ☐ Material Supplier (60% credit)	☐ Professional Services ☐ Trucking/Hauling Firm ☐ Manufacturer ☐ Distributor
Scope of Work Description:		

APPLICABLE NAICS CODES	
NAICS CODE:	DESCRIPTION:

THIS SECTION MUST BE COMPLETED IF REQUESTING A SUBSTITUTION OR IF TERMINATION WILL RESULT IN GOAL SHORTFALL (does not apply if shortfall due to MSCAA Change Order)

Proposed SBPP Substitute:			
Proposed SBPP type:	☒ Subcontractor/Subconsultant ☐ Material Supplier (60% credit)	☐ Professional Services ☐ Trucking/Hauling Firm	☐ Manufacturer ☐ Distributor
Proposed Scope of Work:			
Is the substitution a certified SBPP? ☐ Yes ☐ No (must provide Good Faith Effort (GFE))			
Projected date for SBPP substitute to commence work?			
For MSCAA Use Only			
Notice of Intent provided to Firm: ☐ Yes (date sent _____) ☐ No (must be sent to Firm 5 days prior to Request)			
All required documentation submitted with Request: ☐ Yes ☐ No (all documents must be submitted for review)			
Request Approved: ☐ Yes ☐ No		Reason:	
DBELO Signature:		Date:	

Memphis-Shelby County Airport Authority
Memphis, Tennessee

Small Business Participation Plan (SBPP) Requirements for Subcontracts

Received: _____ Date: _____	Project Name: _____
_____ Sr. Manager of BDD	Project No.: _____

Memphis-Shelby County Airport Authority (MSCAA) operates a SMALL BUSINESS PARTICIPATION PLAN (SBPP) to ensure full and fair opportunities in MSCAA contracting for small businesses defined by U.S. Small Business Administration (SBA). This document sets forth SBE provisions that must be included in all contracts and subcontracts for the subject project as required by non-federal regulations. **A SIGNED COPY MUST BE (1) TO THE MSCAA SBE LIASON OFFICER AND (2) INCLUDED IN YOUR SUBCONTRACT AS AN EXHIBIT TO ANY UNDERLYING AGREEMENT FOR THE SUBJECT PROJECT.**

The undersigned parties agree and acknowledge that this document shall be deemed to form, be read and construed as, as if stated verbatim therein, part of any agreement between the parties related to the subject project. This document is an agreement wherein the parties accept, agree to, and incorporate federally mandated contractual provisions into any underlying agreement for the subject project as well as acknowledge applicable MSCAA SBPP rules and regulations. **THE TEXT CONTAINED IN THIS DOCUMENT CANNOT BE REVISED, ALTERED, OR OTHERWISE MODIFIED BY THE PARTIES. THIS IS A FINAL DOCUMENT.**

Any subcontract for the subject project shall be governed by regulations set forth in MSCAA SBE program rules and regulations, including but not limited to the following:

1. **Assurance** : The contractor, sub-recipient, or subcontractor shall not discriminate on the basis of USDOT SBA size standard in the performance of this contract. 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, which may include, but is not limited to: 1) Withholding monthly progress payments; 2) Assessing sanctions; 3) Liquidated damages; and/or 4) Disqualifying the contractor from future bidding as non-responsible.
2. **Prompt Payment**: The prime contractor is required to pay its subcontractors performing work related to this contract for satisfactory performance of that work no later than 15 days after the prime contractor's receipt of payment for that work from MSCAA. A subcontractor's work is satisfactorily completed when all the tasks called for in the subcontract have been accomplished and documented as required by MSCAA. When MSCAA 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. Any delay or postponement of payment from the above referenced timeframe may occur only for good cause and written approval of the MSCAA. Retainage will not be withheld on this project. No retainage will be withheld by the MSCAA from progress payments due the prime contractor. Retainage by the prime or subcontractors is prohibited. No retainage will be held by the prime from progress due subcontractors.
3. **Termination/Substitution**: The prime contractor may not terminate or substitute any approved SBPP subcontractor listed in the Assurance Statement without prior written consent of MSCAA. The prime contractor must follow the procedures set forth by MSCAA.
4. **Counting Participation**: SBPP participation in a contract must be counted in accordance with and applicable guidance.
5. **SBPP Independence**: An independent business is one of the viability of which does not depend on its relationship with another firm or firms.
6. **DBE Liaison Officer (DBELO)**: For SBPP related questions, issues, and disputes, please contact the MSCAA DBELO (contact information found at <https://flymemphis.com/business-diversity-development-program/>). The

Memphis-Shelby County Airport Authority
Memphis, Tennessee

current DBELO is Regina Armstrong, who may be reached at 901-922-0167 or rarmstrong@flymemphis.com.

This document shall control and supersede any inconsistency, conflict or ambiguity contained in any underlying agreement between the parties for the subject project as to the procedures, processes, or subject matter set forth in this document or otherwise applicable MSCAA SBPP program rules and regulations.

PRIME CONTRACTOR: _____
SIGNATURE: _____
TITLE: _____ DATE: _____

SUBCONTRACTOR: _____
SIGNATURE: _____
TITLE: _____ DATE: _____

DIVISION 0 – SECTION 00490**ADDENDA AND MODIFICATIONS****1. INTERPRETATIONS - ADDENDA AND MODIFICATIONS**

- A. If, during the bidding period Bidder finds discrepancies, ambiguities, omissions, or is in doubt as to meaning or intent of Contract Documents, notify the Owner or Engineer not less than seven (7) days prior to Bid Date. All such necessary clarifications, information, interpretations or amendments shall be answered in the form of written addenda to Drawings and Specifications, and shall be issued simultaneously to all holders of complete sets of Documents.
- B. No Addenda will be issued less than two days prior to the Bid opening date. Neither the Owner nor Engineer shall be responsible for oral interpretations or instructions during the bidding period.
- C. All Addenda are incorporated by reference into the Contract. Failure of any Bidder or sub-bidder to receive any addenda shall not relieve the Bidder of any obligation with respect to the Bid.
- D. All Addenda and Modifications to the Contract Documents shall be inserted and indexed in this location behind this page.

END OF SECTION 00490

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**CONSTRUCTION CONTRACT
FOR
SRE BUILDING – BUILDING PACKAGE - CONSTRUCTION**

**BY AND BETWEEN
THE MEMPHIS-SHELBY COUNTY AIRPORT AUTHORITY
AND
CONTRACTOR**

MSCAA PROJECT NO. 23-1476-17-02

THIS CONSTRUCTION CONTRACT (hereinafter referred to as “Contract”) is made and entered into as of May 29, 2026, between MEMPHIS-SHELBY COUNTY AIRPORT AUTHORITY, a body politic and corporate under the laws of Tennessee (hereinafter referred to as “**Owner**” or “**Sponsor**”) doing business at 2491 Winchester Road, Suite 113, Memphis, Tennessee 38116-3856, and CONTRACTOR, a (STATE) (COMPANY TYPE) doing business at (ADDRESS), (hereinafter referred to as “**Contractor**,” “**Bidder**,” or “**Offeror**”). Owner and Contractor may sometimes be referred to herein individually as “Party” or collectively as “Parties.”

RECITALS

1. **WHEREAS**, the Owner desires to have constructed certain work in Memphis, Tennessee, more particularly described as SRE BUILDING – BUILDING PACKAGE - CONSTRUCTION, MSCAA Project No. 23-1476-17-02 (herein referred to as “the Project”); and

2. **WHEREAS**, the Contractor desires to enter into this Contract as an independent contractor and is ready, willing and able to construct the Project in accordance with the terms and subject to the conditions of this Contract; and

3. **WHEREAS**, the “Program Manager” is to act as the Owner’s representative, and the Owner will advise the Contractor in writing of the name of the Program Manager; and

4. **WHEREAS**, the “Engineer” is the Owner’s representative with responsibility for design of the technical specifications, and the Owner will advise the Contractor in writing of the name of the Engineer; and

NOW, THEREFORE, in consideration of good and valuable consideration, received or to be received, the sufficiency of which the Parties acknowledge, the Parties agree as follows:

ARTICLE 1

SCOPE OF THE WORK AND TERM OF AGREEMENT

Section 1.01. Scope of the Work. The general scope of the work is more particularly described in Exhibit A, which is attached hereto and incorporated herein by reference. Contractor agrees that the Project shall be constructed in accordance with the terms of this Contract and the “Contract Documents” as defined in Article 2 of this Contract. The term “Work” includes, but is not limited to, all labor, materials, supplies, tools, equipment and services necessary to construct the Project as described in the Contract Documents, whether or not all materials and equipment are incorporated or will be incorporated in the Project; and all Work deemed necessary to fully close the Project including demobilization.

Section 1.02. Term of Contract and Completion. The term of this Contract shall commence upon Owner’s issuance of the Notice to Proceed pursuant to Section 3.01 and shall continue until the Work is completed in accordance with the Contract Documents, unless earlier terminated by the provisions set forth in Section 23 of this Contract.

ARTICLE 2

CONTRACT DOCUMENTS

Section 2.01. Definition. The "Contract Documents" include this Contract, the Legal Notice, Instructions to Bidders, the Proposal, the Proposal Guaranty, the drawings and the specifications, the Federal Aviation Authority ("FAA") General Provisions ("GP"), all addenda, and exhibits or modifications to any of them, issued prior to or after execution of this Contract. The Contract Documents are more particularly described in Exhibit B, which is attached hereto and incorporated herein by reference. As used in this Contract, a "modification" is either:

- (a) a written and signed Contract Amendment to this Contract; or
- (b) an accepted Request for Proposal ("RFP"); or
- (c) an Engineer's Supplemental Instruction ("ESI"); or
- (d) a Construction Change Directive (as defined in Section 9.02(c) of this Contract).

Section 2.02. Intent of Contract Documents. The intent of the Contract Documents is to include all design, architecture and engineering, except as otherwise expressly provided in the Contract Documents, materials, appliances, labor and services of every kind necessary for the proper execution of the Work and the terms and conditions of payment for the Work. The Contract Documents are to be considered as one document, and whatever is called for by any one of the Contract Documents shall be as binding as if called for by all.

Section 2.03. Coordination of the Contract, Plans and Specifications. This Contract, the plans, specifications, and all referenced standards cited in the Contract Documents are essential parts of the Contract requirements. A requirement occurring in one of the Contract Documents is as binding as though occurring in all. They are intended to be complementary and used to describe and provide for a complete project. In case of dimensional discrepancies, calculated dimensions will govern over scaled dimensions. In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following priorities:

- (a) This Contract.
- (b) The Addenda, with those of later date having precedence over those of earlier date.
- (c) The Technical Specifications.
- (d) The Plans.
- (e) Cited standards for materials or testing and cited FAA General Provisions and advisory circulars.

Section 2.04. Errors in Contract Documents. Prior to commencing the Work, the Contractor shall review all of the Contract Documents for the purpose of identifying any error, inconsistency, omission, discrepancy or variance that may be contained therein. If the Contractor finds any error, inconsistency, omission, discrepancy or variance in the Contract Documents, it shall notify the Owner at least ten (10) days before beginning the affected portion of the Work. The Owner shall make any correction, interpretation or clarification promptly, basing its decision on the intent of the Contract Documents. Failure of the Contractor to timely notify the Owner of any such error, inconsistency, discrepancy or variance within the time provided by this paragraph shall bar the Contractor from making any claim for additional time or compensation caused by any such error, inconsistency, discrepancy or variance even if the error, inconsistency, discrepancy or variance caused the Contractor to incur additional expense or time of performance.

ARTICLE 3

PROGRESS OF THE WORK

Section 3.01. Commencement and Completion. The Contractor shall commence the Work upon receipt of the written Notice to Proceed, as defined in Section 01100 of the Technical Specifications, from the Owner and shall achieve substantial completion of the Work, as defined in Section 01100 of the Technical Specifications. The Contractor warrants that it will deliver the Project to the Owner free from any and all mechanics' liens or other encumbrances. Contractor further agrees to promptly (which is defined for purposes of this paragraph as no more than three (3) days from receipt of any lien or other notice) notify the Owner of the existence of any and all mechanics' liens filed by any subcontractors, materialmen, suppliers or sub-subcontractors. If any mechanics' liens are filed, Contractor shall, at its expense, bond off any such mechanics' liens within three (3) days from receipt of a written request of Owner to do so. Time is of the essence, and the substantial completion date may be altered only as provided in this Contract. Substantial completion shall occur when the Work is sufficiently complete in accordance with the Contract Documents, so the Owner can occupy or utilize the Work for its intended use, and when only minor punch list work remains to be done and a certificate of occupancy has been issued. The Owner will, upon written request of the Contractor, issue a certificate establishing the substantial completion date at any time after substantial completion has occurred.

Section 3.02. The Progress Schedule. Contractor shall fully comply with the requirements for scheduling the Work as set forth in Section 01100 and Section 01320 of the Technical Specifications. The Owner reserves the right to reschedule the Work, or the sequence of the activities of the Contractor, for no additional compensation should Owner deem such rescheduling to be in its best interest. At least fifteen (15) days prior to the due date of the first payment to be made hereunder by the Owner and thereafter on a monthly basis, the Contractor shall submit to the Owner a cash flow projection depicting the projected monthly cash flow for the entire Project.

Section 3.03. Extension of Substantial or Final Completion Date.

(a) Except as otherwise expressly provided herein, the "Substantial Completion Date" or "Final Completion Date" shall be extended only for such number of calendar days that the Work is actually delayed by a casualty, a fire, or a Contract Amendment (hereinafter referred to as "Excusable Delays"). No extensions to the Substantial Completion Date shall be granted due to the negligence or fault of the Contractor or its subcontractors, non-availability of materials or non-availability of labor. No extension to the Substantial Completion Date shall be granted for the period of time during a delay in the performance of the Work which is caused in part by the Owner or the Engineer, and in part by the Contractor or one for whom the Contractor is responsible ("Concurrent Delay"). A request for a time extension based upon inclement weather shall be governed by the provisions of Section 01320 (3.05) of the Technical Specifications.

(b) In order to obtain an extension of the Final Completion Date or the Substantial Completion Date due to an Excusable Delay, the Contractor in each instance shall give written notice to the Owner within seven (7) days after the occurrence of each Excusable Delay. If the Contractor fails to issue written notice to the Owner, its right to an extension, if any, will be deemed waived. The Owner shall render a written decision, which shall be made in good faith, granting or refusing the request of the Contractor for an extension within a reasonable time after receipt of the request for a time extension. If a Contract Amendment is agreed to by the Contractor and Owner, any extension of the Substantial Completion Date caused by the Contract Amendment work must be stated in the Contract Amendment. If no extension to the Substantial Completion Date is stated in the Contract Amendment, then the Contractor shall be barred from later seeking an extension to the Substantial Completion Date or Final Completion Date because of the Contract Amendment work. No extension to the Substantial Completion Date or the Final Completion Date shall be granted due to the aggregate number of Contract Amendments.

Section 3.04. No Damage for Delay. Contractor agrees to perform the Work and to require the subcontractors to perform the Work in a timely and proper method so as to meet the dates reflected on the progress schedule. In the event that the Contractor is delayed in the performance of the Work through no fault of the Contractor or its subcontractors, and for causes set forth in Section 3.03(a), and defined therein as Excusable Delay, then the Contractor may seek a time extension in accordance with the provisions of Section 3.03(b). Contractor agrees that such time extension is its sole and exclusive remedy for any damages regardless of the cause of such delays. Contractor also agrees that the Owner shall not be liable for any other monetary damages sustained by Contractor or its subcontractors for acceleration, disruption, inefficiencies, suspension or resequencing of the Work or any other damages related to the progress schedule regardless of the cause of such damages. The Owner shall not be liable for consequential damages of any nature for any reason at any time.

Section 3.05. Liquidated Damages. As set forth in Section 01100 of the Technical Specifications, liquidated damages will be assessed for the Project. The Contractor shall proceed with the Work at such rate of progress to ensure full completion by the Final Completion Date.

ARTICLE 4

PAYMENT

Section 4.01. Contract Price. The Owner and Contractor agree that the Contractor shall be paid the amount of **and 00/100 Dollars (\$0.00)** ("Contract Price"), as set forth in the Contractor's Proposal, for completion of the Work in accordance with the Contract Documents. The Contract Price shall include all profit and overhead, including without limitation field overhead, general conditions and home office overhead of the Contractor. The Contract Price also includes all allowances specified in the Contract Documents.

Section 4.02. Payment Procedures. As Work proceeds under the Contract, payments ("Progress Payments") shall be made by the Owner to the Contractor in accordance with the following procedure:

(a) By the 1st day of each calendar month during the performance of the Work, the Contractor shall submit to the Owner an Application and Certificate for Payment, based on the Work completed during the previous month ("previous month" being defined for this Section only as the second calendar day of the prior month through the first calendar day of the current month), using a form approved by the Owner. Contractor shall not be paid any amounts exceeding the Contract Price set forth in Section 4.01 of this Contract, unless modified by a properly executed written Contract Amendment in accordance with the provisions of Article 9 of this Contract.

(b) Each Application and Certificate for Payment shall be accompanied by: (1) lien waivers of the Contractor conditioned upon payment by the Owner of the amount sought in the Application; (2) other documentation as may be requested by the Owner for the proper review of the Application and Certificate for Payment; (3) a list of current subcontractors, sub-subcontractors and material suppliers; (4) the Business Diversity Monthly Compliance Reports; and (5) all documents required by the Owner Controlled Insurance Program ("OCIP") Manual, as applicable.

(c) The Owner or Engineer shall promptly review each Application and Certificate for Payment and recommend for approval such amount as is properly due under the Contract Documents.

(d) Payments by the Owner shall be made within thirty (30) days from the date on which an Application and Certificate for Payment has been submitted and approved by the Owner or the next working day if the thirtieth day is a Saturday, Sunday or holiday.

(e) When at least 95% of the work has been completed, no further Progress Payments will be made until Final Payment. See Section 4.08 for Final Payment requirements.

Section 4.03. Mobilization. The work which is conducted in preparation for the construction activities, which includes but is not limited to, movement of personnel, equipment, stockpiles, supplies to the project site, (all as more particularly described in Article 3.01 of Section 01100 of the Technical Specifications) shall be designated as "Mobilization." The Mobilization lump sum amount for this Contract shall be and 00/100 Dollars (\$0.00) which is a fixed amount that shall not change for the term of the Contract.

Section 4.04. Demobilization. The activities which are conducted by the Contractor in order to complete the work and conduct any closeout items, which includes but is not limited to, removal of personnel, equipment, Contractor owned stockpiles, supplies and incidentals from the project site, (all as more particularly described in Article 3.01 of Section 01100 of the Technical Specifications) shall be designated as "Demobilization."

Section 4.05. Payment for Material Stored On-Site.

(a) Payment for the actual unit cost of materials suitably stored on the site of the Work ("Work Site") and intended for incorporation in the Work will be made by the Owner to the Contractor subject to the provisions of Section 4.02 of this Contract, Section 90-07 of the FAA General Provisions, and the following conditions:

- (1) The Contractor shall furnish supporting evidence satisfactory to the Owner evidencing the cost of the materials and shipment to the work site.
- (2) The materials shall not be stored on the work site for more than ninety (90) calendar days before they are installed without the written consent of the Owner.
- (3) The materials shall be stored on the work site in accordance with applicable recommendations of the manufacturer and the instructions of the Owner.
- (4) A representative of the Owner or Engineer may inspect and inventory any stored materials.

(b) Payment will not be made for materials stored away from the work site without the written consent of Owner. In the event that the Owner consents to payment for materials stored off-site, such payment shall be conditioned upon submission by the Contractor of bills of sale or such other documentation satisfactory to the Owner to establish the title of the Owner to such materials or equipment, and the submission of satisfactory insurance certificates for the stored materials.

(c) Notwithstanding any provision herein to the contrary, if payments are to be made on account of materials or equipment not incorporated in the Work but delivered and suitably stored at the work site, such payments shall be conditioned upon submission by the Contractor of bills of sale or such other documentation satisfactory to the Owner to establish the title of the Owner to such materials or equipment, and the submission of satisfactory insurance certificates for the stored materials to protect the interest of the Owner.

(d) Regardless of ownership or insurance, the Contractor shall remain the guardian and protector of all materials and equipment stored or incorporated into the Work.

Section 4.06. Use of Payments. The Contractor shall use all sums paid to it pursuant to this Contract for the performance of the Work in accordance with the Contract Documents. Upon the request of the Owner or Engineer, the Contractor shall furnish satisfactory proof of payment, including, but not limited to, partial release of liens and the Business Diversity Monthly Compliance Report, as to the disposition of any monies paid to the Contractor by the Owner.

Section 4.07. Payment Not a Waiver. Neither the approval or making of any payment to the Contractor, nor the partial or entire use or occupancy of the Work by the Owner, shall be deemed an acceptance of any portion of the Work.

Section 4.08. Final Payment.

(a) "Final Payment," by the Owner shall constitute a waiver of all claims by the Owner for performance of the Work except for claims of the Owner arising from unsettled liens, incomplete or defective workmanship, defective materials, failure to perform in accordance with the progress schedule, or for the breach of any guarantees of warranties provided or to be provided by the Contractor under this Contract. Acceptance of the Final Payment by the Contractor shall constitute a waiver and release of any and all claims which the Contractor may then have or in the future have against the Owner or the Engineer arising from the Work or this Contract.

(b) Final Acceptance of the Work shall occur only after all Work (including punch list items) provided for in the Contract Documents has been finally completed and accepted in writing by the Owner, and only after the Contractor has provided the Owner with instructions and operating manuals, parts lists, "record" drawings and all other items required by the Contract Documents.

(c) Within thirty (30) days after "Final Acceptance" of the Work, the Final Payment of amounts found properly due under the Contract Documents shall be paid to the Contractor.

(d) Final Payment shall not become due until the Contractor submits to the Owner the following:

- (1) An affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or its property might in any way be responsible, have been paid or otherwise satisfied; and

- (2) A consent of surety to Final Payment; and
- (3) Other data establishing payment or satisfaction of all such obligations, such as receipts, releases and waivers of liens arising out of the Work, to the extent and in such form as may be designated by the Owner or Engineer; and
- (4) Any documents required by Article 6 of this Contract.

(e) The Owner shall issue a "Certificate of Final Completion" when, in its sole discretion, the Project has been completed and all conditions required by this Section 4.07 have been complied with by Contractor.

Section 4.09. The Right of Owner to Withhold Payment. The Owner may withhold or, on account of subsequent evidence, nullify, the whole or part of any Progress Payment, including the Final Payment, to such extent as may be necessary to reasonably protect itself from any of the following:

- (a) unacceptable work as further described in Section 50-10 of the FAA General Provisions; or
- (b) third-party claims filed or reasonable evidence indicating probable filing of such claims; or
- (c) reasonable doubt that the Work will be substantially completed by the Substantial Completion Date; or
- (d) failure of the Contractor to make payments properly to subcontractors or for equipment, materials, services or labor; or
- (e) reasonable evidence of fraud, over-billing or overpayment; or
- (f) failure of the Contractor to perform the Work in accordance with the Contract Documents; or
- (g) a reasonable doubt that the Work can be completed for the unpaid balance of the Contract Price; or
- (h) damage to the Owner, or to another contractor, subcontractor or sub-subcontractor caused by the Contractor; or
- (i) failure to provide certified payroll records; or
- (j) failure to provide any documents required by the Owner Controlled Insurance Program (OCIP); or
- (k) failure to keep the record drawings current each month in accordance with Article 6 of this Contract.

ARTICLE 5

EQUIPMENT AND MATERIALS

Section 5.01. Materials Provided by Contractor.

(a) Unless otherwise provided in the Contract Documents, the Contractor shall provide all equipment, materials, labor, services, water, and power to the Work Site, as well as all tools, equipment, lights, transportation, and other facilities necessary for the performance of the Work.

(b) All equipment, machinery, material, and articles incorporated in the Work shall be new and unused unless otherwise specified in the Contract Documents. When not specified in detail in the Contract Documents, the equipment, machinery, material, and articles incorporated in the Work shall be of the most suitable grade and quality for the purpose intended.

Section 5.02. Type of Equipment Used.

(a) When any equipment, machinery, material, or article is referred to by trade name, make, or catalog number followed by the words "or equal," the reference shall be regarded as establishing the minimum standard of quality and performance required and shall not be construed as limiting competition. The Contractor may, with the prior written approval of the Owner, use other equipment, machinery, materials, or articles which are at least equal in quality and performance to that named in the Contract Documents; provided, however, that in no event shall such approval be construed as a waiver of the right of the Owner to require equipment, machinery, materials, or articles which conform to the standard of quality and performance established by reference to the trade name, make, or catalog number of the equipment, machinery, materials, or articles for which the substitution has been approved. Any cost of redesign and additional expense resulting from the substitution shall be at the sole expense of the Contractor.

(b) The name of the manufacturer, model number, and other identifying information respecting the performance, capacity, nature, and rating of equipment, machinery, materials, and articles proposed in substitution of those specified in the Contract Documents shall be submitted to the Owner in sufficient time to avoid delays in the Work.

Section 5.03. Non-Conforming Materials.

(a) Equipment, machinery, materials or articles installed or used in the Work which do not comply with the requirements of the Contract Documents, and which have not been previously approved in writing by the Owner shall be installed or used at the risk of the Contractor of subsequent rejection by the Owner.

(b) The Contractor shall be fully and solely responsible for quality control for all equipment, machinery, materials or articles used in the performance of the Work.

Section 5.04. Owner Furnishing Equipment or Fixtures. The Owner may directly furnish any and all of the equipment or fixtures required for the Project. In the event the Owner elects to do so, the Contract Price shall be reduced by the amount which was to be charged by Contractor for such equipment or fixtures as set forth and included in the Contract Documents. A Contract Amendment reducing the Contract Price for that item of Work shall be executed by Owner and Contractor to reflect a reduction in the Contract Price for that item of Work and that the Owner is to furnish the equipment or fixtures. The Contractor shall assume responsibility for and be fully responsible for the care, custody, and control of all Owner furnished equipment or fixtures after said equipment or fixtures arrives on the Work Site or in any approved offsite storage facility, as set forth in Section 60-08 of the FAA's General Provisions.

ARTICLE 6

RECORD DRAWINGS AND DATA

Section 6.01. Record Drawings. A complete set of drawings shall be maintained by the Contractor at the Work Site for the purpose of accurately indicating all record conditions. The drawings shall be kept up-to-date and marked each day to show all changes and variations and each entry shall be dated and verified as made. At the completion of the Work and prior to Final Payment, a complete set of marked record drawings shall be furnished by the Contractor to the Owner. If the record drawings are not kept current each month, the Owner shall have no obligation to pay the Contractor until the record drawings are made current.

Section 6.02. Operation and Maintenance Data.

(a) The Contractor shall furnish complete and necessary data for the operation, repair, and maintenance of each operating component of the Work (hereinafter referred to as "the Data"). The Data shall include prints of shop drawings, "as-installed" conditions, sources of equipment and principal materials, specified tests and performance data, repair and maintenance data, lubrication instructions and recommendations, parts lists, and other catalog data or information required to operate and maintain any part of the Work. Care shall be taken to include all pertinent data and to exclude inapplicable or duplicative information.

(b) Prior to Final Payment, a set of Data shall be furnished to the Owner in an electronic PDF format. In addition, three (3) complete sets of the Data in a form directed by the Owner shall be provided to the Owner, indexed alphabetically

by components, grouped together and securely bound in a durable folder or binder that is labeled and indexed to show its contents.

(c) Installation information for all machinery and equipment also shall be kept on the site of the Work during construction, but used or marked prints or data sheets are not to be used in assembling the final maintenance and operating manuals described in paragraph (b) of this Section 6.02.

(d) Operations and maintenance demonstrations by the manufacturer of all machinery and equipment shall be complete in all respects and shall specify the appropriate and inappropriate uses of the machinery and equipment.

Section 6.03. Information from Suppliers. The Contractor shall make it a requirement or condition of purchase from its suppliers of equipment and/or materials: (1) to furnish complete and adequate operating and maintenance data pertaining to their equipment and/or materials; (2) to assign to the Owner any warranty, express or implied, furnished by the manufacturer of the equipment and/or materials; and, (3) to assign to the Owner any customary maintenance or repair service, spare parts supply service, or personnel support service furnished by the manufacturer of the equipment and/or materials. If the terms and conditions of any warranty, maintenance or repair service, spare parts supply service, or personnel support service furnished by manufacturer of the equipment and/or materials are negotiable, they shall be negotiated by the Owner and the manufacturer.

ARTICLE 7

SUBCONTRACTS

Section 7.01. Definition.

(a) As used in the Contract Documents, a “subcontractor” is a person or organization that has a contract with the Contractor to perform any portion of the Work or to furnish any equipment, labor or materials to the Project.

(b) As used in the Contract Documents, a “sub-subcontractor” is a person or organization that has a contract with a subcontractor to perform any portion of the Work or to furnish any equipment, labor or materials to the Project.

Section 7.02. No Contractual Relationship with Owner. Nothing contained in the Contract Documents or otherwise shall create any contractual relationship between the Owner and any subcontractor or sub-subcontractor, and no subcontract or sub-subcontract shall relieve the Contractor of its responsibilities and obligations should any subcontractor or sub-subcontractor fail to perform its work in a satisfactory manner. The Contractor agrees to be as fully responsible to the Owner for the acts and omissions of its subcontractors and their sub-subcontractors and of persons either directly or indirectly employed by them as it is for the acts and omissions of persons directly employed by Contractor.

Section 7.03. Award of Subcontracts.

(a) Unless the Owner gives its written approval to Contractor, the Contractor shall not enter into a subcontract or purchase order with any entity that is a party in any litigation, arbitration, or other dispute resolution proceeding with the Owner. The Contractor shall request written confirmation from any potential subcontractor or supplier prior to the execution of any subcontract or purchase order that there is no pending litigation, arbitration, or other dispute resolution proceeding where the Owner and the potential subcontractor or supplier are adverse parties. Such written confirmation shall be sent to the Owner within seven (7) days from the receipt of bids.

(b) If the Owner refuses to accept any subcontractor or material supplier (or sub-subcontractor) or person or organization because of such pending litigation, arbitration, or other dispute resolution proceeding, the Contractor shall submit an acceptable substitute at no additional cost to Owner.

Section 7.04. Change of Subcontractors. The Owner may require a change of any subcontractor. The Contract Price shall be adjusted accordingly due to the Owner's requiring a change of any subcontractor, sub-subcontractor, or material supplier previously approved in writing by the Owner, unless the change was required because the subcontractor, sub-subcontractor or material supplier was unable to timely or properly perform its work in accordance with the Contract Documents.

Section 7.05. No Substitution of Subcontractors. The Contractor shall not make any substitution for any subcontractor nor allow the substitution of any sub-subcontractor who has been accepted by the Owner, unless the substitution is required and previously approved by the Owner. Acceptable reasons for substitution (other than where required by the Owner) shall be limited to the following:

- (a) Inability of the subcontractor or sub-subcontractor to provide bonds, if required; or
- (b) Failure of the subcontractor or sub-subcontractor to perform according to approved schedules or other provisions of the Contract Documents; or
- (c) Other reasons which would reasonably render the subcontractor or sub-subcontractor unable to perform its work according to the Contract Documents as evidenced in writing by the Contractor.

Section 7.06. Subcontract Terms. All portions of the Work performed by a subcontractor or sub-subcontractor shall be pursuant to an appropriate agreement between the Contractor and the subcontractor (and where appropriate between subcontractors and sub-subcontractors) which shall contain provisions that:

- (a) Preserve and protect the rights of the Owner under the Contract Documents, including, but not limited to, the obligation to indemnify the Owner as set forth in Article 21 of this Contract with respect to the portion of the Work to be performed under the subcontract (or sub-subcontract) so that the subcontracting will not prejudice such rights; and
- (b) Require that such Work be performed in accordance with the requirements of the Contract Documents; and
- (c) Require submission to the Contractor of applications for payment under each subcontract to which the Contractor is a party; and
- (d) Require that all requests for additional compensation, extensions of time or otherwise with respect to subcontracted portions of the Work be submitted to the Contractor (via any subcontractor or sub-subcontractor where appropriate) in sufficient time so that the Contractor may comply in the manner provided in the Contract Documents for like requests by the Contractor upon the Owner; and
- (e) Name the Owner as an additional insured under all applicable insurance policies; and
- (f) Require compliance with the Small Business Participation Program requirements, including, but not limited to, the non-discrimination and prompt pay provisions.

Section 7.07. Subcontractor Relations Requirements. By appropriate written agreement, the Contractor shall require each subcontractor, to the extent of the Work to be performed by the subcontractor, to be bound by the obligations, terms and conditions of this Contract and the Contract Documents, and to assume toward the Contractor all the obligations, terms, conditions and responsibilities which the Contractor, by this Contract and the Contract Documents, assumes toward the Owner and the Engineer. Each subcontract agreement shall preserve and protect the rights of the Owner and the Engineer under this Contract and the Contract Documents with respect to the Work to be performed by the subcontractor so that subcontracting thereof will not prejudice the rights of the Owner or the Engineer. The Contractor shall require each subcontractor to enter into similar agreement with sub-subcontractors. The Contractor shall make available to each proposed subcontractor, prior to the execution of the subcontract agreement, copies of this Contract and the Contract Documents to which the subcontractor will be bound. Subcontracts shall similarly make copies of this Contract and the Contract Documents available to their respective proposed sub-subcontractors.

ARTICLE 8

PAYMENT TO SUBCONTRACTORS

Section 8.01. Payments to Subcontractors from the Contractor. The Contractor shall pay each subcontractor an amount equal to the percentage of completion allowed to the Contractor on account of the work of each subcontractor. The Contractor shall also require each subcontractor to make similar payments to its sub-subcontractors.

Section 8.02. Withholding of Payment by the Owner. If the Owner withholds monies for any cause which is the fault of the Contractor and/or the fault of a particular subcontractor, the Contractor shall pay all other subcontractors, in accordance with the terms of their applicable subcontract, if not in conflict with this Contract and applicable law, any time after the progress payment by the Owner should otherwise have been issued, for its Work to the extent completed. Notwithstanding this Section 8.02, Contractor may withhold funds from any subcontractor that is not performing its work in accordance with the Contract Documents.

Section 8.03. Independent Obligation to Pay. The obligation of the Contractor to pay its subcontractors (and their obligation to pay sub-subcontractors) is an independent obligation from the obligation of the Owner to make payment to the Contractor. The Owner shall have no obligation to pay or to see to the payment of any monies to any subcontractor or sub-subcontractor. The provisions of this Contract are solely intended for the benefit of the Owner and Contractor and not for any other person. Nothing in this Contract is intended to create any third party rights against the Owner.

Section 8.04. Payments to Sub-Subcontractors. This Contract is governed by federal prompt pay provisions where applicable and as set forth in Exhibit "E" to this Contract. To the extent that Tennessee statutes are not superseded by applicable federal statutes, Tennessee statutes also will apply. Contractor agrees to require each of its subcontractors (1) to pay their subcontractors for invoices submitted or normal progress payments for work completed satisfactorily pursuant to its contract with each subcontractor and (2) to make such payments to their respective subcontractors no later than fifteen (15) days after any such subcontractors receive payment from the prime contractor or their respective subcontractor, as applicable.

ARTICLE 9

CHANGES

Section 9.01. Changes in the Work.

(a) The Owner, without invalidating this Contract, may order extra work or make changes by altering, adding to or deducting from the Work by executing a Contract Amendment or a Construction Change Directive in a form provided by the Owner or Engineer. All Work performed pursuant to a valid Contract Amendment or a Construction Change Directive shall be performed under the conditions of this Contract and the Contract Documents.

(b) The Owner shall have authority to make changes in the Work not involving extra cost, not involving an extension to the Substantial Completion Date, and not inconsistent with the purposes of the Work, but otherwise, no extra Work or change in the Work shall be made unless pursuant to a Contract Amendment or a Construction Change Directive and no claim by Contractor for additional cost or fee or any extension of the Substantial Completion Date shall be valid unless so ordered in a written Contract Amendment or a Construction Change Directive.

(c) Engineer's Supplemental Instructions (ESI) are written instruments prepared by the Owner or Engineer to issue additional instructions or interpretations or to order changes in the Work not involving extra costs or fees, or any extension of the scheduled Substantial Completion Date. Contractor shall give prompt written notice to Owner if it believes that the contents of an ESI require the Contractor to incur extra costs or fees or affect the Substantial Completion Date.

Section 9.02. Construction Change Directive.

(a) A Construction Change Directive is a written order prepared by the Owner, Program Manager, or Engineer and signed by the Owner, Engineer or Program Manager directing a change in the Work and stating a proposed basis for adjustment, if any, in the Contract Price or the Substantial Completion Date, or both. The Owner may, by Construction

Change Directive, without invalidating this Contract, order changes in the Work consisting of additions, deletions or other revisions.

(b) A Construction Change Directive shall be used in the absence of an agreement on the terms of a Contract Amendment.

(c) If the Construction Change Directive provides for an adjustment to the Lump Sum Price, the adjustment shall be based on one of the following methods:

- (1) Mutual acceptance of a lump sum properly itemized and supported by sufficient documentation to permit evaluation; or
- (2) Unit prices stated in the Contract Documents or subsequently agreed upon; or
- (3) Cost to be determined in a manner agreed upon by the Parties and a mutually acceptable fixed or percentage fee; or
- (4) As provided in paragraph (f) of this Section 9.02.

(d) Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Owner of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Price or the Substantial Completion Date.

(e) A Construction Change Directive signed by the Contractor indicates the agreement of the Contractor therewith, including adjustment in the Contract Price, the Substantial Completion Date or the method of determining the adjustment. Such agreement shall be effective immediately and shall be recorded as a Contract Amendment.

(f) If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Price, the method and the adjustment shall be determined by the Owner on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Price, a reasonable allowance for overhead and profit. In such case, the Contractor shall keep and present, in such form as the Owner may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purpose of this paragraph shall be limited to the following:

- (1) The actual cost for labor, including social security and unemployment insurance, fringe benefits required by agreement, and workers' or workmen's compensation insurance; and/or
- (2) The actual cost of materials, supplies, machinery, and equipment, including cost of transportation, whether incorporated or consumed; and/or
- (3) The actual cost of subcontractors and sub-subcontractors; and/or
- (4) The actual cost of premiums for all bonds and insurance, permit fees and sales, use or similar taxes related to the Work; and/or
- (5) The actual additional costs of supervision and field office personnel, if any, directly attributable to the change.

(g) Pending final determination of cost to the Owner, amounts not in dispute may be included in Certificates and Applications for Payment. The amount of credit to be allowed by the Contractor to the Owner for a deletion or change which results in a net decrease in the Contract Price shall be actual net cost, as confirmed by the Owner. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be calculated on the basis of net increase, if any, with respect to that change.

Section 9.03. Contract Amendment Procedure. If the Owner desires extra Work or changes in the Work, the Owner shall submit a Request for Proposal ("RFP") to the Contractor. The Contractor shall furnish to the Owner a statement setting forth in detail the proposal of the Contractor for performing the extra Work or changes and the effect of the extra Work or changes, if any, in the Contract Price and the Substantial Completion Date attributable to the extra Work or changes set forth in the request of the Owner. If the Owner approves in writing the proposal of the Contractor, a Contract Amendment in the form provided by the Owner shall be executed by the Parties and the Contract Price and the Substantial Completion Date shall be adjusted accordingly. In preparing Lump Sum quotes in response to an RFP, the Contractor shall provide a cost breakdown to the Owner that provides sufficient detail for the Owner or Engineer to determine that the quoted costs are reasonable and allowable and to verify that markups are properly calculated according to the terms of this Contract.

Section 9.04. Changes in the Contract Price. Any increase or decrease in the Contract Price attributable to a Contract Amendment performed by the Contractor or any of its subcontractors shall be governed by the provisions of Section 90-05 of the FAA's General Provisions.

Section 9.05. Time and Materials. In the event that the Owner and the Contractor cannot agree on the amount or time extension, if any due, to the Contractor for a Contract Amendment, the Owner may, in writing, direct the Contractor to proceed with the performance of such Work. The Contractor agrees to comply with any such directive issued by the Owner. If any additional compensation is due to the Contractor as a result of a directive, it will be calculated pursuant to the provisions of Section 150-90 of the FAA General Provisions Addendum.

Section 9.06. Unconditional Obligation to Proceed. Notwithstanding anything herein to the contrary, the Contractor will proceed with the Work so as to complete the Work on or before the Substantial Completion Date even if it has a dispute with the Owner concerning a Construction Contract Amendment, a Construction Change Directive or any extension of time which is or could be due to the Contractor pursuant to a Contract Amendment, a Construction Change Directive or otherwise.

Section 9.07. Request for Additional Compensation. If for any reason the Contractor believes that additional compensation is due for work not clearly provided for in the Contract Documents, the Contractor shall provide written notice to the Owner at least three (3) days before beginning the work which is not clearly provided for in the Contract Documents. If such notification is not given, then the Contractor hereby agrees to waive any claim for such additional compensation. Such notice by the Contractor shall not in any way be construed as proving or substantiating the validity of the request for additional compensation. When the work, which is the basis for the Contractor's request for additional compensation, has been completed, the Contractor shall, within ten (10) calendar days, submit evidence of costs incurred by the Contractor and a narrative which provides the basis for the request for additional compensation.

ARTICLE 10

THE UNDERSTANDING OF THE CONTRACTOR

Section 10.01. Examination of Work Site. The Contractor acknowledges that it has, by careful examination, satisfied itself as to the nature and location of the Work, the conformation of the ground conditions, the character, quality and quantity of the materials, equipment, supplies, machinery, and facilities needed preliminary to and during the performance of the Work, the general and local conditions, and all other matters which can in any way affect the Work.

Section 10.02. Sufficiency of Contract Documents and Representations of Contractor.

(a) The Contractor acknowledges that the Contract Documents are sufficient to enable it to determine the cost of all of the Work and that the Work can be completed in accordance with the Contract Documents for the Contract Price.

(b) The Contractor acknowledges that any observed errors, discrepancies, omissions, ambiguities, or conflicts in the Contract Documents will be brought to the attention of the Owner, as set forth in Section 2.04 of this Contract, and in a timely manner in order to ensure substantial completion of the Work by the Substantial Completion Date. The Contractor shall be responsible for using its best efforts to discover and observe errors, discrepancies, omissions, ambiguities, or conflicts in the Contract Documents. In addition, the Contractor acknowledges that the Owner has not made nor shall it be deemed to have made any warranties, guarantees, or representations of any kind whatsoever regarding the sufficiency of the Contract Documents or any conditions relating to the Work.

(c) Contractor represents that it has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing underground use facilities at or contiguous to the Work Site and, subject to the provisions of Section 10.03 of this Contract, assumes responsibility for the accurate location of said underground use facilities. No additional examinations, investigations, explorations, tests, reports, studies or similar information or data in respect of said underground use facilities are or will be required by Contractor in order to perform and furnish the Work for the Contract Price and substantially complete the Work by the Substantial Completion Date. However, notwithstanding anything herein to the contrary, the Contractor may, at its sole expense after receiving written permission from the Owner, and subject to any limitations specified by the Owner or Engineer, conduct any additional testing it deems necessary.

Section 10.03. Differing Work Site Conditions. If conditions are encountered at the Work Site that are: (1) subsurface physical conditions, which differ materially from those indicated in the Contract Documents; or (2) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then notice by the observing Party shall be given to the other Party promptly before conditions are disturbed and in no event later than seven (7) days after the first observance of the conditions. The Owner or Engineer will promptly investigate such conditions and, if they differ materially and cause an increase or decrease in the Contractor's cost, or time required, for performance of any part of the Work; will recommend an equitable adjustment in the Contract Price or the Substantial Completion Date, or both. However, any equitable adjustment in the Contract Price shall not include additional general conditions costs. If the Owner determines that the conditions at the Work Site are not materially different from those indicated in the Contract Documents and that no change in the terms of this Contract is justified, the Owner shall so notify the Contractor in writing, stating the reasons. Claims by the Contractor in opposition to such determination must be made within fourteen (14) days after the Owner has given notice of the decision.

Section 10.04. No Oral Modification. No oral agreement or conversation with any officer, agent or employee of the Owner or its representatives, including the Engineer, either before or after the execution of this Contract, shall affect or modify any of the terms or obligations contained in this Contract or the Contract Documents.

ARTICLE 11

SUPERVISION OF THE WORK; SAFETY AND SECURITY

Section 11.01. The Superintendent of the Contractor. The Contractor shall designate in writing to the Owner and keep on the Project during its progress a competent employee who has responsibility to oversee the Work ("Superintendent"). The Superintendent shall be satisfactory to the Owner. The Superintendent shall be changed upon written request of the Owner but shall not be changed by the Contractor except with the consent of the Owner, unless the Superintendent ceases to be in its employ. The Superintendent shall represent the Contractor, and all directions given to him by the Owner shall be as binding as if given to the Contractor directly. The Superintendent shall devote his full time to the Work and shall maintain an office on the Work Site. The Superintendent shall direct, coordinate and supervise all Work, inspect all materials delivered to the Work Site to ascertain whether or not they comply with the requirements of the Contract Documents, and reject all non-conforming materials or workmanship.

Section 11.02. Order and Discipline. The Contractor shall at all times be responsible for enforcing strict discipline and good order among its employees, and all employees of its subcontractors and sub-subcontractors. If any person on the Work Site shall appear to be incompetent, disorderly or intemperate, in any way disrupts or interferes with the Work, or is in any other manner not qualified for or unfaithful to the job entrusted to him, such person shall be discharged from the Project immediately and shall not again be employed on the Work Site without the prior written consent of the Owner.

Section 11.03. Cleaning Up.

(a) During the performance of the Work, the Contractor shall keep the Work Site clean and free of all rubbish, waste materials, debris and other materials in accordance with the instructions set forth in the Contract Documents. At the end of each working day, the Contractor shall remove all waste materials, rubbish, debris, and other materials from and about the Work Site as well as all surplus materials, and shall leave the Work Site clean in accordance with the Contract Documents.

(b) The Contractor shall establish an active ongoing program to eliminate any foreign objects from the Work Site that may cause damage to aircraft or cause personal injury to other persons.

(c) The Contractor shall pay particular attention to haul routes used to and from the Work Site to prevent any construction debris from being dropped or tracked that may present a hazard.

(d) The Contractor, upon written notice from the Owner, shall promptly cut the grass and clean debris around the Work Site. If the Contractor fails to clean up any debris which is deposited as a result of construction operations, the Owner will, after notice, immediately do so. The cost thereof will be charged to the Contractor at actual cost per hour, but not less than the minimum rate of Two Hundred Fifty Dollars (\$250.00) per hour. The Contractor shall assume full responsibility for failure to perform cleanup operations required by this Section 11.03.

(e) All materials delivered to the Work Site shall be stored and handled so as to preclude inclusion of any foreign substances, and to prevent any discoloration or damage which might reduce its effectiveness as part of the Work.

Section 11.04. Safety and Security.

(a) The Contractor shall be solely responsible for and oversee all safety orders, precautions and programs necessary for the safety of the Work. The Contractor shall take the precautions set forth in the Contract Documents in order to ensure the safety of all persons involved in the Work, all other persons whom the Work might affect, all equipment and materials incorporated in the Work, all property on the Work Site and adjacent to it, and the Owner's business operations which are functioning on the Work Site or in the vicinity of it.

(b) The Contractor shall keep an accurate record of all persons who are on the Work Site and shall provide a copy of such list to the Owner with each monthly Application and Certificate for Payment. The Contractor, its subcontractors, their sub-subcontractors and all employees of same, shall comply with all security rules made by the Owner and the Federal Aviation Administration. In addition, Contractor shall comply with the construction safety and health guidelines which are set forth in Exhibit D.

(c) The Contractor shall conform to Owner's rules and regulations for airport operations.

(d) Prior to the commencement of the Work, the Contractor shall provide to the Owner a list of all of its employees who will perform any portion of the Work.

Section 11.05. Observation of the Work.

(a) The Engineer, the Owner and persons designated by the Owner, shall at all times have access to the Work Site whenever it is in preparation or progress and the Contractor shall provide proper facilities for such access and for observation. If the Owner or the Engineer discovers any defective Work in connection with any observation, it shall be reported to the Contractor in writing and the Contractor shall correct it.

(b) If the Contract Documents, the written instructions of the Owner, laws, ordinances, rules or regulations, or any public authority require any of the Work to be specifically tested or inspected, the Contractor shall give the Owner timely notice of its readiness for inspection and testing, and of the date set for such test or inspection. Inspections by the Owner or Engineer shall be promptly made. If any of the Work should be covered up without the approval or consent of the Owner, the Engineer or any public authority, it shall be uncovered for examination, if required by the Owner, the Engineer, or such other public authority, at the sole expense of the Contractor.

(c) Re-examination of questioned Work that has been previously tested or inspected by the Engineer or the Owner may be ordered by the Engineer or the Owner and, if so ordered, the questioned Work shall be uncovered by the Contractor. If such Work is found to be in compliance with the Contract Documents, the Owner shall pay the actual cost of the re-examination. If such Work is found not to be in compliance with the Contract Documents, the Contractor shall bear the costs of the re-examination.

(d) The Contractor shall not be required to provide professional services which constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless

the Contractor needs to provide such services in order to fulfill the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, then the Contractor shall promptly and at its expense secure such services. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, shop drawings and other submittals prepared by such professional. Shop drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Owner or Engineer. The Owner and the Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals.

ARTICLE 12

PERMITS, LICENSES, LAWS AND REGULATIONS

Section 12.01. Contractor to Secure All Permits. The Contractor shall secure and pay for all construction related permits, including the building permit. The Contractor shall be responsible for all inspections required by governmental authorities in conjunction with the issuance of said permits. Contractor shall secure and pay for all governmental fees, licenses and other permits necessary for the lawful and proper execution and completion of the Work.

Section 12.02. Compliance with Laws. The Contractor shall give all notices and shall comply with all laws, ordinances, rules, regulations and orders of any public authority having jurisdiction over the Work, which have any bearing on the execution of the Work. If the Contractor observes that any of the Contract Documents are at variance in any respect with any such laws, ordinances, rules, regulations and orders, it shall promptly notify the Owner and the Engineer in writing and any necessary changes shall be made by the Contractor. If the Contractor fails to give such notice or executes any of the Work in a manner contrary to any such laws, ordinances, rules, regulations or orders, the Contractor shall bear all resulting costs to correct said Work to comply with such laws and regulations and be liable for any resulting fines, penalties, judgments or damages imposed on or incurred by the Owner.

ARTICLE 13

TAXES AND OTHER FEES AND COSTS

Section 13.01. Payment of Taxes by Contractor.

(a) Any and all taxes, excises, duties and assessments in any manner levied, assessed or imposed by any government or subdivision or agency having jurisdiction over the Work shall be the sole responsibility and liability of the Contractor.

(b) The Contractor shall promptly pay and discharge when due, unless the validity or application is being contested by the Contractor in good faith, any and all taxes, excises, duties and assessments, together with any interest and penalties, if any, the responsibility and liability for which the Contractor has assumed pursuant to the provisions of paragraph (a) of this Section 13.01, unless any such tax, excise, duty or assessment is levied, assessed or imposed upon the Owner, in which case the Owner shall promptly give the Contractor notice of such levy, assessment or imposition, whereupon the Contractor shall promptly pay and discharge the same. Upon the written request and at the sole expense of the Contractor, the Owner shall assist the Contractor in contesting the validity or application of any such levy, assessment or imposition, and in the event a refund of all or any part of any tax, excise, duty or assessment (including interest and penalties, if any), said refund shall be refunded to the Contractor (less the amount of expenses associated with such contest not previously reimbursed by the Contractor to the Owner).

(c) The Contractor shall pay all applicable fees, and for all damage to sidewalks, streets, Owner's property, and other public property or to any public utilities caused by the performance of this Contract.

Section 13.02. Damage to Owner Property. Contractor agrees to promptly notify Owner of any damage caused to Airport property arising from Contractor's activities at the Airport. Contractor also agrees to comply with any request

made by the Owner for reimbursement of costs associated with any damage to Airport property arising from work performed at the Airport by Contractor or any of Contractor's representatives, managers, employees, agents, contractors, subcontractors, licensees or invitees or from the conduct of same. This provision shall survive the termination of this Contract.

ARTICLE 14

SHOP DRAWINGS AND SAMPLES; MATERIAL TESTING

Section 14.01. Definitions.

(a) As used in this Contract, "shop drawings" are drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are prepared by the Contractor, any subcontractor, sub-subcontractor, manufacturer, supplier or distributor, and which illustrates some portion of the Work.

(b) As used in this Contract, "samples" are physical examples furnished by the Contractor to illustrate materials, equipment or workmanship.

Section 14.02. Submissions.

(a) Contractor shall submit to Owner all shop drawings in electronic format or as hard copies in accordance with the Technical Specifications. Contractor shall review, stamp with its approval and submit, in orderly sequence so as to cause no delay in the Work or the work of any other contractor, all shop drawings and samples required by the Contract Documents or subsequently by the Owner or Engineer. Shop drawings and samples shall be properly identified as specified in the Contract Documents or as the Engineer or Owner may require. At the time of submission, the Contractor shall inform the Engineer and the Owner by separate written correspondence of any deviation in the shop drawings or samples from the requirements of the Contract Documents.

(b) By approving and submitting shop drawings and samples, the Contractor represents that it has determined and verified all field measurements, field construction criteria, materials, catalogue numbers and other data, and that it has checked and coordinated each shop drawing and sample with the requirements of the Work and the Contract Documents.

Section 14.03. Review of the Engineer.

(a) The Engineer will review and act upon shop drawings and samples with reasonable promptness so as to cause no unreasonable delay in the Work, but only for conformance with the design concept of the Work and with the information given in the Contract Documents. The review of the Engineer or its agents of a given item shall not indicate approval of an assembly in which the item functions.

(b) The approval of the Engineer of shop drawings or samples shall not relieve the Contractor of its responsibility for any deviation from the requirements of the Contract Documents unless the Contractor has informed the Engineer and the Owner by separate written letter of such deviation at the time of submission and the Owner or Engineer has given written approval of the specific deviation, nor shall the approval of the Engineer relieve the Contractor from responsibility for errors or omissions in the shop drawings or samples.

Section 14.04. Corrections Made by Contractor. The Contractor shall make any corrections required by the Owner or Engineer and shall submit the required number of corrected copies of shop drawing or new samples until approved by Owner. The Contractor shall direct specific attention in writing or on resubmitted shop drawings or samples to revisions other than the corrections requested by the Engineer or the Owner on previous submissions.

Section 14.05. Prior Approval Required. No portion of the Work requiring a shop drawing or sample submission shall be commenced until the submission has been approved by the Owner or Engineer. All such portions of the Work shall be performed in accordance with approved shop drawings and samples and the Contract Documents.

Section 14.06. Submittal Schedule. Within seven (7) days after execution of this Contract, the Contractor shall provide the Owner and the Engineer with a preliminary submittal schedule of the dates that each shop drawing or sample

will be submitted for approval. Within thirty (30) days after execution of this Contract, the Contractor shall provide the Engineer and the Owner with a final schedule of the dates that each shop drawing or sample will be submitted for approval. The sequence of the submittals of the Contractor shall be scheduled so as to permit an orderly review by the Engineer. The schedule shall allow reasonable added time according to the number or complexity of shop drawings or samples in each submittal for the checking, correction and rechecking of corrections, as well as for return of approved or rejected shop drawings and samples to the Contractor. The submittal schedules shall allow not less than fourteen (14) calendar days for the Engineer to review any shop drawing or sample.

Section 14.07. Material Testing.

(a) If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any portion of the Work to be inspected, tested or approved, the Contractor shall give the Owner timely notice of its readiness so the Owner or Engineer may observe such inspection, testing or approval. The Contractor shall bear all costs of such inspections, tests or approvals required by public authorities. Unless otherwise provided, the Owner shall bear all costs of other inspection, tests or approvals.

(b) If the Owner or Engineer determines that any Work requires special inspection, testing or approval which paragraph (a) of this Section 14.07 does not include, the Owner or Engineer will instruct the Contractor to order such special inspection, testing or approval, and the Contractor shall give notice as provided in paragraph (a) of this Section 14.07. If such special inspection or testing reveals a failure of the Work to comply with the requirements of the Contract Documents, the Contractor shall bear all costs thereof, including compensation for the Owner's or Engineer's additional services made necessary by such failure; otherwise, the Owner shall bear such costs and an appropriate Contract Amendment shall be issued.

(c) Required certificates of inspection, testing or approval shall be secured by the Contractor and promptly delivered to the Owner.

(d) If the Owner or Engineer is to observe the inspections, tests or approvals required by the Contract Documents, they will do so promptly.

ARTICLE 15

THE RIGHT OF THE OWNER TO INSPECT AND AUDIT

Section 15.01. Right to Audit. The Contractor shall keep full and accurate records of all costs incurred and items billed in connection with any Work which records shall be open to audit by the Owner, or any authorized representative of the Owner, including but not limited to the Federal Aviation Administration and the Comptroller General of the United States during the course of the Project and until four (4) years after the final payment by the Owner to the Contractor. In addition, the Contractor shall make it a condition of all subcontracts and sub-subcontracts entered into in furtherance of the Work that any and all subcontractors and sub-subcontractors will keep accurate records of costs incurred and items billed in connection with the subcontract (or sub-subcontract) and that such records shall be open to audit by the Owner, or any authorized representative of the Owner, including but not limited to the Federal Aviation Administration and the Comptroller General of the United States during the course of the Work and until four (4) years after final payment by the Owner to the Contractor.

Section 15.02. Review of Subcontracts. Upon request of the Owner or Engineer, the Contractor shall provide the Owner with an executed copy of all subcontracts, sub-subcontracts and purchase orders entered into in furtherance of the Work.

ARTICLE 16

SEPARATE CONTRACTS

Section 16.01. The Right of the Owner to Award Separate Contracts. The Owner reserves the right to award other contracts in connection with work at or in the vicinity of the Work and the Contractor agrees to cooperate fully and not to unreasonably interfere with the work of such other contractors.

Section 16.02. Cooperation. The Contractor shall afford the other contractors of Owner the opportunity for the introduction and storage of their materials and equipment to their work sites and for the execution of their work. The Contractor shall properly connect and coordinate the Work with work of any other contractors of the Owner.

Section 16.03. Inspection of Work of Other Contractors. If any part of the Work depends, for proper execution or result upon, the work of another contractor of Owner, the Contractor shall inspect and promptly report to the Engineer and the Owner any discrepancies or defects in such work that render it unsuitable for such proper execution or results. Failure of the Contractor to so inspect and report shall constitute an acceptance of the Work of the other contractor as fit and proper to receive the Work.

Section 16.04. Responsibility for Damage. Should the Contractor cause damage to the work or property of any other contractor of the Owner, including, but not limited to, delay, disruption, suspension of work and/or acceleration damages, the Contractor shall settle all claims with such other contractor if the other contractor will so settle. If such other contractor sues the Owner on account of any damage alleged to have been so sustained, the Owner shall notify the Contractor who shall defend such proceedings at the expense of the Contractor, or provide counsel of Owner's choice for Owner at the expense of Contractor, and if any judgment or award against the Owner results, the Contractor shall pay or satisfy it and shall reimburse the Owner for all attorney's fees and other litigation costs which the Owner has incurred.

ARTICLE 17

WARRANTIES OF THE CONTRACTOR

Section 17.01. Warranty of Title. The Contractor warrants and guarantees that title to all Work, materials and equipment covered by an Application and Certificate for Payment, whether incorporated in the Work or not, will pass to the Owner, free and clear of all liens, claims, security interests or encumbrances (hereinafter "Liens") and that none of the Work, materials or equipment covered by an Application and Certificate for Payment will have been acquired by the Contractor, or by any other person performing any part of the Work or furnishing materials and equipment for the Work, subject to an agreement under which a lien is retained by the seller or supplier.

Section 17.02. Special Warranties. When special guarantees or warranties are required by the Contract Documents for specific parts of the Work, the Contractor shall procure certified copies of such guarantees or warranties, countersign them and submit them to the Owner in triplicate. Delivery of such guarantees or warranties will not relieve the Contractor from any obligations assumed under any provision of this Contract or the Contract Documents.

Section 17.03. Assignment of Warranties. The Contractor hereby assigns to the Owner any and all existing assignable warranties, service life policies and patent indemnities of manufacturers of materials, equipment or items incorporated in the Work. Upon the request of the Owner or the Engineer, the Contractor shall give the Owner assistance in enforcing the rights of the Owner arising under such warranties, service life policies and patent indemnities. At the request of the Owner or the Engineer, the Contractor shall give notice (with copies to the Owner) to any such manufacturers of the assignment of such warranties, service life policies and patent indemnities.

Section 17.04. General Warranty and Correction of Work.

(a) In addition to any special guarantees or warranties contained in the Contract Documents, the Contractor warrants to the Owner that all materials and equipment furnished in performance of the Work will be new unless otherwise specified, and that all Work will be of good quality, free from faults and defects and in conformance with the Contract Documents. All work not so conforming to these standards shall be considered defective.

(b) The Contractor shall promptly correct all defective Work to comply with the Contract Documents whether observed before or after the substantial completion date and whether or not fabricated, installed or completed. The Contractor shall bear all costs of correcting defective Work.

(c) If, within one (1) year after the substantial completion date, or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee or warranty required by the Contract Documents, any

of the Work is found to be defective and not in accordance with the Contract Documents, the Contractor shall correct it promptly after receipt of a written notice from the Owner, or the Engineer, to do so.

(d) All defective or non-conforming Work shall be removed from the site of the Work if necessary, and the Work shall be corrected to comply with the Contract Documents without cost to the Owner. The Contractor also shall bear the cost of making good all work of other contractors destroyed or damaged by removal or correction of the defective Work of Contractor.

(e) If the Contractor fails to timely and properly correct defective Work, the Owner may correct it and hold the Contractor liable for all costs, expenses and damages, including attorney's fees and litigation costs incurred by Owner in correcting it.

(f) In addition to the foregoing warranty, a warranty period of one (1) year shall apply under the same terms and conditions as the original warranty, to any work, supplied in correction of defective work under warranty pursuant to the provisions of this Section 17.04 and the Contractor shall assign to the Owner any warranties, including extended warranties, which are available in connection with the performance of such correction of defective Work. The warranty period shall commence on the date the Owner accepts the corrective Work of the Contractor.

ARTICLE 18

RIGHT OF THE OWNER TO DO WORK

Section 18.01. Right of the Owner to do Work. If the Contractor should neglect to perform the Work properly or fails to do anything required by the Contract Documents, and the Contractor does not correct the untimely or improper performance within seven (7) days after written demand is made, the Owner may, without prejudice to any other remedy it may have under this Contract or at law or in equity, make good any deficiencies in the Work, including, but not limited to, supplementing the workforces of the Contractor and deduct all costs of doing so from the payment then due or thereafter due the Contractor. The Owner shall not be required to give multiple notices to the Contractor in order to exercise its rights under this paragraph.

Section 18.02. Deduction for Uncorrected Work. If the Owner deems it inexpedient to correct deficiencies in the Work pursuant to Section 18.01 of this Contract, the Owner may deduct the reasonable cost of correcting the deficiencies, including any attorney's fees and additional fees and expenses of the Engineer, from the payment then due or thereafter due to the Contractor, but the making of such a deduction shall in no way be deemed an election of remedies by the Owner.

Section 18.03. Correction of Work before Final Payment.

(a) The Contractor shall promptly remove from the Work Site all materials, equipment or other items rejected by the Engineer or the Owner as failing to conform to the Contract Documents, whether incorporated in the Work or not, and the Contractor shall promptly replace and re-execute its original work to comply with the Contract Documents without expense to the Owner. In addition, the Contractor shall bear the expense of making good all work of other contractors destroyed or damaged by such removal or replacement.

(b) If the Contractor does not remove rejected material, equipment or other items within a reasonable time (as fixed by written notice from the Owner, or the Engineer), the Engineer or the Owner may remove such items and store them at the expense of the Contractor, or dispose of such material, equipment or other items at the sole discretion of the Owner. If the Contractor does not pay the expense of such removal or storage within ten (10) days, the Owner may, upon ten (10) days written notice, sell such items at auction or at private sale and shall account for the net proceeds of such sale, after deducting all the costs and expenses of removal that should have been borne by the Contractor.

ARTICLE 19

INSURANCE

Section 19.01. Insurance Requirements. The Contractor shall fully comply with all requirements relating to insurance for the Project as set forth in this Article 19.

Section 19.02. Owner Controlled Insurance Program. The Owner has established an Owner Controlled Insurance Program (OCIP). To the extent required by the Owner, Contractor shall fully participate in and comply with all requirements of the OCIP. A copy of the OCIP Manual is attached hereto as Exhibit C and incorporated herein by reference. However, if the OCIP is not used, Contractor agrees to meet the requirements for Insurance coverage referenced in Section 19.03. A copy of the Construction Safety and Health Guidelines is attached hereto as Exhibit D and incorporated herein by reference.

Section 19.03. Contractor Provided Insurance Coverage. During the Term of this Contract, Contractor shall comply with the insurance requirements set forth in Exhibit C ("Insurance Requirements").

Section 19.04. Survival. The insurance provisions of this Article 19 shall survive any termination of this Contract.

ARTICLE 20

SURETY BONDS

Section 20.01. Surety Bonds Required. The Contractor shall furnish and keep in force throughout the performance of the Work a separate performance bond and separate labor and material payment bond, each in the amount of the total of the Contract Price (as the same may be modified from time to time) conditioned upon the faithful performance of the Work by the Contractor and payment of all obligations arising in connection with the Work by the Contractor. The bonds shall also guarantee to the Owner that the Work shall be free of all liens. The bonds shall name the Owner as obligee and shall be in such form and with such sureties as the Owner may approve prior to commencement of the Work.

ARTICLE 21

INDEMNIFICATION

Section 21.01. Indemnification of the Contractor.

(a) Without limiting any insurance required herein and to the fullest extent permitted by law, Contractor, on behalf of itself, its subcontractors, their agents, their employees or any entity or person for which the Contractor is or may be responsible (hereinafter collectively referred to as "Indemnitors"), shall fully defend, indemnify, save and hold the Owner, the Board of Commissioners of the Owner, the Program Manager, the Engineer, their agents, employees, officers, directors, partners and related entities (hereinafter collectively referred to as "Indemnitees") harmless from and against all liability, damages, loss, claims, demands, actions and expenses of any nature whatsoever, including, but not limited to reasonable attorney's fees which arise out or are connected with: (1) any negligent act, error or omission by any Indemnitor, or (2) the failure of the Indemnitor to comply with any applicable laws, statutes, ordinances, rules or regulations of any governmental or quasi-governmental authority, or (3) the material breach of any term or condition of this Contract by any of the Indemnitors.

(b) Without limiting the generality of the foregoing, the indemnity set forth in this Article 21 shall include all liability, damages, loss, claims, demands and actions on account of personal injury, death or property loss to any third party, any Indemnitees, any of the Indemnitees' employees, agents, licensees or invitees relating to the Project and which results from the negligent act, error or omission of Contractor.

(c) When the Contractor is obligated to provide the Owner a defense hereunder, it shall do so with qualified counsel that is selected by the Contractor and approved by the Owner. Such approval shall not be unreasonably withheld. In light of the Owner and Contractor's continuing relationship, however, the potential for conflicts of interests exists if the same counsel represents both the Owner and Contractor when the Contractor accepts the Owner's tender of defense

under the indemnity provision of this Contract. Therefore, the Owner retains the right to select its own counsel from a list of qualified attorneys provided by Contractor or Contractor's insurer. The selected counsel's fees and expenses shall be paid for by Contractor or its insurer, and the counsel shall be different from that selected by Contractor to represent it in the same matter.

(d) The indemnity set forth in this Article 21 shall survive any termination of this Contract.

Section 21.02. Labor Indemnity. The Contractor shall indemnify, defend and hold harmless the Owner, the Board of Commissioners of the Owner, the Program Manager, and the Engineer, their agents, employees, officers, directors, partners and related entities, from any and all administrative and judicial actions (including reasonable attorney's fees related to any such action), incurred by the Owner, the Program Manager, or the Engineer in connection with any labor related activity arising from the wrongful acts or omissions of the Contractor or its subcontractors in the performance of the Work of the Contractor. As used in this Contract, "labor related activity" includes, but is not limited to, strikes, walk-outs, informational or organizational picketing, use of placards, or distribution of hand-outs or leaflets at or in the vicinity of any facility where the Owner conducts business. The Owner shall advise the Contractor if any labor related activity occurs and the Contractor shall arrange for the legal representation necessary to protect the Owner, the Program Manager, and the Engineer provided such representation is previously approved by Owner.

Section 21.03. Royalties and Patents. The Contractor shall pay all royalties and license fees in anyway relating to the Work, shall defend all suits or claims for infringement of any patent or copyrights, and shall indemnify and hold the Owner, the Board of Commissioners of the Owner, their agents, officers, directors, partners and related entities, harmless from loss on account of such suit or claim.

Section 21.04. Attorney's Fees. In the event it becomes necessary for Owner to employ an attorney to enforce any provision of this Contract or to defend against any claim or litigation initiated by the Contractor, then the Contractor shall be liable for all attorney's fees and litigation expenses of Owner.

ARTICLE 22

RIGHT TO OCCUPY BY OWNER

Section 22.01. Early Occupancy by Owner. The Owner has the right to occupy or use ahead of schedule, at no additional cost nor obligation to Owner, all or any substantially completed or partially completed portion of the Work when such occupancy and use are in its best interest, notwithstanding the time of completion for all of the Work. Maintenance of occupied portion will remain the Contractor's responsibility.

Section 22.02. Corrections after Occupancy. After the Owner has taken occupancy of all or any portion of the Work, the Contractor shall not disrupt the use and occupancy of the Owner to make corrections in the Work.

ARTICLE 23

DEFAULT: RIGHT TO TERMINATE BY OWNER

Section 23.01. Breach of Contract Terms. (Required by FAA) 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. Owner reserves the right to withhold payments to 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. Owner may proceed with termination of the contract if the Contractor fails to correct the breach by 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.

Section 23.02. Default and Termination by Owner. (Required by FAA)

(a) The Contractor shall be considered in default of his or her 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:

- (1) Fails to begin the Work under the Contract within the time specified in the Notice to Proceed, or
- (2) 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
- (3) 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
- (4) Discontinues the execution of the Work, or
- (5) Fails to resume Work which has been discontinued within a reasonable time after notice to do so, or
- (6) Becomes insolvent or is declared bankrupt, or commits any act of bankruptcy or insolvency, or
- (7) Allows any final judgment to stand against the Contractor unsatisfied for a period of 10 days, or
- (8) Makes an assignment for the benefit of creditors, or
- (9) For any other cause whatsoever, fails to carry on the Work in an acceptable manner.

Should the Engineer consider the Contractor in default of the Contract for any reason above, the Engineer 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..

(b) 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 Engineer 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 Engineer will be required for the completion of said Contract in an acceptable manner.

(c) 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.

Section 23.03. Termination for Convenience by Owner. (Required by FAA) The Owner may terminate this Contract without cause at any time by providing fifteen (15) days prior written notice to Contractor. 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 due 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; and

- (f) Take action as directed by the Owner to protect and preserve property and work related to this Contract that Owner will take possession.

Owner agrees to pay Contractor for:

- (1) Completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination;
- (2) 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;
- (3) Reasonable and substantiated claims, costs and damages incurred in settlement of terminated contracts with Subcontractors and Suppliers; and
- (4) 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 revenue 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.

Section 23.04. Suspension by the Owner.

(a) The Owner may order the Contractor in writing to suspend, delay, or interrupt the Work in whole or in part for such period of time as the Owner may determine (hereinafter referred to as "Suspension").

(b) Provided the Suspension lasts for more than ninety (90) days, an adjustment to the Contract Price ("Adjustment") shall be made as set forth in paragraph (c) of this Section 23.02. The Substantial Completion Date shall be extended by written Contract Amendment to the extent that substantial completion is actually delayed by this Suspension. No Adjustment shall be made to the extent:

- (1) That performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is in full or in part responsible; or
- (2) That an equitable adjustment is made or denied under another provision of this Contract.

(c) The amount of the Contractor's compensation for a Suspension pursuant to this Section 23.02 shall be limited to any properly documented costs of maintaining personnel and equipment in the field provided such costs are pre-approved by the Owner in writing. The Owner shall not be liable at any time for home office overhead or consequential damages. At the Owner's option, the Contractor may be ordered to demobilize its forces because the Project is suspended. In such event, the Owner will reimburse the Contractor for the reasonable cost of demobilization and remobilization.

Section 23.05. Assignment of Subcontracts. In the event of termination by the Owner pursuant to this Article 23 or Exhibit E to this Contract, the Owner may require the Contractor to promptly assign to it all or some of the subcontracts, materials, tools, and equipment to be installed under this Contract, or rental agreements, and any other commitments which the Owner, in its sole discretion, chooses to take by assignment. In such event, the Contractor shall promptly execute and deliver to the Owner written assignments of such commitments.

ARTICLE 24

HAZARDOUS MATERIALS

Section 24.01. Hazardous Materials Covenants.

(a) Contractor hereby represents and warrants to and for the benefit of Owner that the Project or Work Site will not be used or operated in any manner that will result in the storage, use, treatment, manufacture or disposal of any Hazardous Materials (hereinafter defined) upon the Project or Work Site or any portion thereof or which will result in Hazardous Materials Contamination (hereinafter defined). For purposes of this Article 24, the term "Hazardous Materials" shall mean and refer to: (1) any "hazardous waste" as defined by the Resource Conservation and Recovery Act of 1976 (42 U.S.C. § 6901 *et seq.*), as amended from time to time, and regulations promulgated thereunder; (2) any "hazardous substance" as defined by the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (42 U.S.C. § 9601 *et seq.*) ("CERCLA"), as amended from time to time, and regulations promulgated thereunder; (3) asbestos; (4) polychlorinated biphenyls; (5) urea formaldehyde; (6) any substance the presence of which on the premises is prohibited by any applicable environmental laws or regulations ("Laws") or by any other legal requirements affecting the Project or the Work Site; (7) petroleum based materials (with the exception of tires affixed to vehicles); and, (8) any other substance which is defined as hazardous, toxic, infectious or radioactive by any Laws or by any other legal requirements affecting the Project or Project site. For purposes of this Article 24, the term "Hazardous Materials Contamination" shall mean and refer to the contamination of the Project or Project site, soil, surface water, ground water, air, or other elements on, or of, the buildings, facilities, soil, surface water, ground water, air, or other elements on or of any other property as a result of Hazardous Materials at any time emanating from the Project or Work Site.

(b) In addition to and without limiting the generality of any other provision of this Contract, Contractor shall and hereby does indemnify and hold Owner, the Board of Commissioners of the Owner, the Program Manager, the Engineer, their agents, employees, officers, directors, partners and related entities harmless from and against any and all losses, damages, expenses, fees, claims, demands, causes of action, judgments, costs and liabilities, including, but not limited to, attorney's fees and costs of litigation, and costs and expenses of response, remedial and corrective work and other cleanup activities, arising out of or in any manner connected with: (1) the "release" or "threatened release" (as those terms are defined in CERCLA and the rules and regulations promulgated thereunder, as from time to time amended) by Contractor or Contractor's employees, agents, delegees, invitees, licensees, concessionaires, subcontractors or representatives, of any Hazardous Materials; or (2) any occurrence of Hazardous Materials Contamination affecting the Project or Work Site caused by or resulting from, in whole or in part, the operations of the Contractor or Contractor's employees, agents, delegees, invitees, licensees, concessionaires, subcontractors or representatives. The provisions of this paragraph shall survive any payment or satisfaction of this Contract and such provisions shall remain in full force and effect.

(c) When use or storage of hazardous materials or equipment or unusual methods of construction are necessary, the Contractor shall obtain prior written approval from the Owner. The use of explosives is strictly prohibited provided, however, powder activated fasteners are permitted.

(d) If Contractor encounters on the Work Site any substance or material reasonably believed by Contractor to be hazardous, Contractor immediately shall (i) stop work in the area affected, (ii) take measures appropriate to the condition to keep people away from the suspected Hazardous Material and, (iii) report the condition to Owner in writing. If the Work is so stopped and Hazardous Material is found, the Work in the affected area shall not thereafter be resumed except by the issuance of a Construction Change Directive pursuant to Section 9.02 of this Contract. Any such Construction Change Directive shall be limited to, an adjustment to the Substantial Completion Date appropriate. If no Hazardous Material is found after the Work is stopped, no Construction Change Directive is required to resume the Work in the affected area.

ARTICLE 25

MISCELLANEOUS

Section 25.01. No Waiver. No consent or waiver, express or implied, by either party to this Contract or of any breach or default by the other in the performance of any of its obligations hereunder shall be deemed or construed to be a consent or waiver to or of any other breach or default by such party. Failure on the part of the Owner to complain of any

act or failure to act of the Contractor or to declare the Contractor in default, irrespective of how long such failure continues, shall not constitute a waiver of the rights of Owner.

Section 25.02. Assignment. This Contract shall not be assigned, delegated or transferred in whole or in part by the Contractor nor shall the Contractor assign any monies due or to become due to it without the prior written consent of the Owner.

Section 25.03. Governing Law. This Contract is entered into in Tennessee and shall be governed by and construed according to the laws of Tennessee. Any and all disputes arising out of this Contract, and/or the Project shall be decided by a state or federal court of competent jurisdiction in Memphis, Shelby County, Tennessee.

Section 25.04. Execution of Contract. The parties hereby agree and express their intent to execute this Contract electronically if Owner has a designated information processing system. The parties also hereby agree that this Contract may be executed in counterparts, each of which shall be deemed to be an original, but all of which, taken together, shall constitute one and the same agreement.

Section 25.05. Article and Section Headings. Article and section headings contained in this Contract are for ease of reference only and shall not affect the interpretation or meaning of this Contract.

Section 25.06. Parties in Interest. This Contract shall inure to the benefit of and be binding upon the Parties and their respective successors, assigns and legal representatives. It is specifically agreed between the Owner and the Contractor that the Parties do not intend to create any third party beneficiary rights by the execution of this Contract.

Section 25.07. Severability. If any one or more of the provisions contained in this Contract shall for any reason be held invalid, illegal or unenforceable in any respect, such invalidity, illegality or unenforceability shall not affect any other provision of this Contract, but it shall be construed as if such invalid, illegal or unenforceable provision had never been contained herein.

Section 25.08. Written Notices. Whenever by the terms of this Contract notice shall be given either to Owner or to Contractor, such notice shall be in writing and shall be sent by regular United States Postal Service, by hand-delivery, by registered or certified mail, by a nationally recognized overnight delivery service or by electronic mail with a delivery receipt. Notice intended for Owner shall be addressed to the Vice President of Operations as follows with a copy to Owner's General Counsel at the address for regular mail:

If to the Owner, address to:

Regular Mail or Hand Delivery
Vice President of Operations
Memphis-Shelby County Airport Authority
2491 Winchester Rd., Suite 113
Memphis, Tennessee 38116-3856

Certified Mail or Overnight Delivery
4150 Louis Carruthers Drive
Memphis, TN 38118
(901) 922-8000

If to the Contractor, address to:

Either Party, from time to time, may change its address by giving written notice to the other Party.

Section 25.09. Exhibits. All exhibits described in this Contract shall be deemed to be incorporated into and made a part of this Contract. If there is any inconsistency between this Contract and the provisions of any exhibits, the provisions of this Contract shall control to the extent of the inconsistency.

Section 25.10. Entire Contract. This Contract, together with the exhibits and the other Contract Documents, constitutes the entire agreement between the Owner and the Contractor and supersedes all prior written or oral agreements, understandings, representations, negotiations and correspondence between the Parties. This Contract shall not be supplemented, amended or modified by any course of dealing, course of performance or usage of trade and may only be amended or modified by a written instrument duly executed by officers of both Parties.

Section 25.11. Non-Federally Assisted Projects. Regardless of the funding source for the Project, Contractor hereby agrees to comply with all nondiscrimination provisions of this Contract.

Section 25.12. Small Business Participation Programs.

(a) The Project is subject to the requirements of Owner's Small Business Participation (SBP) Program. It is the responsibility of the Contractor to see that all requirements of the SBP Program are met. The SBP Program participation goal for the Project is **FIFTEEN PERCENT (15%)**. The SBP Program goal shall apply to Change Orders. The Contractor must either meet the goal or make good faith efforts to do so. Good faith efforts are defined in Appendix A to 49 CFR Part 26. To qualify, a firm must be included on the Owner's list of certified SBE firms.

(b) In case of the Contractor's non-compliance with SBP Program requirements as applicable, including, but not limited to, documentation, cooperation, and truthfulness, the Authority shall impose such Contract sanctions as it may determine to be appropriate. This may include but is not limited to:

- (1) Withholding of payments to the Contractor under the Contract until the Contractor complies; and/or
- (2) Cancellation, termination, or suspension of the Contract, in whole or in part; and/or
- (3) Assessing sanctions; and/or
- (4) Payment by the Contractor to the Authority of an amount equal to the difference in the SBE dollar value contracted for and the dollar value achieved in documented SBE participation or any lesser amount or penalty as deemed appropriate by the Authority, which dollar value shall be considered liquidated damages for failure to perform the requirements of the Contract and for which Contractor and all of its subcontractors agree to be bound.

(c) Retainage will not be withheld on this project. No retainage will be withheld by MSCAA from progress payments due the Contractor. Retainage by the Contractor or subcontractors is prohibited, and no retainage will be held by the Contractor from progress payments due to subcontractors.

(d) Contractor must not terminate a SBE subcontractor listed in response to the solicitation (or an approved substitute SBE firm) without prior written consent of Authority. This includes, but is not limited to, instances in which Contractor seeks to perform work originally designated for a SBE subcontractor with its own forces or those of an affiliate, a non-SBE firm, or with another SBE firm.

Contractor shall utilize the specific SBEs listed to perform the work and supply the materials for which each is listed unless the Contractor obtains written consent from the Authority. Unless consent is provided by the Authority, Contractor shall not be entitled to any payment for work or material unless it is performed or supplied by the listed SBE.

The Authority may provide such written consent only if the Authority agrees, for reasons stated in the concurrence document, that Contractor has good cause to terminate the SBE firm. For purposes of this paragraph, good cause includes the circumstances listed in 49 CFR §26.53.

Before transmitting to the Authority its request to terminate and/or substitute a SBE subcontractor, Contractor must give notice in writing to the SBE subcontractor, with a copy to the Authority, of its intent to request to terminate and/or substitute, and the reason for the request.

Contractor must give the SBE five days to respond to the notice. In the response, the SBE must advise the Authority and Contractor of the reasons, if any, why it objects to the proposed termination of its subcontract and why Owner should not approve the Contractor's action. If required in a particular case as a matter of public necessity (e.g., safety), Owner may provide a response period shorter than five days.

Section 25.13. No Financial Benefit. Contractor understands and agrees that no Owner employee or member of the Board of Commissioners, Memphis City Council or Shelby County Commission shall receive any financial benefit arising out of this Contract, either directly or indirectly. Further, any fees paid to any person or entity by Contractor for assistance in obtaining this Contract with Owner must be fully disclosed to Owner. Notwithstanding any term, condition, obligation or provision in this Contract, any other writing, any other agreement, any oral understanding or agreement, or any conduct or failure to act by the Owner, Contractor stipulates and agrees conclusively that Contractor has against the Owner no right, entitlement or claim for any payment, compensation, cost or remuneration of any type other than pursuant to the terms of this Contract.

ARTICLE 26

FEDERAL AVIATION ADMINISTRATION (FAA) REQUIRED CONTRACT PROVISIONS

Section 26.01. FAA Required Provisions. Federal laws and regulations require that specific contract provisions be included in certain contracts and subcontracts. All such provisions are set forth in Exhibit E, which is attached hereto and incorporated herein by reference. Contractor hereby agrees to insert these provisions in each contract and subcontract (to the extent applicable) related to the performance of this Contract and to require each of its subcontractors to do the same. Contractor also hereby agrees to incorporate these provisions by reference for work done under any purchase order, rental agreement or other agreement for supplies or services related to the performance of this Contract. Contractor further agrees to be responsible for compliance with these provisions by any subcontractor, lower-tier subcontractor or service provider. Contractor acknowledges that the FAA prevents any modification to these provisions that creates a conflict with federal laws and regulations or changes the intent of the required provision.

ARTICLE 27

STATE REQUIRED CONTRACT PROVISIONS

Section 27.01. State of Tennessee Laws and Regulations - Grant Contract Provisions. State laws and regulations require that specific contract provisions be included in certain contracts and subcontracts. All such provisions are set forth in Exhibit E, which is attached hereto and incorporated herein by reference.

*The remainder of this page intentionally left blank.
[Signature page to follow.]*

IN WITNESS WHEREOF, the Parties have made and executed this Contract as of the day and year first above written.

**MEMPHIS-SHELBY COUNTY
AIRPORT AUTHORITY**

COMPANY

By: _____

By: _____

Title: President and CEO

Title: _____

Approved as to Content:

By: _____

Title: Vice President of Operations

Approved as to Form and Legality:

By: _____

Title: General Counsel

Reviewed and Approved:

By: _____

Title: Director of Development

By: _____

Title: Sr. Manager of Business Diversity Development

**EXHIBIT A
TO
UNIT PRICE CONSTRUCTION CONTRACT
FOR
SRE BUILDING – BUILDING PACKAGE - CONSTRUCTION**

**BY AND BETWEEN
THE MEMPHIS-SHELBY COUNTY AIRPORT AUTHORITY
AND
CONTRACTOR**

SCOPE OF WORK

The scope of this project is for the construction of new snow removal equipment building at MEM. This project is for Phase 2, which is the building package to construct an approximate 49,000 SF Pre-Engineered Metal Building (PEMB) to store snow removal equipment at MEM. Overall scope will include building construction, relocated AOA fencing, concrete paving, and associated utilities. The work includes, but not limited to, PEMB construction, storm drainage, utility installation (fiber optic/electrical/water), fire sprinkler system, Portland cement concrete pavement, joint sealing, chain link fencing, and other efforts normally required for building construction. The prime/general contractor must have experience with similar building projects, specifically PEMB.

The scope of work is more specifically described in the Contract Documents, as defined in Article 2 of this Contract.

**EXHIBIT B
TO
UNIT PRICE CONSTRUCTION CONTRACT
FOR
SRE BUILDING – BUILDING PACKAGE - CONSTRUCTION

BY AND BETWEEN
THE MEMPHIS-SHELBY COUNTY AIRPORT AUTHORITY
AND
CONTRACTOR**

CONTRACT DOCUMENTS

EXHIBIT C
TO
UNIT PRICE CONSTRUCTION CONTRACT
FOR
SRE BUILDING – BUILDING PACKAGE - CONSTRUCTION

BY AND BETWEEN
THE MEMPHIS-SHELBY COUNTY AIRPORT AUTHORITY
AND
CONTRACTOR

OWNER CONTROLLED INSURANCE PROGRAM

INSURANCE REQUIREMENTS (OCIP)

C.1. Owner Controlled Insurance Program

The Owner has elected to implement an Owner Controlled Insurance Program (OCIP) that will provide **Workers' Compensation, Employer's Liability, Commercial General Liability, Excess Liability and Builders' Risk insurance** for Contractors and Subcontractors of every tier who have been properly enrolled and are providing direct labor to the Project. A general summary of coverage provided by the OCIP is included in the MSCAA OCIP Manual, (hereinafter called the Manual), a copy of which is attached hereto and made a part of this Agreement and should be attached to and incorporated in every subcontract. All terms and conditions of Exhibit C will apply during the term of the contract. The Owner agrees to pay all premiums associated with the OCIP.

While the OCIP provides uniform coverages and reasonable limits, the OCIP is not intended to meet all the insurance needs of the Contractor and eligible Subcontractors who have been properly enrolled. In addition to any insurance provided by Owner, the Contractor and all Subcontractors working on the Project will be responsible for providing certain insurance as specified in paragraph C.2. Contractors and eligible Subcontractors should discuss the OCIP with their insurance agent or consultant to assure that other proper coverages are maintained. Contractor and eligible Subcontractors enrolled in the OCIP agree that the insurance company policy limits of liability, coverage terms and conditions shall determine the scope of coverage provided by the OCIP.

C.1.1. Applicability of the OCIP

Participation in the OCIP by the Contractor and all eligible Subcontractors is mandatory but not automatic. The Contractor and each eligible Subcontractor (as defined below) must follow the enrollment procedures shown in the Manual. The Contractor shall comply with all requirements of the OCIP as outlined in the OCIP Manual and shall require all eligible Subcontractors to comply with requirements of the OCIP manual. The Manual may be updated and revised during the course of construction to reflect any changes in State Law, Rules and/or Regulations or Procedures that may be necessary or appropriate, and said revisions will replace all previous versions. Copies of any revised Manual will be distributed by the OCIP Administrator.

- If the Contractor or any eligible Subcontractor fails to enroll any of its eligible Subcontractors of any tier, it will be subject to a penalty charge of the full and complete deduct as shown in C.1.2.c or 3% of the subcontract cost, whichever is greater. Note: Collection of the penalty charge of any non-enrolled contractor(s) of any tier does not provide automatic coverage in the program.
- If any Contractor or any eligible Subcontractor enrolls in the OCIP more than 30 days after its start date, it will have to provide a No Known Loss Letter to the Carrier along with the enrollment documentation.

Eligible Subcontractor includes all Subcontractors providing or subcontracting for direct labor on any Designated Project (see definition of ineligible Subcontractors below).

Ineligible Subcontractor includes (but is not limited to) subcontractors performing any type of environmental remediation work (example: asbestos or underground tank removal), consultants, suppliers (that do not perform or subcontract installation), vendors, materials dealers, guard services, janitorial services, truckers (including trucking to any Designated

Project where delivery is the only scope of work performed), employee leasing companies, temporary labor services and other temporary project services. However, such Employee leasing and temporary labor service companies can be insured by the OCIP but must be submitted for review to the OCIP administrator prior to acceptance.

A Designated Project is a project designated and approved by the Owner as a Designated Project and, enrolled by the OCIP Administrator with the insurance company. This project is a Designated Project. A Designated Project includes operations necessary or incidental to the Work. The Contractor's/Subcontractor's regularly established workplace, plant, factory, office, shop, warehouse, yard or other property even if such operations are for fabrications of materials to be used at the job site or training of apprentices will be considered off-site and not covered by the OCIP.

Unless otherwise directed by the Owner, the Contractor, eligible Subcontractors and all Subcontractors not enrolled in the OCIP, will be required to maintain at least the insurance coverages set forth in paragraph C.2 and are required to participate in the MSCAA OCIP Safety Program. Contractor will promptly furnish the Owner, or their designated representative, certificates of insurance giving evidence that all required insurance is in force.

C.1.2. Contractor Insurance Cost Identification

The Contractor and eligible Subcontractors will exclude their cost for all insurance coverages to be provided by the Owner for the work at any Designated Project from their bid. The Contractor and each Subcontractor of any tier warrant that all insurance premium calculations for work performed at the Designated Project Site have been correctly identified and removed from their bids.

C.1.3. Change Order Pricing

Contractor and all enrolled Subcontractors will price each change order to exclude the cost of insurance.

C.1.4. Assignment of Return Premiums

The Owner will be responsible for the payment of all premiums associated solely with the OCIP and will be the sole recipient of any dividend(s) and/or return premium(s) generated by the OCIP. In consideration of the Owner's provision of said coverages under the OCIP program, the Contractor and eligible Subcontractors agree to:

- 1) Exclude all applicable insurance costs for coverage provided by the Owner associated with their contract work and excluded from their bid; and cooperate with the OCIP Administrator in the administration of the OCIP.
- 2) Irrevocably assign to and for the benefit of the Owner, all return premiums, premium refunds, premium discounts, dividends, retentions, credits, and any other monies in connection with the OCIP insurance. Contractor also assigns its right of cancellation of all insurance policies provided by Owner. Contractor agrees to evidence such assignment by executing and delivering the Form-2. Contractor further agrees to require each eligible Subcontractor to execute the assignment on the Form-2, for the benefit of the Owner.

C.1.5 Audit of Contractor and/or Subcontractor Payroll

For insurance purposes, the Contractor and all tiers of Subcontractors agree to keep and maintain accurate and classified records of their payroll for operations at any Designated Project. Contractor and all eligible Subcontractors agree to furnish a copy of the Monthly Payroll Reporting Form, Form 5, to the OCIP Program Administrator by the 20th of each month and attach a copy of the Form-5, to their monthly pay application. If this report (Form-5) is not attached to the monthly pay application, payment may be held until the report is received.

The Contractor and all eligible Subcontractors will permit the Owner and its representative to examine and/or audit its books and records pertaining to any Designated Project. Contractor and eligible Subcontractor will also provide any additional information to the Owner or its appointed representatives as may be required. At the end of each contract, an audit may be performed of the reported payroll by the OCIP Carrier.

Upon Final Completion of each contract, the Contractor and eligible Subcontractors will furnish a completed and signed Form-4 - Notice of Anticipated Completion Form (a copy of which is attached hereto as "Form-4") to the OCIP Administrator, together with all required documentation.

Demobilization payments will not be released until all closeout documentation has been received and approved.

C.1.6. OCIP Deductibles

General Liability:

If a claim arises under the Owner provided Commercial General Liability OCIP policy from the partial or sole negligence of a Contractor or Subcontractor, or for violation of any OCIP Safety Requirements, such Contractor or Subcontractor shall be responsible for reimbursing the Owner's deductible to the extent of their respective negligence, as determined solely by owner, up to a maximum of \$10,000 per occurrence per Contractor.

Builders Risk:

The Contractor shall be responsible for a deductible of \$25,000 for each and every loss.

C.1.7. Termination/Modification of the OCIP

The Owner reserves the right to terminate or to modify the OCIP or any portion thereof. To exercise this right, the Owner will provide thirty (30) days advance written notice of termination or material modification to the Contractor and all eligible Subcontractors covered by the OCIP. In such event, the Contractor will promptly obtain appropriate replacement insurance coverage acceptable to the Owner. Written evidence of such insurance will be provided to the Owner prior to the effective date of the termination or modification of the OCIP coverages. The reasonable cost of such replacement insurance will be reimbursed by the Owner to the Contractor.

SPECIAL NOTE: The Contractor and eligible Subcontractors who have completed their work at any Designated Project and whose insurance as provided by MSCAA OCIP has been terminated, and who returns to the site to perform warranty work does so under its own insurance coverages and not under those provided by MSCAA OCIP.

C.2 Contractor Provided Coverages

All insurance obtained by the Contractor pursuant to this Agreement shall be written by insurance companies licensed to do business in Tennessee and acceptable to Owner.

Prior to the commencement of any operations by or on behalf of the Contractor relating to the Project, and with respect to any and all such operations, the Contractor shall procure, maintain and provide to Owner and the Program Manager:

- 1) Evidence of Contractor's **Commercial Automobile Liability Insurance**. A certificate of insurance and copy of endorsement shall be provided as evidence of:
 - a) Coverage for Owner, their officers, directors and employees as additional insureds.
 - b) Coverage to apply to all liability arising out of the ownership or use of all vehicles owned by, hired by, or used on behalf of the Contractor.
 - c) Waiver of Subrogation to be provided in favor of the Owner, the Design Professional, the Program Manager and their officers, directors, and employees.
 - d) If hazardous materials or waste are to be transported, the policy will be endorsed with the MCS-90 endorsement in accordance with the applicable legal requirements.

This insurance shall be for an amount not less than \$1,000,000 combined single limit liability.

- 2) Evidence of Contractor's **Workers' Compensation and Employer's Liability Insurance**. A certificate of insurance or, at Owner's request, a certified policy copy shall be provided as evidence of:
 - a) Coverage for claims for damages arising out of bodily injury, occupational sickness or disease or death of Contractor's employees under any applicable workers' compensation statute or any other applicable employers' liability law. Certificate of insurance or policy must clearly identify that coverage applies in the state of Tennessee.

- b) A waiver of subrogation by the insurer against the Owner the Design Professional, the Program Manager and their officers, directors and employees.
 - c) This insurance shall include Employer's Liability limits of not less than \$1,000,000 bodily injury each accident, \$1,000,000 bodily injury by disease each employee and \$1,000,000 bodily injury by disease in the aggregate.
 - d) All Enrolled Contractors must provide Workers' Compensation and Employer's Liability insurance covering all employees for injuries that occur AWAY from the Designated Project Site or after OCIP termination, expiration, or cancellation.
 - e) Ineligible subcontractors or subcontractors not enrolled must provide coverage for ALL operations.
- 3) Evidence of Contractor's **Commercial General Liability Insurance**. Certificate of insurance and copies of endorsements to Contractor's primary commercial general liability policy and shall be provided as evidence of:
- a) Coverage for Owner and the Design Professional, Program Manager, their officers, directors and employees as additional insureds as respects claims or liabilities arising from or connected with Contractor's work, operations and completed operations. The additional insured endorsements shall be at least as broad as the ISO CG 2010 (1001) during the course of construction and CG2037 (1001) until the expiration of the statute of repose, or its carrier equivalent.
 - b) Coverage shall be primary and non-contributing with any coverage Owner maintains in its own name and on its own behalf.
 - c) Coverage shall be written on an occurrence coverage form, with coverage at least as broad as that provided under the current edition of the ISO Commercial General Liability coverage form, CG 0001. Other than standard exclusions applicable to pollution, asbestos, mold, employment practices, ERISA and professional liability, there shall be no limitations or exclusions beyond those contained in the standard policy forms which apply to property damage, products and completed operations, contractual liability or construction defects. In addition to procuring and maintaining this insurance during the duration of the contract, contractor agrees to continue to procure and maintain products and completed operations liability insurance coverage for a minimum of six (6) year(s) after the date the contract is completed or terminated or in accordance with the applicable statute of limitations under state law, whichever is longer.
 - d) Waivers of subrogation by insurers against Owner, Design Professional, Program Manager and their officers, directors and employees.
 - e) Contractual Liability Insurance applicable to the indemnification agreement contained in Section 21.01 of this Agreement.
 - f) The required amounts of primary Commercial General Liability Coverage in the amount of:

\$1,000,000	Bodily Injury and Property Damage Limit for each occurrence
\$1,000,000	Personal & Advertising Injury
\$2,000,000	General Aggregate (Annual)
\$2,000,000	Products/Completed Operations Aggregate (annual)
The general aggregate limit shall apply separately to each project.	
 - g) All Enrolled Contractors must provide General Liability insurance covering third-party losses that occur AWAY from the Project Site (including products liability for any product manufactured, assembled or otherwise worked upon away from the Designated Project Site) or after OCIP termination, expiration or cancellation.
 - h) Ineligible contractors or subcontractors not enrolled must provide coverage for ALL operations.

i) The policy will be endorsed to exclude any "Designated Project" for onsite coverage only, if you are a participant in the OCIP.

- 4) Evidence of Contractor's **Excess or Umbrella Liability Insurance**. Certificate of insurance and copies of endorsements to Contractor's Excess or Umbrella liability policy and shall be provided as evidence of this excess liability or umbrella insurance with an annual aggregate amount of not less than **\$10,000,000** for the Contractor and \$1,000,000 limits required of subcontractors unless otherwise stated in the Contract Documents, and shall be excess and follow form over primary coverages included herein. Such coverage will be excess and "drop down" for defense and indemnity in the event of exhaustion of the underlying insurances of Commercial, Automobile, Liability, Employer's Liability and the Commercial General Liability policies.

5) Evidence of **Professional Liability Insurance**:

Per Claim and in the Aggregate:

\$1,000,000

All professional services firms must provide professional liability insurance appropriate for their profession. Architectural and engineering firms must provide coverage for liability arising out of design errors and omissions. The policies shall provide a three (3) year extended reporting period.

6) Evidence of **Contractors Pollution Liability Insurance**:

Each Occurrence Limit and in the Aggregate:

\$3,000,000

Coverage applies to third-party bodily injury and property damage claims (including natural resource damage), and clean-up costs, caused by pollution conditions which result from covered operations performed by, or on behalf of, contractors and subcontractors of all tiers at the Designated Project Site. Coverage shall apply to claims for mold and fungus damage that result from the work as well as gradual and sudden and accidental pollution incidents arising from activities of the contractors working at the project site.

Coverage must be evidenced for on-site and off-site transportation which may result in a pollution incident/event and non-owned disposal site coverage (if applicable to the project).

The policy shall be endorsed to provide a Waiver of Subrogation in favor of the Owner, Design Professional and Program Manager. In addition, the Owner, their officers, directors and employees shall be included as Additional Insureds.

7) Evidence of **Contractor's Equipment Insurance**:

The Contractor is responsible for their tools and equipment including, but not limited to, construction trailers and their contents and temporary scaffolding at the project site, whether owned, leased, rented or borrowed. Contractor acknowledges and agrees that the Owner will not be responsible for any loss or damage to their tools and equipment. If insured, the Contractor's insurance policies covering tools and equipment will include a waiver of subrogation and any other rights of recovery in favor of the Owner. If uninsured, the Contractor will hold harmless the Owner, Program Manager and Design Professional for loss or damage to their tools and equipment.

8) **Aircraft/Aviation Liability Insurance**:

Each Occurrence Limit and in the Aggregate (including passenger liability): **\$1,000,000 (If Applicable)**

The operator of an aircraft of any kind, whether manned or unmanned, must maintain liability insurance covering bodily injury and property damage on a Combined Single Limit basis. If non-employee passengers are carried, there cannot be a per-passenger sublimit.

Prior to commencing operations, the operator must provide the Owner with a certificate of insurance naming the Owner, their officers, directors and employees as additional insureds on a primary and non-contributory basis. Operator and their insurer(s) must hold the Owner harmless and waive subrogation with respect to damage to the aircraft.

If aircraft is to be used to perform lifts at the Designated Project Site, a "slung cargo" endorsement must be included to cover the full replacement value of any equipment being lifted.

NOTE: If the Contractor and / or eligible Subcontractor participating in the OCIP choose(s) to have the policy endorsed to include any "Designated Project" site during the construction period, coverage should be Excess and/or Difference in Conditions (DIC) of the OCIP and this cost should not be passed back to the Owner. Inclusion of any "Designated Project"

Site on such insurance policies shall not replace the OCIP coverage or otherwise affect the cost identification requirement in paragraph C.1.2.

C.2.2. Contractor's Insurance Primary.

Any coverage applicable to Owner under Contractor's insurance policies shall be primary and non-contributing with any insurance maintained by Owner in its own name and on its own behalf. Copies of endorsements to Contractor's policies shall be provided to Owner.

C.2.3. Cancellation.

All such insurance shall be in form and substance satisfactory to the Owner and shall provide that not less than thirty (30) days' notice of cancellation or non-renewal, other than non-payment of premium which shall be ten (10) days' notice, be provided to Owner. If unavailable, Contractor must provide Owner with thirty (30) days' advance written notice of cancellation, other than non-payment of premium, which shall be ten (10) days' notice. Contractor must notify Owner of any material change or reduction in coverage to the Contractor's insurance policies.

C.2.4. Certificates of Insurance - Contractor Provided Insurance Coverage Requirements

As shown in Section C.2

Description of Operations for contractors participating in the OCIP shall read:

Workers' Compensation and Commercial General Liability coverages shown above do not apply to any Designated Project at the Memphis International Airport.

Additional Insured Wording for Contractors shall read:

Memphis-Shelby County Airport Authority, Program Manager, Design Professional and their officers, commissioners, agents and employees as now or hereafter exist as respect to the services / work to be performed under this Agreement, for coverages as required by contract MSCAA Project #23-1476-17-02.

Additional Insured Wording for Subcontractors shall read:

For Subcontractors participating in the OCIP

The Memphis-Shelby County Airport Authority, Program Manager, Design Professional and their officers, commissioners, representatives, agents and employees ATIMA are additional insureds for coverages as required by contract.

For Subcontractors not participating in the OCIP

The Memphis-Shelby County Airport Authority, Program Manager, Design Professional and their officers, commissioners, representatives, agents and employees ATIMA and Awarding Contractor are additional insureds as respect to the services / work to be performed under this Agreement for coverages as required by contract.

IN THE EVENT THAT THE LAW OF THE STATE IN WHICH THE PROJECT IS LOCATED (OR APPLICABLE LAW) LIMITS THE ADDITIONAL INSURED COVERAGE THAT OWNER MAY REQUIRE FROM CONTRACTOR AND SUBCONTRACTORS, THEN CONTRACTOR AND SUBCONTRACTORS SHALL BE REQUIRED TO OBTAIN ADDITIONAL INSURED COVERAGE TO THE FULLEST EXTENT OF COVERAGE AND LIMITS ALLOWED BY APPLICABLE LAW AND THIS CONTRACT SHALL BE READ TO CONFORM TO SUCH LAW.

Filing of Certificates

Certificates of insurance acceptable to the Owner shall be filed with the Owner by furnishing to the OCIP Administrator, prior to commencement of the Work. If any of the foregoing insurance coverages are required to remain in force after final payment and are reasonably available, an additional certificate evidencing continuation of such coverage shall be submitted with the final Application for Payment.

A sample is provided of a certificate of insurance is provided in the OCIP Manual.

MSCAA OCIP

c/o Willis Towers Watson National Project Insurance Practice.

Attn: OCIP Administrator

15305 North Dallas Parkway, Suite 1100

C.2.5. The Right of the Owner to Maintain Insurance.

In the event the Contractor fails to furnish and maintain the required insurance or to furnish certificates of insurance, the Owner shall have the right, at its option, to terminate this Agreement or to take out and maintain such insurance, and hold the Contractor liable for the cost. Compliance by the Contractor with the requirements of this Article shall in no way relieve the Contractor from liability under any provision of this Agreement or the Contract Documents.

C.2.6. Other Insurance

Any type of insurance or any increase of limits of liability not described in this section which the Contractor or any Subcontractor requires for their own protection or on account of any statute will be their own responsibility and their own expense. Any type of insurance or any increases of limits of liability not described herein that the Contractor or any Subcontractor requires for its own protection or on account of statute shall be its own responsibility and its own expense. If the Contractor or the Subcontractors maintain any insurance policies covering owned, leased or borrowed, equipment, such policies shall contain a waiver of subrogation against the Owner. Each item must be shown as a line item and approved by the Owner.

C.2.7. Deductibles

The Contractor shall be responsible for the payment of the deductible amounts for any insurance in force pursuant to this Agreement whether such insurance is furnished by the Owner or the Contractor.

C.2.8. Insurance for Project Property While outside the United States and Canada.

If any project property is in transit or is located outside the continental United States or Canada for any reason, Contractor shall arrange to insure such property for its full replacement value separate from the other insurance described herein.

C.2.9. Subcontractors Flow-Down Clause.

Subcontractors of all tiers are subject to the same insurance requirements as Contractor. Contractor shall cause each Subcontractor employed by Contractor to purchase and maintain such insurance and upon request, must promptly furnish Owner with copies of certificates of insurance evidencing coverage for each Subcontractor.

C.2.10. No Representation of Coverage Adequacy.

In specifying minimum Contractor insurance requirements, Owner does not represent that such insurance is adequate to protect Contractor for loss, damage or liability arising from its work. Contractor is solely responsible to inform itself of the types or amounts of insurance it may need beyond these requirements to protect itself. The insurance requirements set forth in minimum amounts shall not be construed to relieve Contractor for liability in excess of such coverage, nor shall it preclude Owner from taking such other actions as is available to it under any other provision of the contract.

C.2.11. Contractor Responsibilities

The Contractor will cooperate with and will require all eligible Subcontractors to cooperate with The Owner and/or the OCIP Administrator with regards to the administration and operation of the OCIP. The Contractor and eligible Subcontractors responsibilities will include, but not be limited to:

- 1) Compliance with all rules and regulations of the applicable State Insurance Bureau/Board; failure to meet state requirements may result in fines being assessed, and, if this occurs, the Owner shall deduct from monies due or to become due under the provisions of this contract for any applicable fines that are assessed against the Owner, the Contractor or any eligible Subcontractor;
- 2) Compliance with applicable Construction Safety Program;
- 3) Provision of necessary contract, operations and insurance information, including verification of current Worker's Compensation Experience Modifier;

- 4) Cooperation with any insurance company or OCIP Administrator with respect to requests for claims, payroll or other information required under the program;
- 5) The Contractor and all eligible Subcontractors shall adhere to and perform all reporting requirements as set forth in the Claims Procedures portion of the OCIP Program Manual.

C.2.12. Contractor's Responsibility for its Subcontractors.

The Contractor will include this Exhibit and the Manual with the bid documentation. The Contractor will require that all eligible Subcontractors participate in the OCIP and comply with all rules and procedures as outlined in MSCAA Enrollment Process Summary. It will be the Contractor's responsibility to submit to The Owner and its designated representative all bid documentation for approval. If Contractor fails to comply with this section and any eligible Subcontractors do not enroll in the program, the Owner has the right to retain the 3% of subcontracted work as a penalty from the awarding Contractor/Subcontractor as set out in C.1.2.c.

C.2.13. Approval of Forms and Companies

All insurance described in this Section will be written by an insurance company or companies satisfactory to the Owner and licensed to do business in Tennessee and will be in a form and content satisfactory to the Owner. No party subject to the provisions of this contract will violate or knowingly permit to be violated any of the provisions of the policies of insurance described herein.

C.2.14. Coverage to be provided by Contractor during Warranty Period

During the period following the final acceptance date and prior to expiration of the warranty period hereunder, Contractor will maintain in full force and effect all insurance as specified in paragraph C.2 covering all Work performed during such period.

C.3. Waiver of Subrogation and Waiver of Rights of Recovery

Owner Controlled Insurance Program

Except as respects any deductibles identified above, Owner waives all rights of subrogation and recovery against the Contractor and all Subcontractors of all tiers to the extent of any loss or damage, which is insured under the OCIP. Except as respects the deductibles identified above, Contractor waives all rights of subrogation and recovery against the Owner, Design Professional and Program Manager, other Contractors and Subcontractors of all tiers to the extent of any loss or damage, which is insured under the OCIP. The Contractor and each Subcontractor will require all Subcontractors to similarly waive their rights of subrogation and recovery in each of their respective construction contracts with respect to their work on any Designated Project.

Contractor Provided Coverages

Contractor waives all rights of subrogation and recovery against the Owner, Design Professional and Program Manager, to the extent loss or damage is insured under the Contractor's policies. The Contractor and each Subcontractor will require all Subcontractors to similarly waive their rights of subrogation and recovery in each of their respective construction contracts with respect to their work on any Designated Project.

C.4. Project Safety Administration

It is the responsibility of the Contractor to maintain total control of safety to ensure that its employees and the general public will be provided an environment free of recognized hazards during construction activities. In carrying out this policy it is clear the only accepted level of performance is to be "Incident Free" on this project each and every day.

A. Project Safety Manual

The safety requirements of any Designated Project Safety Manual are a supplementary document to all Government rules, codes and regulations. It is understood that the ultimate responsibility for providing a safe place to work rests with each individual Contractor. All Contractors are responsible for full compliance with the requirements and standards referenced in the manual.

B. New Employee Orientation

Each new Contractor or Subcontractor employee will be required to attend an orientation program. This orientation is designed to communicate all project specific safety policies, procedures, and expectations of “the Safety Team” in regard to the construction of any Designated Project.

C. Contractor Safety Program Review

To proactively monitor the safety, health and environmental performance of Contractors and Subcontractors the Owner and/or his Representative, will be conducting a periodic review of Contractor or Subcontractor safety programs. This will be a formal process, which will be done with or without advanced notice. Upon completion of the Safety Program Review, a list of recommendations will be provided to the Contractor or Subcontractor. There will be a timeline developed and agreed upon for the purpose of abating any deficiencies in the Contractor or Subcontractor safety program.

C.5. No Release

The provision of the OCIP by The Owner will in no way be interpreted as relieving the Contractor or any Subcontractor of any other responsibility or liability under this agreement or any applicable law, statute, regulation or order.

C.6. CIP Exclusion Limitation

If any party’s insurance includes an exclusion tied to Controlled Insurance Programs (a.k.a. “wrap-ups” or “CIPs”) or other project-specific insurance, it may apply only to the extent of coverage available to that party under the CIP or other Sponsor-provided insurance. Such exclusion may not be broader than what the CIP or such other Sponsor-provided insurance actually covers.



MSCAA OCIP V

An Owner Controlled Insurance Program Manual for Construction Projects

MSCAA OCIP – ENROLLMENT SUMMARY

Contract Bid – All Contractors/Subcontractors

Bid package will be furnished to bidders

1. All eligible Contractors/Subcontractors of every tier will exclude their cost of insurance for coverage provided by the Owner from their bid. Contractors and eligible Subcontractors should discuss the OCIP with their insurance agent or consultant to assure that the OCIP insurance identification cost is accurate.
2. Contractors and Subcontractors at any tier shall not charge any eligible Subcontractor for its participation in the OCIP.
3. Workers' Compensation – Tennessee Payroll Rules are applicable to WC payroll. First dollar coverage is given to all Contractors on WC.
4. General Liability – Mandatory deductible not to exceed \$10,000 will apply to any loss as described in the OCIP manual. 5% credit will be applied to Contractor's premium for this deductible

Contract Award

Once notification of contract award has been received, all eligible Contractors/Subcontractors of every tier will complete and submit Form 2 with the required certificate of insurance. Any Contractors or Subcontractors who enroll in the OCIP 30 days after their start date will have to provide a No Known Loss Letter to the Carrier along with the enrollment documentation. The OCIP Administrator will:

- 1) Assign a location code for this contract, forward the **Form 2** to the insurance carrier for enrollment into program
- 2) Issue a certificate of insurance which will reflect all OCIP coverages. The original copy will be sent to the enrolled contractor/Subcontractor with a copy to their awarding contractor.

Change Order

Contractor and all enrolled Subcontractors will price each change order to exclude the cost of insurance provided by the Owner.

Monthly Payroll Reporting

The Enrolled Contractor/Subcontractor will receive a Payroll Request e-mail from the following email address on behalf of Willis Admin at the beginning of each month during construction reminding them to complete their payroll report via the link in the email by the payroll due date. The payroll link will expire in 30 days. If the payroll link expires, please contact your Willis Towers Watson CIP Administrator to receive an updated link.

If Contractor/Subcontract receives additional contracts

Once the contractor/Subcontractor has enrolled in the OCIP, all additional contract bids must also exclude the Contractor's cost of insurance for coverage provided by the Owner. **Form 2** must be submitted to the OCIP Administrator to receive confirmation of enrollment in the OCIP for the additional contract. (Contact the OCIP Administrator if you have questions). The OCIP Administrator will:

- 1) Assign a location code for this contract, forward the **Form 2** to the insurance carrier for enrollment into program
- 2) Issue a certificate of insurance which will reflect all OCIP coverages. The original copy will be sent to the enrolled contractor/Subcontractor, a copy to their awarding contractor.

When Contractor/Subcontract reaches Substantial Completion

Notice of Anticipated Completion - **Form 4** – Prior to completion of all work being performed under the contract. This will initiate Closeout Procedures. Payroll and Receipts may be audited.

When Contractor/Subcontractor has completed the Work

Contractor should notify their insurance agent/broker to remove any exclusion for this Designated Project from their primary policies.

Claims

All Contractors/Subcontractors must follow claims rules and procedures outlined in the MSCAA OCIP Manual.

Safety

All Contractors/Subcontractors must follow safety rules and procedures outlined in the MSCAA OCIP Site Specific Safety Plan.

Notice to All Contractors/Subcontractors

Failure to follow the Enrollment or Claims procedures outlined in MSCAA OCIP Manual may result in fines being assessed by the State Bureau/NCCI, State's Workers' Compensation Commission or the Owner against the Contractor or Subcontractor. If the Owner or Carrier is assessed fines due to Contractor's or Subcontract's failure to follow State rules or regulations, the Owner will deduct from monies due or to become due for any applicable fines.

CHANGES TO ANY OCIP REQUIREMENT OR PROCEDURE MUST BE APPROVED BY THE OWNER AND OCIP ADMINISTRATOR. NO CONTRACTOR OR SUBCONTRACTOR HAS THE AUTHORITY TO AMEND THE OCIP REQUIREMENTS.

INTRODUCTION

This manual identifies, defines, and assigns responsibilities related to the administration of the Memphis-Shelby County Airport Authority (MSCAA) Owner Controlled Insurance Program (OCIP).

This manual:

- Describes the OCIP and details the insurance-related responsibilities of the various parties involved.
- Provides a basic description of the OCIP structure and operation, with an overview of coverage provided by the OCIP and guidelines for carrying out specific administrative and audit procedures.
- Provides answers to questions that are likely to arise during the course of the project.

Because it is impossible to anticipate every question or situation that may arise, the directory lists those involved in the administration of the OCIP and their areas of expertise. Please feel free to call with any questions.

This Manual will be updated as changes dictate during this project.

NOTE

- This Manual does not, and is not intended to, provide coverage interpretations or complete information about coverages.
- The terms and conditions of the insurance policies govern how coverage is applied.
- The information herein is not intended to alter any provisions of the actual contract documents of the Contractors, and if any such conflict occurs, the contract documents will govern.

CHANGES TO ANY OCIP REQUIREMENT OR PROCEDURE MUST BE APPROVED BY THE SPONSOR AND OCIP ADMINISTRATOR. NO CONTRACTOR OR SUBCONTRACTOR HAS THE AUTHORITY TO AMEND THE OCIP REQUIREMENTS.

ADMINISTRATION

Program Management

OCIP Program Coordinator

Willis Towers Watson

John Shorten

8285 Tournament Drive, Suite 130
Memphis, TN 38125

Phone: (901) 248-3102

Fax: (901) 248-3101

E-mail: john.shorten@willistowerswatson.com

OCIP Program Unit Manager

Willis Towers Watson

Nancy Jarmon

500 North Akard St., Suite 4300
Dallas, TX 75201

Phone: (972) 973-2394

Fax: (972) 386-5561

E-Mail: nancy.jarmon@willistowerswatson.com

OCIP Administration

Willis Towers Watson

Starla Lacey

Five Course Parkway, Suite 1800
Atlanta, GA 30328

Phone: (404) 224-5000

Cell: (404) 536-8567

E-Mail: starla.lacey@willistowerswatson.com

On-Site Safety

Willis Towers Watson

Wes Shelby

4225 Airways Blvd.
Memphis, TN 38116

Phone: (901) 344-1659

Cell: (901) 604-2136

Fax: (901) 345-6636

E-Mail: wes.shelby@willistowerswatson.com

Claims Management

Zurich North America

PO Box 968077
Schaumburg, IL 60196-8077

FAX NUMBER FOR REPORTING CLAIMS: (877) 967-2567
GENERAL CLAIMS FAX NUMBER: (615) 872-1303
GENERAL PHONE NUMBER: (800) 366-8366

Leadership	Title	Phone	Email
Tammy Fike	GL Sr. Specialist	(404) 851-3616	tammy.fike@zurichna.com
Ginny Howard	WC Team Manager	(615) 872-1315	ginny.howard@zurichna.com
Karen Kingo	WC Pension Manager	(847)413-5868	karen.kingo@zurichna.com
Vea Storey	WC Claims Specialist	(615) 872-1241	veatrice.storey@zurichna.com
Patricia Painter	WC Claims Specialist	(615) 391-7501	patricia.painter@zurichna.com
Nat Woodruff	Claims Customer Service Executive	(404) 851-3278	nathaniel.woodruff@zurichna.com

Insurance Policy References

Workers Compensation

Insurance Company: Zurich American Insurance Company

Master Policy Number: WC 6675835-00

Each Contractor and/or Subcontractor will be issued their own Workers' Compensation Policy

Part One - Workers' Compensation

TN State Limits

Part Two - Employers' Liability

Bodily Injury by Accident – Each Accident \$1,000,000

Bodily Injury by Disease – Policy Limit \$1,000,000

Bodily Injury by Disease – Each Employee \$1,000,000

Part Three – Other States Insurance

All States except those listed in Part One and Monopolistic States (OH,ND,WA,WY)

Commercial General Liability

Insurance Company: Zurich American Insurance Company

Master Policy Number: GLO 6675834-00

General Aggregate Limit (Other than Products – Completed Operations) \$4,000,000

Product-completed Operations Aggregate Limit \$4,000,000

Personal and Advertising Injury Limit (Any One Person or Organization) \$2,000,000

Each Occurrence Limit \$2,000,000

Fire Legal Liability (Any One Fire) * \$250,000

Medical Expense Limit (Any One Person) \$10,000

Umbrella Liability

Insurance Company: ACE Property and Casualty Insurance Company

Master Policy Number: XCQ G46622029 001

Limits: \$25,000,000 excess of primary

Excess Liability – Layer 1

Insurance Company: Allied World National Assurance Company

Master Policy Number: 0313-3804

Limits: \$10,000,000 excess of \$10,000,000

Excess Liability – Layer 2

Insurance Company: ACE Property and Casualty Insurance Company

Master Policy Number: XCQ G7257896A 001

Limits: \$15,000,000 excess of \$15,000,000

Excess Liability – Layer 3

Insurance Company: Great American Security Insurance Co.

Master Policy Number: EXC 4051403

Limits: \$12,500,000 excess of \$12,500,000

Excess Liability – Layer 4

Insurance Company: Starr Indemnity & Liability Company

Master Policy Number: 1000587787221

Limits: \$15,000,000 excess of \$15,000,000

Insurance Company: Endurance Risk Solutions Assurance Co.

Master Policy Number: XSC30019604800

Limits: \$15,000,000 excess of \$15,000,000

Insurance Company:	Westchester Surplus Lines Insurance Company
Master Policy Number:	G72578387001
Limits:	\$20,000,000 excess of \$20,000,000

Program Definitions

Owner Controlled Insurance Program (OCIP)	The Insurance Program under which Workers' Compensation, Employer's Liability, Commercial General Liability and Excess Liability are procured or provided on a project "wrap-up" basis for Contractors/Subcontractors(s) of any tier, who have been properly enrolled, while performing operations on a designated Project Site for Memphis-Shelby County Airport Authority.
Insured	The Memphis-Shelby County Airport Authority, Contractors(s) and Subcontractors of any tier who are enrolled in the OCIP and who have been named in a policy, certificate of insurance, or advice of insurance.
Enrolled Contractors	"Enrolled Contractors", mean "Eligible Contractors" who, prior to the commencement of their work on the covered project, have completed the appropriate enrollments documents for the "designated project site".
Insurer	Insurance Company, as identified in the Insurance Policy Reference section.
OCIP Coordinator and Administrator	The firms responsible for the insurance broker and administration of the OCIP.
OCIP Safety Consultants	These representatives are employees of the Insurer and Willis Towers Watson who will provide safety consulting services to MSCAA, and its contractors enrolled in the OCIP.
Project Description	All Designated Projects identified and approved by the Owner and on file with the Insurance Company.
On-Site Activities/ Designated Project	Zurich's designated project means: "The project shown in this Schedule, including operations on the project site or location that are necessary or incidental to the project as described in contract documents. "Designated Project" includes the work site(s) associated with such "designated project(s)" and any offsite staging areas, if they are dedicated solely to the "designated project(s)" and the sponsor agrees to provide coverage. Also included are those areas immediately adjacent to the "designated projects", including boundaries of local streets or public easement, in which the enrolled subcontractors at any tier perform work under their respective contracts." The OCIP does not provide insurance coverage for permanent yards or other locations of any Contractors/Subcontractors, except as specifically requested by Contractors and, if accepted by insurer, endorsed to the policy.
Eligible Contractors	Insured by the OCIP: Eligible Contractors include all contractors providing direct labor on the Designated Project (see definition of ineligible contractors below). Temporary labor services and leasing companies are to be treated as subcontractors.
Ineligible Contractors	Not insured by the OCIP: Includes (but is not limited to) contractors performing any type of environmental remediation work (example: asbestos or underground tank removal), consultants, suppliers (that do not perform or subcontract installation), vendors, materials dealers, guard services, janitorial services, truckers (including trucking to any Designated Project where delivery is the only scope of work performed), Blasting Contractors or Any Person or organizations that manufactures or fabricates products or components outside the designated project that does not also install the product or component at the designated project, employee leasing

companies, temporary labor services and other temporary project services. However, such Employee leasing and temporary labor service companies can be insured by the OCIP but must be submitted for review to the OCIP administrator prior to acceptance.

Certificate of Insurance

Written evidence of the existence of coverage terms of a particular insurance policy.

COVERAGE SUMMARY

The OCIP coverage applies only to work performed under the Agreement at any Designated Project Site for eligible enrolled contractors. Contractor and Subcontractors must provide their own insurance as detailed in the contract.

Through a combination of insured and self-insured insurance programs the Owner, at its sole expense, will provide and maintain in force the types of insurance listed in subsection (1) through (4) below as a part of the OCIP for Contractor and eligible Subcontractors who have been enrolled. Contractor and eligible Subcontractors enrolled in the OCIP agree that the insurance company policy limits of liability, coverage terms and conditions shall determine the scope of coverage provided by the OCIP.

This section provides a brief description of the coverages provided under the OCIP. The Contractor shall refer to the actual policies for details concerning coverages, exclusions, and limitations. Policies are available for review upon request.

While the OCIP is intended to provide uniform coverages and reasonable limits, the OCIP is not intended to meet all the insurance needs of the Contractor and all eligible Subcontractors who have been properly enrolled. Contractor and eligible Subcontractors enrolled in the OCIP agree that they will discuss the OCIP with their insurance agent or consultant to ensure that proper coverages are maintained. It is the contractors' responsibility to notify their agent that the work performed on-site will be insured under an OCIP.

1) **Workers' Compensation and Employers' Liability Insurance** (Off-site operations are excluded unless locations are scheduled & approved by the Owner and OCIP insurance carriers) with Statutory Limits with All States Endorsement and minimum Employer's Liability Limits will be provided as follows:

- a) \$1,000,000 Bodily Injury with Accident - Each Accident.
- b) \$1,000,000 Bodily Injury by Disease - Policy Limit
- c) \$1,000,000 Bodily Injury by Disease - Each Employee; and

Each Enrolled Contractor will be issued a separate Workers' Compensation policy. The premium and loss experience on the Project Site will be reported to the appropriate rating authorities in the normal manner for use in calculating Enrolled Contractors' future experience modifiers. OCIP loss experience will impact Contractor's future insurance costs and, therefore, compliance with the project safety guidelines will directly benefit all Contractors.

2) **Commercial General Liability Insurance**, (Off-site operations are excluded unless locations are scheduled & approved by the Owner and OCIP insurance carriers) will be provided on an "occurrence" form under a single liability policy. Certificates of insurance will be provided to the Contractor and all tiers of eligible Subcontractors reflecting the following Limits of Liability, Coverages, and Terms:

a) Limit of Liability: Limits of Liability Shared by all Enrolled Contractors

General Aggregate Limit (Other than Products – Completed Operations)	\$4,000,000
Product-completed Operations Aggregate Limit	\$4,000,000
Personal and Advertising Injury Limit (Any One Person or Organization)	\$2,000,000
Each Occurrence Limit	\$2,000,000
Fire Legal Liability (Any One Fire)	\$250,000
Medical Expense Limit (Any One Person)	\$10,000

b) Coverage and Terms:

- i) Occurrence Basis.
- ii) Products.
- iii) Contractual Liability specifically designating the indemnity provision of this agreement as an insured contract.
- iv) Completed Operations (Six Year Term).
- v) Independent Contractor/Subcontractor's Liability.

- vi) Personal Injury, Explosion, Collapse, and Underground (X, C, U) exclusion deleted.
 - vii) Coverage limited to any Designated Project.
 - viii) General Aggregate Limits will apply per project and annually.
 - ix) Products and Completed Operations Aggregate Limit applies once or all projects and applies once for the policy period and extended completed operations period combined; and
 - x) Policy Exclusions include (but are not limited to) asbestos, pollution, mold, professional liability, employment practices, EIFS, impaired property and work or operations performed away from any Designated Project Site.
- c) If a claim arises under the Owner provided Commercial General Liability OCIP policy from the partial or sole negligence of a Contractor or Subcontractor, or for violation of any OCIP Safety Requirements, such Contractor or Subcontractor shall be responsible for reimbursing the Owner's deductible to the extent of their respective negligence, as determined solely by owner, up to a maximum of \$10,000 per occurrence per Contractor.
- d) The limits of liability detailed under 2) a) apply to construction operations within the property boundary of the applicable Airport under the management of MSCAA and as per the issued policies' definitions.
- 3) **Umbrella and Excess Liability Insurance** (Off-site operations are excluded)
- a) Limits of Liability Shared by all Enrolled Contractors
 - i) \$100,000,000 per Occurrence
 - ii) \$100,000,000 Aggregate
 - iii) \$100,000,000 Products / Completed Operations Aggregate
- 4) **Builder's Risk Insurance** will be provided on "All-Risk" coverage on a replacement cost basis, subject to the limits of the insurance policy. This insurance will include the interests of the Owner the Contractor and all tiers of Subcontractors in the Work. The Builders Risk policy will not provide coverage against loss by theft or disappearance of any materials (unless the materials are to be incorporated into the Project), tools, or equipment of the Contractor or any tier of Subcontractor, or any other person furnishing labor or materials for the Work. The Contractor shall be responsible for a deductible of \$25,000 for each loss.

ACCIDENT REPORTING AND CLAIMS PROCEDURES

When accidents happen, everyone needs to work together. Even though the Contractors and each Subcontractor has instituted tough safety measures, work-related accidents are bound to occur. When they do, the OCIP Insurers stand ready to serve the Contractors and Subcontractors, but they need help if they are to perform this service in the most effective and efficient manner.

Each Contractor/Subcontractor should have the claims procedures and emergency numbers posted on the jobsite and in all vehicles.

The Insurer will have a claims adjuster available to handle all Commercial General Liability and Workers' Compensation claims.

The Insurer will arrange for legal counsel to handle all lawsuits emanating from the project.

Never discuss any accident or claim with anyone except authorized representatives of MSCAA, Contractor, the Insurer(s), and the Owners Insurance Broker or Law Enforcement agencies.

MSCAA Emergency Procedures (Serious Injuries)

1. Contact MSCAA Emergency Dispatch at **(901) 922-8333 (DO NOT call 911)**. Specific directions should be given to the accident scene. If the accident occurred in the SIDA area, give location in relation to an active taxiway/runway. If outside the SIDA, give location relative to a street or construction gate. Explain the extent of injuries.
2. Notify the on-site OCIP Safety Coordinator, Wes Shelby, (901) 604-2136 (cell).
3. Methodist South Hospital Emergency Room, 1300 Wesley Drive, Memphis, TN, will be used (901) 516-3700, the decision on the treating medical facility will be made by the EMT, in serious cases, the Med Trauma Center may be used.
4. Contractors must always have currently qualified First Aid personnel on site. First Aid supplies must be readily available and maintained, including rubber gloves to protect First Aid personnel against blood borne pathogens, etc.
5. After the call for emergency unit is made to MSCAA, the contractor should send escorts to all locations where the emergency unit could enter the site.
6. If the injured employee does not speak English, send a good interpreter to the treating medical facility.
7. The Contractor should provide the Medical Facility with a completed Authorization for Treatment form (sample provided in the OCIP Manual).

A. Workers' Compensation Claims

1. Seek immediate medical attention for the injured person(s).
2. Immediately notify your supervisor and project manager of the situation.
3. Notify the on-site OCIP Safety Coordinator, Wes Shelby, (901) 604-2136 (cell). If you cannot reach Wes, please leave a voice mail message.
4. Complete a **First Report of Injury form** and the **Claim Reporting Cover Sheet** (include appropriate Location Code) and forward to **Zurich Insurance Company** via fax **877-967-2567** or email usz_carecenter@zurichna.com immediately. If not possible, then send before the end of the business day.
5. MSCAA the Contractor's safety representative or designated person will transport the injured worker to

Concentra Medical Center
2831 Airways Boulevard
Suite 102
Memphis, TN 38132
Phone: (901) 348-0200
Hours: 8a.m. to 8p.m. (Mon. – Fri.)

If accident occurs and Concentra Medical Center is not open:

Methodist South Hospital
1300 Wesley Drive
Memphis, TN 38116
Phone: (901) 516-3700
24 Hours, 7 days per week

Or

Baptist Memorial Hospital DeSoto
7601 Southcrest Parkway
Southaven, MS 38671
Phone: (662) 349-4000
24 Hours, 7 days per week

6. Complete the **Accident Investigation Form** and forward it along with the **Claim Reporting Cover Sheet** to Wes Shelby, OCIP Safety Coordinator (e-mail: Wes.Shelby@willis.com, fax: (901) 345-6636, or mail: 4225 Airways Blvd., Memphis, TN 38116 before the end of the day.
7. Receipt of Acknowledgement of Claim and claim number from Zurich Insurance Company will be sent to the contact person provided on the Claim Reporting Cover Sheet and to Wes Shelby, OCIP Safety Coordinator. The claim number should be used for future reference.
8. All medical bills, hospital bills, etc. should be forwarded to Zurich Insurance Company identifying the injured employee and claim number.

After Hours / Close of Business Claims Reporting

1. Call Zurich Insurance Company at (800) 987-3373.
2. Tell the Zurich representative that an injury just occurred and that you need to be routed to the on-call specialist to authorize treatment.
3. You will either be placed directly in touch with the on-call person, or the on-call person will be paged and will return your call within two hours.
4. If hospital needs to speak with Zurich directly, the contractor will have to supply the hospital name and phone number to Zurich, and they will call the hospital directly.

B. Commercial General Liability Claims

Any occurrence involving Bodily Injury or Property Damage to members of the public that is NOT caused by an automobile accident.

1. Seek immediate medical attention for any injured person(s).
2. Immediately notify your supervisor and project manager of the situation.
3. Notify the on-site OCIP Safety Coordinator, Wes Shelby, (901) 604-2136 (cell). If you cannot reach, please leave a voice mail message.
4. Complete the **Claim Reporting Cover Sheet** (include appropriate Location Code) and forward to Zurich Insurance Company via fax **(866) 691-7068** or email usz_carecenter@zurichna.com immediately. If not possible, then send before the end of the business day.
5. Complete the Accident Investigation Form and Claim Reporting Cover Sheet (include appropriate Location Code) and forward to Wes Shelby, OCIP Safety Coordinator, (e-mail: wes.shelby@willis.com, fax: (901) 345-6636, or mail: 4225 Airways Blvd., Memphis, TN 38116).
6. Receipt of Acknowledgement of Claim and claim number from Zurich Insurance Company will be sent to the contact person provided on the Claim Reporting Cover Sheet and to Wes Shelby, OCIP Safety Coordinator. The claim number should be used for future reference.
7. All investigation reports, pictures, medical bills, hospital bills, etc should be forwarded to Zurich Insurance Company identifying the injured individual, claimant and claim number.

C. Duties in the event of a claim or suit

1. Follow the claims reporting procedures above.
2. You must see to it that the OCIP Safety Coordinator, Wes Shelby, is notified promptly of an "occurrence" which may result in a claim. Notice should include:
 - a. How, when and where the "occurrence" took place; and
 - b. The names and addresses of any injured persons and witnesses.
3. If a claim is made or "lawsuit" is brought against any insured, you provide written notice of the claim or "lawsuit".
4. You and any other involved insured must:

- a. Cooperate with the Insurer in their investigation, settlement or defense of the claims or “suit”; and
 - b. Assist the Insurer, upon their request, in the enforcement of any right against any person or organization which may be liable to the insured because of injury or damage to which this insurance may also apply.
5. No Insureds will, except at their own cost, voluntarily make a payment, assume any obligation, or incur any expense, other than for first aid, without Insurer’s consent.

D. Automobile Claims

Even though no Automobile Liability or Physical Damage coverage is provided under the OCIP, the Contractor/Subcontractor must notify Wes Shelby, OCIP Safety Coordinator, in writing of any automobile accident which could be related to the project. This should be done as soon as possible following the accident.

E. Contractor's Equipment Claims

Even though no coverage is provided under the OCIP for loss of or damage to Contractor's or Subcontractor's owned equipment the Contractor/Subcontractors must notify Wes Shelby, OCIP Safety Coordinator, in writing, of any loss or damage to their equipment at the project. This should be done as soon as possible, following first knowledge of loss or damage.

F. Miscellaneous Claims Notes

1. Any incident that involved injury to persons or property is to be reported to Wes Shelby, OCIP Safety Coordinator's office immediately.
2. Any claims adjuster representing a Contractor/Subcontractor's normal insurer who seeks to come onto Any Designated Project site must obtain written authorization from Wes Shelby, OCIP Safety Coordinator, prior to coming on the site. There will be no exceptions to this stipulation.

FORMS

Zurich Claim Reporting Cover Sheet

Incident Investigation Report

Workers' Compensation Referral Slip for Injured Employees

Authorization to Treat

Form 1 – Notice of Sub-contract Award

Form 2 – Enrollment Form

Form 4 – Notice of Anticipated Completion

Certificate of Insurance

ZURICH CLAIM REPORTING COVER SHEET

Email to: USZ_CARECENTER@ZURICHNA.COM

OR

Fax to: (866) 691-7068

Account Name: Memphis Shelby County Airport OCIP V

Master WC policy #:	WC	6675835-00
Master GL Policy #:	GLO	6675834-00

Project Location: _____

Subcontractor/Employer: _____

Subcontractor/Employer Policy Number: _____

Contact Name: _____

Contact Phone Number: _____

Contact Fax Number: _____

Location Code: _____

Injured Worker: _____

Attention Zurich Representative – Please fax the receipt and claim number immediately to the contact above.

Incident Investigation Report

(To be completed within 24 hours by Supervisor at time of incident)

INJURED EMPLOYEE INFORMATION

Employee Name	Male	Female	Date of Birth	Ht.	Wt.
Employee Address	Street	City	State	Zip Code	Home Phone
Employer Name	Address				
Date of Incident	Time	AM/PM	Jobsite/Area		
Employee Job Title	Length of Employment				
Weather Condition	Shift	Supervisor			

UNSAFE ACTS

What actions caused or contributed to the incident?

- ☐ Operating equipment without authority
- ☐ Failure to warn/signal
- ☐ Failure to secure/lock out/tag out
- ☐ Reaching into/servicing equipment in operation
- ☐ Making safety devices inoperable
- ☐ Used defective equipment
- ☐ Took unsafe/improper position
- ☐ Horseplay, disruptive actions
- ☐ Improper lifting or movement
- ☐ Other: _____
- ☐ No unsafe action

What actions caused or influenced above unsafe acts?

- ☐ Unaware of job hazards
- ☐ Inattention to hazards
- ☐ Unaware of safe method/procedure
- ☐ Tried to gain or save time
- ☐ Influence of fatigue/illness
- ☐ Influence of emotions/stress
- ☐ Defective vision/bodily defects
- ☐ Under influence of alcohol or drugs
- ☐ Failure to enforce procedures/rules
- ☐ Other: _____

UNSAFE CONDITIONS

What conditions of tools, equipment, or environment contributed to incident?

- ☐ Inadequate guard/barrier/safety device
- ☐ Inadequate/improper protective equipment
- ☐ Inadequate warning system
- ☐ Defective or work tools/equipment materials
- ☐ Congestion or restricted area
- ☐ Fire or explosion hazard
- ☐ Hazardous storage method
- ☐ Unsecured against movement
- ☐ Lighting/noise/visual obstruction
- ☐ Environmental/atmospheric conditions
- ☐ Other: _____
- ☐ No unsafe condition

What caused or influenced above unsafe condition?

- ☐ Defective/worn from normal use
- ☐ Defective/worn from abuse/misuse
- ☐ Housekeeping/cleaning failure
- ☐ Lack of preventative maintenance
- ☐ Inadequate maintenance
- ☐ Exposure to environment
- ☐ Inadequate purchasing
- ☐ Safety inspection failure
- ☐ Other: _____
- ☐ Unknown

INJURY/ILLNESS DATA

Describe the nature and extent of injury/illness (body part affected, type of injury, etc.) _____

Was first aid administered?	Yes	No	If yes, what type and by whom
Was employee taken to hospital/clinic?	Yes	No	If yes, list name, address, and phone number of hospital/physician/nurse attending

List any eyewitnesses to the incident and others who might provide information about the incident _____

INCIDENT/ILLNESS EVALUATION

How did the incident occur? Describe in detail the task the employee was doing when injured or became ill. Include specifics such as equipment, structure tools, materials, objects (size, shape, and weight), people involved in the task, positions, distances, rate of movement, sequence of events, etc.

(Attach any additional information comments, documentation of interviews, sketches, pictures, etc. as necessary)

Incident Investigation Report**Incident/Illness Evaluation (continued)**

Type of exertion/body motion during injury: Pull _____ Lift _____ Bend _____ Reach _____ Twist _____ Other _____
 Was this the employee's regular job? Yes _____ No _____ How much experience does this employee have on this job? _____
 Was the employee trained in this job or task? Yes _____ No _____ When was last training on this task? _____
 Was this the employee's first job-related injury or illness? Yes _____ No _____ If no, briefly describe previous injuries (date, nature, extent, etc.) _____

Hours of overtime worked in last 24 hours _____ Did this possibly contribute to incident? If so, describe _____

Does a safety rule or policy apply to this task? Yes _____ No _____ If yes, describe rule and how employee followed or violated _____

Does a specific procedure for task exist? Yes _____ No _____ If yes, describe procedure briefly and if it was followed _____

Is protective equipment required for this task? Yes _____ No _____ If yes, describe equipment, if it was used, if it was adequate/functioned properly, and if the employee(s) were trained on it. _____

Is there possibly any third party which contributed to the incident? (Other contractors, employee, etc.) Yes _____ No _____
 If yes, describe. _____

Did any unsafe physical/environmental conditions exist? Yes _____ No _____ If yes, describe conditions (physical, mechanical, electrical, etc.) which contributed to the incident _____

Is material handling equipment required for this task? Yes _____ No _____ If yes, was it used and did it function properly? _____

Possible actions to be taken to prevent reoccurrence

_____ Reinstruction of employee(s) involved	_____ Do/revise Job Safety Analysis	_____ Repair/replace/modify equipment
_____ Preventative instruction of others who do job	_____ Revise/establish safety rule	_____ Improve clean-up procedure
_____ Training of employee(s)	_____ Reassign employee to another job	_____ Improve inspection procedure
_____ Action to improve enforcement	_____ Require/replace protective equipment	_____ Eliminate/reduce congestion
_____ Reprimand/discipline of employee(s) involved	_____ Install safety guard device	_____ Improve design/construction
		_____ Improve environmental conditions

CORRECTIVE ACTION(S) TAKEN OR PLANNED

What was/will be done	By Whom	Estimated Completion Date	Completion Confirmed	
			Date	Initials

Was incident discussed with employee to prevent reoccurrence? Yes _____ No _____ Date _____
 Any disciplinary action taken? Yes _____ No _____ If yes, describe what type. _____

FOLLOW UP COMMUNICATION

YES _____ NO _____ Incident site reviewed by supervisor with employee (and safety coordinator if applicable.)
 YES _____ NO _____ Incident review meeting conducted. Attended by _____
 YES _____ NO _____ Employee or supervisor reviewed incident with work group.
 YES _____ NO _____ Employee reviewed injury with safety committee
 YES _____ NO _____ Project Safety informed of incident

Date of Report _____ Prepared by _____ Signature _____ Title _____

Reviewed by _____ Superintendent _____

MSCAA OCIP V

4225 Airways Blvd.
Memphis, TN, 38116

WORKER'S COMPENSATION REFERRAL SLIP FOR INJURED EMPLOYEES

On-Site EMT: (901) 922-8333

Authorized Clinic: **Concentra Medical Center**
2831 Airways Boulevard
Suite 102
Memphis, TN 38132
(901) 348-0200 (Phone)
(901) 348-0046 (Fax)

Clinic Hours: 8 a.m. to 8 p.m. (Mon. – Fri.)

Authorized After- **Methodist South Hospital**

Hours Clinics: **1300 Wesley Drive**
Memphis, TN 38116
(901) 516-3700

Baptist Memorial Hospital DeSoto

7601 Southcrest Parkway
Southaven, MS 38671
(662) 349-4000

Employee Name: _____ Date: _____

Employer: _____ Employer Policy Number: _____

Location Code (if known): _____ Claim Number (if known): _____

Account Name: **Memphis Shelby County Airport Authority OCIP V**
Insurer: **Zurich**
Master Policy Number: **WC 6675835-00**

Instructions for medical facility:

The person listed above has been injured on the job. Please provide the employee with medical treatment per OCIP protocol.

MSCAA OCIP V
Authorization to Treat

Local Office Information

Company Name: _____
Designated Representative: _____
Address: _____
Phone: _____ **Fax:** _____ **E-mail:** _____

Billing Information for Drug Screens

Company Name: **Zurich North America**
Address: PO Box 968077
Schaumburg, IL 60196-8077

Phone: (800) 366-8366 Fax: (615) 872-1303

Insurance Information for Work Comp Carrier

Company Name: Zurich American Insurance Company **Master Policy #: WC 0183275-00**
Address: PO Box 968077
Schaumburg, IL 60196-8077

Phone: (877) 928-4531 Fax: (866) 691-7068

Services Required

Worker's Comp Injuries _____

Drug Screen Required For (employer to check necessary testing):

☐ Pre-Employment	☐ Random
☐ Probable Cause	☐ Post Accident
☐ Urine (collection only)	☐ Breath Alcohol
☐ Test Cup (Cocaine, PCP, etc.)	

Treating Medical Center: Please be advised if negative, DO NOT send out. Be sure to mark on the Chain of Custody (COC) the information for the employer:

Employer: _____ **Fax:** _____

Special Instructions: Use TEST CUP. Do NOT send out unless the test reads positive.

Fax results to designated employer listed above.

Company Authorized Signature: _____ **Date:** _____

MSCAA OCIP V

Notice of Subcontract Award and Request for Insurance

Send this Form to:

Willis Towers Watson

Starla Lacey, CSS

Copy: Nancy Jarmon, CSS

500 N. Akard St., Suite 4300

Dallas, TX 75201

Phone: (972) 715-6303

Email: starla.lacey@wtwco.com

Email: nancy.jarmon@wtwco.com

Phone: (404) 536-8567

RE: Project Name: _____

This is to inform you that we have awarded the following subcontract to the following Subcontractor:

Name of Firm: _____

Address: _____ City: _____ State: _____ Zip: _____

Phone: (____) _____ Fax: (____) _____

Office Contact: _____ E-Mail: _____

Type of Work: _____ Job # _____ Contract Value: \$ _____

Award Date: _____ Estimated Start Date: _____

Awarding Contractor: _____

By: _____

Title: _____

Date: _____

Prime Contractor (if different) _____

DO NOT complete this form for your own company.

A Form-1 should be completed on each of your Subcontractors.

- **Award Date – date Notice to Proceed was given (Verbally or in Writing)**
- **Start date is mandatory – date shown will be the effective date of coverage.**

Any Contractors or Subcontractors who enrolls in the OCIP 30 days after their start date will have to provide a No Known Loss Letter to the Carrier along with the enrollment documentation.

- ☐ Additional Contract
☐ Time & Material Contract
☐ Short Term (< 30 days)
☐ Small Contract (< \$30,000)

MSCAA OCIP V ENROLLMENT FORM

Project: _____

CONTRACTOR'S INFORMATION

Contractor: _____ Indv _____ Ptshp _____ Corp _____ J/V _____
 Address: _____ FEIN: _____
 Office Contact: _____ Phone: _____ Email: _____
 Site Contact: _____ Phone: _____ Email: _____
 Safety Contact: _____ Phone: _____ Email: _____
 Insurance Contact: _____ Phone: _____ Email: _____
 Payroll Contact: _____ Phone: _____ Email: _____
 Address (if different): _____

CONTRACT INFORMATION

Contract Value: \$ _____

Job Name/Description: _____ Contract/JOB #: _____
 Awarding Contractor: _____ Prime Contractor: _____
 Award Date: _____ Start Date: _____ Est Completion Date: _____
 Self Performed: _____ %, Est. CV \$: _____ Subcontracted _____ %; Est. CV \$: _____
 Est. # of Subcontractors _____ Est. Man hours _____ DBE/MBE/WBE: _____

CURRENT INSURANCE INFORMATION;

Contractors' Insurance Broker or Agent:

PLEASE PRINT

Company Name: _____ Contact: _____
 City/State/Zip: _____ Phone: (_____) _____

WORKERS' COMPENSATION

Current Experience Modifier: ____ (Provide documentation confirming)

W.C. Classification	W.C. Class Codes	Estimated Payroll
1.		
2.		
3.		
4.		

It is each Contractor's responsibility to notify its own insurance carrier to exclude all work to be done under this contract from your current insurance program. Any Contractors or Subcontractors who enrolls in the OCIP 30 days after their start date will have to provide a No Known Loss Letter to the Carrier along with the enrollment documentation.

Contractor warrants that the insurance costs for coverages provided by the Owner have been removed from the bid and no eligible Subcontractor has been charged by the Contractor for its participation in the OCIP. The OWNER, or their Agent, is granted permission by Contractors to inspect the insurance and payroll records. At completion of the Work, Owner's Agent shall have the right to audit the project payroll records of Contractors. Any and all returns of premiums, dividends, discounts or other adjustments to any OCIP policy, including rights of cancelation, is assigned, transferred and set over absolutely to OWNER. This assignment is valid for insurance policies whose premiums have been paid by the OWNER on behalf of such Contractors.

Signed _____ Title _____ Date _____

Send this Form to:

Willis Towers Watson

Starla Lacey, CSS

Copy: Nancy Jarmon, CSS

500 N. Akard St., Suite 4300

Phone: (972) 715-6303

Email: starla.lacey@wtwco.com

Email: nancy.jarmon@wtwco.com

Phone: (404) 536-8567

MSCAA OCIP V
NOTICE OF ANTICIPATED COMPLETION
 (to be submitted with Final Pay Request)

Send this Form to:**Willis Towers Watson****Starla Lacey, CSS****Copy: Nancy Jarmon, CSS****500 N. Akard St., Suite 4300****Dallas, TX 75201****Phone: (972) 715-6303****Email: starla.lacey@wtwco.com****Email: nancy.jarmon@wtwco.com****Phone: (404) 536-8567**

Please be advised, we, _____ are scheduled to complete our work

for: Awarding Contractor: _____ Prime Contractor: _____

Project Description: _____ Actual Start Date: _____ Completion Date: _____

Reported Contract Value: _____ Final Contract Value: _____

Self Performed Work: _____ Subcontracted Work: _____

Estimated WC On Site Payroll: _____ Final WC On Site Payroll: _____

We used the following enrolled subcontractors, who will also complete their work on the date shown above:

<u>Subcontractors</u>	<u>Reported Contract Value</u>	<u>Final Contract Value</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

This is our contract: YES ☐ NO ☐

We are still working on the following contracts:

<u>Location Code</u>	<u>Awarding Contractor</u>	<u>Prime Contractor</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Your Company's Name: _____ Date: _____

By: _____ Title: _____

Final insurance audits may be made under the applicable policies. Please show who in your office (or another location if applicable) is responsible for this information:

Name: _____ Phone: _____ Fax: _____ E-Mail: _____

Address: _____ City: _____ State: _____ Zip _____



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Agent Company Name Address City, State ZIP Attn:	CONTACT NAME:	
	PHONE (A/C, No. Ext):	FAX (A/C, No):
INSURED OCIP Enrolled Contractor	E-MAIL ADDRESS:	
	INSURER(S) AFFORDING COVERAGE	
	NAIC#	
	INSURER A : AM BEST Rating A- VII or better	
	INSURER B :	
	INSURER C :	
	INSURER D :	
INSURER E :		
INSURER F :		

COVERAGES

CERTIFICATE NUMBER:

REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN. THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YY)	LIMITS
	GENERAL LIABILITY <i>Applies to Off Site Risks</i>	X	X				EACH OCCURRENCE \$1,000,000
X	COMMERCIAL GENERAL LIABILITY						DAMAGES TO RENTED PREMISES(Ea occurrence) \$
	CLAIMS-MADE ☒ OCCUR						MED EXP (Any one person) \$
							PERSONAL & ADV INJURY \$1,000,000
							GENERAL AGGREGATE \$2,000,000
							PRODUCTS-COMP/OP AGG \$2,000,000
	GEN'L AGGREGATE LIMIT APPLIES PER:						
	☐ POLICY ☒ PRO-JECT ☐ LOC						
	AUTOMOBILE LIABILITY <i>Applies to Off and On Site Risks</i>	X	X				COMBINED SINGLE LIMIT (Ea accident) \$1,000,000
	ANY AUTO						BODILY INJURY(Per person) \$
X	ALL OWNED AUTOS						BODILY INJURY(Per accident) \$
X	HIRED AUTOS						PROPERTY DAMAGE (Per accident) \$
	SCHEDULED AUTOS						\$
	NON-OWNED AUTOS						\$
X	UMBRELLA LIAB	X					EACH OCCURRENCE \$1,000,000
	EXCESS LIAB		X				AGGREGATE \$1,000,000
	DED ☐ RETENTION \$ ☐						\$
	WORKERS' COMPENSATION AND EMPLOYERS' LIABILITY <i>Applies to Off Site Risks</i>	N/A	X				X WC STATUTORY LIMITS OTH-ER
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. EACH ACCIDENT \$1,000,000
							E.L. DISEASE - EA EMPLOYEE \$1,000,000
							E.L. DISEASE - POLICY LIMIT \$1,000,000
	OTHER						

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

Workers' Compensation and Commercial General Liability coverages shown above do not apply to any Designated Project at the Memphis International Airport – only for off-site activities/operations. The Memphis-Shelby County Airport Authority, its officers, commissioners, representatives, agents and employees ATIMA and [AWARDING CONTRACTOR] are additional insureds applicable to the Auto Liability Insurance and off-site Commercial General Liability insurance policies including Excess Umbrella. 30 Day Notice of Cancellation or Non-Renewal other than 10 days for non-payment of premium is provided to MSCAA. Waiver of Subrogation in favor of MSCAA is provided by all policies.

CERTIFICATE HOLDER

MSCAA OCIP
c/o Willis Towers Watson
Attn: OCIP Administrator
500 North Akard St., Suite 4300
Dallas, TX 75201

CANCELLATION

SHOULD ANY OF THE ABOVE-DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

EXHIBIT D
TO
UNIT PRICE CONSTRUCTION CONTRACT
FOR
PROJECT TITLE

BY AND BETWEEN
THE MEMPHIS-SHELBY COUNTY AIRPORT AUTHORITY
AND
(CONTRACTOR NAME)

CONSTRUCTION SAFETY AND HEALTH GUIDELINES

OCIP CONSTRUCTION SAFETY AND HEALTH GUIDELINES

Memphis-Shelby County Airport Authority

Construction Safety and Health Guidelines



Revision	Date
1	11/30/2012
2	05/02/2016
3	02/06/2017

Confirmation of these Project Safety & Health Guidelines

It is the responsibility of the Contractor to maintain total control of safety to ensure that employees and the general public are provided with an environment free of hazards during construction and renovation activities. This program does not relieve the Contractor of their responsibilities regarding the safety of their employees, the employees of their Subcontractors and sub-subcontractors, protection of the general public and the preservation of property.

Contractors shall develop their own written site-specific safety and health plans for the Memphis-Shelby County Airport Authority. At minimum, the safety and health plan shall meet the requirements of 29CFR1926 – Federal OSHA Construction regulations and the requirements established in the **Memphis-Shelby County Airport Authority Construction Safety Guidelines**. In short, as required by law, each Contractor is responsible for protecting the health and safety of its employees and the employees of each subcontractor and sub-subcontractor while ensuring they have a safe and healthful place to work. The site-specific safety and health program shall be submitted for approval within fifteen (15) days after the Notice to Proceed for approval to the Project Safety Manager, Wes Shelby, 4225 Airways Blvd., Memphis, TN.

The Safety Requirements of these safety guidelines are a supplementary document to all Government rules, codes and regulations. It does not negate, abrogate, alter or otherwise change any provisions of these rules, codes and/or regulations, and is intended to supplement and enforce the individual program of each contractor and the overall safety effort. It is understood that the ultimate responsibility for providing a safe place to work rests with each individual Contractor.

In the event of a conflict between the provisions of these guidelines and applicable local, State or Federal safety and health laws, regulations and/or standards, contract documents or the Contractor's Safety Plan the more stringent shall apply.

By Signature, each individual confirms their understanding of the contents of this manual and shall conform to the standards of safety outlined in this manual.

Contractor – Project Manager

Contractor – Field Supervisor

Date

Date

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POLICY STATEMENT

Memphis-Shelby County Airport Authority is committed that all construction workers have the best possible working environment while working on this project. It shall be the responsibility of each Contractor/Subcontractor to abide by the Safety and Health Provisions listed in OSHA 29 CFR 1926.

In addition, each Contractor, Subcontractor and Sub-Subcontractor shall abide by **Memphis-Shelby County Airport Authority** Construction Safety Guidelines, Federal Regulations, State laws and regulations, local and county laws and regulations which are applicable.

The primary goal established for the **Memphis-Shelby County Airport Authority** is to safely perform work with “**ZERO ACCIDENTS**”; totally free from lost time injuries for the mutual benefit of the worker, environment, and community.

The safety goals and objectives established for the Project can only be achieved when everyone commits to perform their tasks safely and efficiently. This commitment to achieve these goals will result in both increased productivity and the PREVENTION of job related injuries and illnesses. This will be considered as safe construction.

Definitions

OCIP Team – Means the Owner **Memphis-Shelby County Airport Authority**, Willis Towers Watson and all applicable insurance carrier representatives or the representative of defined such agencies and firms working together to implement the OCIP insurance program.

Construction Managers – Means the Management Group or General Contractor that has direct contract with the Owner **Memphis-Shelby County Airport Authority** to provide the overall control of the construction at the project.

General Contractor – Means the Contractor that has direct contract with the owner or Construction Managers as bid for the project. The General Contractor is also the controlling contractor on the construction site when a Construction Manager is not present.

Subcontractor – Means the contractor and or contractors that carry contracts with the General Contractor or Construction Managers. Subcontractors bid portions of the scope of work to be completed.

Sub-Subcontractors – Means any subcontractors of a subcontractors working or contracted to do work on the project.

Critical Lift – A lift that exceeds 75% of the rated capacity of the crane or requires the use of more than one crane. Also, relates to the installation of equipment and or materials that are critical to the completion of the project and damage to such equipment and/or material could result in delays to the project.

The General Public – Is defined as all persons not employed by or under contract, subcontract or sub-subcontract to the **Memphis-Shelby County Airport Authority**.

PREFACE

From the inception of **Memphis-Shelby County Airport Authority** there has been a determination and commitment to provide a safe environment for all workers and for the public from hazards associated with the construction of the Project.

All Contractors shall implement measures that will create safety awareness, promote safe work practices at the job site and pursue the contract objectives in the safest possible manner. Each Contractor shall bear sole and exclusive responsibility for safety in all phases of their work. Nothing contained herein shall relieve such responsibility.

Each Contractor shall be responsible for all its subcontractors' and sub-subcontractors' compliance with the project safety requirements.

Contractors shall develop their own written site-specific safety and health plan for the MSCAA OCIP. At minimum, the safety and health plan shall conform to the requirements addressed in the Occupational Safety and Health Act of 1970 and all additions and revisions thereto, and the requirements established in the **Memphis-Shelby County Airport Authority** Construction Safety Guidelines. In short, as required by law, each Contractor is responsible for protecting the health and safety of its employees while ensuring they have a safe and healthful place to work.

Contractor developed plans/program(s).

Programs will be reviewed and approved by OCIP Team. Example(s) of such OSHA mandated plans/programs are shown below.

Site Traffic Control Plan	Fall Protection Plan
Fire Protection Plan	Trench Safety Plan
Respiratory Protection Plan	Hazard Communication Program
Confined Space Entry	Scaffold Safety Program
Hearing Conservation Program	Ladder Safety Training
Dust Control Plan	

Emergency Procedures shall be made part of the Contractor's Safety Program. The following provisions shall be included in the emergency plan:

- a. Highest ranking supervisor automatically becomes responsible for the handling any emergency that occurs during his working hours; they may call upon the assistance of any available worker. A responsible supervisor must be designated for each shift.
- b. On a regular basis, at both supervisory and "weekly tool box meetings" instruct and update all employees in any course of action for emergencies.
- c. Establish teams to handle each of the various emergencies.
- d. Following an emergency, ranking personnel shall secure the area as expediently as possible and provide access and an account of the emergency to authorized representative(s) of MSCAA. Questions from the media should be referred to MSCAA.

Emergency procedures that may occur during any 24-hour period in the following categories must be established by each contractor:

- a. Fire
- b. Employee injury
- c. Pedestrian injury due to work activity of any kind
- d. Property damage and damage to above ground and buried utilities
- e. Public demonstrations
- f. Bomb threats

On a regular basis, the Contractor shall review and, when necessary, update Emergency Procedures for maximum effectiveness. The contractor should provide MSCAA, the Construction manager, and the on-site safety rep a telephone list of key management personnel, for after-hours emergency contact.

Should a serious accident or emergency occur, the contractor shall contact the Construction Manager immediately. If an emergency requires the presence of an ambulance or the Fire Department, including nights, weekends and holidays, the contractor shall call MSCAA emergency dispatch at (901)922-8333. Non injury accidents need to be reported to the airport police at (901)922-8298. **DO USE 911**

Site Access

1. ***Use only designated haul routes/crossings.***
2. ***Stay in assigned work area as identified on plans and as defined by fences and barricades. Barricades/fences must not be crossed.***
3. ***Instructions from guards and escort personnel must be obeyed.***

Contractors, Subcontractors, and Sub-Subcontractors will be monitored for implementation and application of their

respective safety programs at the work site. Members of the OCIP Team shall have the authority to stop work when either site conditions and/or work practices present an imminent danger until those conditions and/or practices are corrected. Contractors will be notified of any non-compliance and corrective action required. This notice, when delivered to the contractor or their representative at the site of the work, shall be deemed sufficient notice of non-compliance and corrective action required. After receiving the notice, the contractor shall immediately take corrective action. If the contractor fails or refuses to take corrective action promptly, a stop work order may be issued. The cost to bring the work activity into compliance shall be incurred by the Contractor, Subcontractor or Sub-subcontractor. The Contractor, Subcontractor or Sub-Subcontractor shall not submit a request for extension of time or increased costs as a result of any such stop work order. Members of the OCIP Team shall not be liable for any damages experienced by the Contractor due to the work stoppage. Progress payments may also cease until the Contractor and/or its Subcontractor and Sub-Subcontractors is in full compliance with all applicable safety and health rules, standards and regulations.

Each Contractor and their subcontractors and sub-subcontractors shall establish and enforce an effective disciplinary program (Appendix B). Contractors shall discipline and/or dismiss employees who violate established rules and regulations. This includes immediate termination for serious violations, repeated violations, or the refusal to follow safety and health rules.

OCIP Team members shall have the authority to effectively remove from the site, any person (employees including supervisors and management of any contractor) who is regarded as a frequent violator of safe work practices, or who fails to ensure persons working under their supervision or in a work place they control are not exposed to serious work hazards. Any Competent Person assigned to identify existing and predictable hazards and authorized to eliminate them, which fails to perform this duty for any reason shall be replaced by the employer.

The Contractor shall not receive additional payment or reimbursement for safety items and procedures which have been identified as required by the Project Safety and Health Guidelines.

Failure to comply with the contract safety requirements will be considered as non-compliance with the contract and may result in remedial action including withholding of progress payments due the Contractor and/or termination of the Contractor from the site.

In the event the work or any portion thereof is shut down by either an outside agency or because of an unsafe condition as determined by the OCIP Team, the responsible Contractor shall bear the total cost caused by that shut down.

In no case shall the Contractor be relieved of overall responsibility for compliance with the requirements of federal, state and local safety and health laws for all work to be performed under the contract

For any construction equipment working near operating right of way and in aircraft safety areas that could encroach into MSCAA's operating right of way and air craft safety areas shall submit to MSCAA (and obtain approval from the MSCAA) a plan describing the use of such equipment, and the necessary precautions to be taken to preclude any accidental encroachment unto the right of way or aircraft safety area.

INTRODUCTION

Construction Safety and Health Guidelines, Purpose and Scope

These guidelines are established to aid in the prevention of job-related accidents and health problems during the construction of the **Memphis-Shelby County Airport Authority**. These guidelines set forth elements which all Contractors, subcontractors and sub-subcontractors shall include in their safety plan. This manual is not all-inclusive. Other elements may be added, or conveyed individually to Contractors to whom they expressly apply. There are other essentials which some Contractors, by nature of the specific type of work being performed, must integrate within their own safety plan.

These guidelines set forth basic rules and regulations for all personnel involved in the construction of the Project. The intent of these guidelines is to enhance and supplement the safety and health standards which are required by law, in contract documents, and are applicable to the construction projects for which it is applied. These guidelines do not cover the full spectrum of published safety and health standards mandated by law, and Contractors shall not assume that they are responsible only for those which are referenced in this manual, nor that they are current and quoted as published. It is the responsibility of the Contractor and its employees to ensure that they are in compliance and their safety plan is in compliance with all safety directives required by law.

In the event of a conflict between the provisions of these guidelines and applicable local, State or Federal safety and health laws, regulations and/or standards, contract documents or the Contractor's Safety Plan the more stringent shall apply.

RESPONSIBILITIES

General

Each participant involved in the construction of the Project is individually responsible for conducting their activities to ensure compliance with all applicable safety and health requirements. Construction activities of the Contractor and their Subcontractors and sub-subcontractors will be monitored for compliance with FAA, MSCAA, Federal, State, County, and local safety and health regulations and contract safety and health requirements.

Contractors

The Contractor shall be responsible for the safety and health of employees, subcontractors, sub-subcontractors, visitors, and vendors in accordance with State, Local and Federal regulations, and the Contract Documents. Each Contractor shall establish and submit for review a written Safety and Health Plan which includes details commensurate with the work to be performed. The Contractor's Safety and Health Plan shall clearly describe the contractor's commitments for meeting its obligations to provide a safe and healthful work environment for its employees and subcontractor employees, to protect vendors, visitors, and members of the general public. The Contractor's Safety and Health Plan shall reference Federal OSHA standards, and any other rules or regulations applicable to construction activities.

Each Contractor shall designate an on-site Safety Representative who is charged with the responsibility of on-site safety management. The Safety Representative's sole duty shall be safety management and shall not have other collateral duties. At minimum the safety representative shall meet the requirements of a "competent person" as defined by OSHA for all phases of construction and have a minimum of three (3) years construction safety experience. A resume shall be provided that outlines such items as: work experience, education, training completed and professional organizations, etc. The safety representative shall remain on the Project until contract acceptance (full-term of contract). Safety representative must be knowledgeable on SC-230, SC-240, and other safety requirements as outlined in GP-200, the safety plan and site safety manual. The safety representative shall be interview by the OCIP Team.

As a condition of this contract, a safety improvement team shall be established for this project. The following guidelines (Appendix H) shall be followed.

As a condition of their contract, all Contractors shall submit to the Project Safety Manager or designee:

- A site-specific safety plan within fifteen (15) days after receipt of Notice to proceed and prior to start of any construction activities.
- The name and qualifications (resume) of designated on-site safety person;
- An immediate copy of all citations and/or warning of safety violations received from any state or federal jurisdiction, agency, insurance company, or by any of its subtier contractor.

The Contractor shall:

- Ensure that all employees, subcontractors' and sub-subcontractors' employees are given a comprehensive Safety and Health orientation. This orientation shall include general Safety and Health procedures and policies as well as the project specific rules, regulations and specific hazards. Employees shall be advised that disregard for these rules, or any other applicable Safety and Health regulations shall be subject to company disciplinary action and/or removal from the project. All workers shall complete an acknowledgment that indicates the worker has read, understood, and will abide by the rules and regulations. The following information shall be obtained from all employees: worker's name, date of orientation, Contractor's name and project name (Appendix A).
- Investigate all accidents and incidents that result in personal injury or illness to workers, damage to buildings or equipment and any incident with the public.

- Conduct daily job inspections, identify unsafe conditions or work practices and assure they are corrected, and maintain documentation.
- Conduct weekly, documented, safety meetings with Contractor supervisory personnel.
- Attend monthly Safety committee meetings and participate
- Assure that employees acting in a supervisory capacity understand and enforce all safe work practices. **Foreman and supervisors are required to have completed a 10-hour OSHA Outreach hazard recognition course within Two (2) years prior to directing work on the project.** Documentation must be made available for review
- Assure that employees acting in a supervisory capacity understand and enforce all safe work practices. **Foreman and supervisors are required to have completed a 10-hour OSHA Outreach hazard recognition course within Two (2) years prior to directing work on the project.** Documentation must be made available for review.
- Assure a Competent Person is provided at work locations where required by OSHA.
- Assure that all Personal Protective Equipment (PPE) is available and being used as required.
- Assure all construction equipment and motor vehicles certification, inspection, repair and controls are in compliance with the safety requirements of the project and OSHA. Annual crane certification shall be available for review for each to a crane on the project.
- Prior to making critical crane lift, detailed lift plan shall be submitted. (See Appendix C, "Critical Lift Checklist")
- Assure that all hand and power tools are in safe working order.
- Assure that all work areas are kept clear of debris and trash and that adequate trash barrels are placed throughout the work area and emptied frequently.
- Provide the appropriate number and types of sanitary facilities for employees.
- Assure that fall protection equipment is provided and used. Inspections of this equipment shall be documented and on file for review.
- Assure that all perimeter cables, barricades, or any other safety-related items are installed correctly and maintained. If another Contractor must remove a safety item, coordinate this activity with the Contractor who installed the device and other Contractors who may be exposed. **Safety devices shall be replaced by the Contractor removing them.** Warning signs, tags, or barricades shall be installed if other safety devices are removed.
- Assure that employees receive adequate training as required by the Project and OSHA. Additional training for foreman and safety representative may be required based on unique hazards involved in a task.

WORKPLACE SUBSTANCE ABUSE POLICY

The contractor shall submit as a part of their overall Safety and Health Plan a copy of their company Workplace Substance Abuse policy. This policy shall at minimum comply with Appendix D, "Substance Abuse".

The Contractor shall ensure that all subcontractors and sub-subcontractors are in compliance. The Contractor shall submit a monthly notarized letter stating they and their subcontractors are in compliance with the Project's Substance Abuse Policy.

Contractors should contact the State of Tennessee, at 1-800-332-2667, if there are questions concerning the Tennessee Drug Free Workplace Program. Contractors should also consult their own legal counsel.

INSTRUCTION AND TRAINING

Safety Orientation Program

Newly employed, promoted, and/or transferred personnel shall receive an orientation regarding the general safety and health rules and regulations as well as the site specific policies and hazards prior to starting work on the construction site. The Contractor shall be responsible for the orientation of their employees, Subcontractors and sub-subcontractors, and visitors. Documentation of this orientation shall be maintained on file for review (Appendix A). Hard hat stickers (provided by the Project) are to be issued to an employee following their orientation, and then documented on training Log Sheet. It is the responsibility of the contractor to ensure that non-English speaking employees receive these same instructions in a language they understand. Safety orientation of all personnel shall include at a minimum the following topics Safety orientation of all personnel shall include at a minimum the following topics:

- Unique hazards of the project

- Employer/personnel responsibilities under OSHA Standards – location of required posters
- Personal protective equipment, including appropriate work attire
- Confined space entry
- 6-Foot fall rule - 100% continuous fall protection (*including steel erection and scaffolds*)
- 100% eye protection, 100% hard hat protection
- Appropriate guarding and other warning devices
- Housekeeping
- Fire protection
- Accident reporting procedures - First-aid facilities - Emergency procedures
- Crane and lifting hazards
- Scaffolding tagging requirements
- Hazard communication/ Right-to-Know, location of MSDS's
- Substance abuse policy
- Disciplinary procedures
- Trenching & excavation
- Electrical hazards

PROTECTION OF THE PUBLIC

All necessary precautions to prevent injury to the public or damage to property of others shall be taken. The "Public" is defined as all persons not employed by or under contractor or subcontractor to **Memphis-Shelby County Airport Authority**. Installation of temporary barriers and/or fencing designated to protect the Public shall be reviewed and approved by the Owner and/or their representative. Precautions shall include but not be limited to the following:

1. Work shall not be performed in any area occupied by the Public unless specifically permitted according to the terms of the contract or in writing.
2. When necessary to maintain public use of work areas involving vehicular roadways, etc., the contractor shall protect the Public in accordance with the applicable regulations.
3. Appropriate warnings, signs and instructional safety signs shall be conspicuously posted where necessary. In addition, a signal person shall control the moving of motorized equipment in areas where the public might be endangered. All signage warnings and traffic control shall comply with the particular agency that takes judicial precedence.
4. Each project work area shall be protected by a fence constructed and erected per MSCAA requirements.
5. Barricades for the general public or public roadways shall be secured against accidental displacement and in place at all times, except when temporary removal is required. As such times, a flag person shall be assigned to control the unprotected area. Barricades used on the airfield will be reconstructed erected and maintained per MSCAA/FAA requirements.
6. Required signs and symbols shall be visible at all times when work is being performed and shall be removed or covered promptly when the hazards no longer exist.

Group Tours and Site Visitors

It is particularly important that a high degree of protection be afforded to all persons on the authorized tours of construction work-sites. The following instructions shall be complied with, as applicable, by the Contractor and those responsible for arranging such tours. The following procedures shall be followed:

- a) Group tours shall be cleared through the site **Memphis-Shelby County Airport Authority** office, allowing maximum advance notice.
- b) If visitors to the site will be on foot or out of the vehicle/bus, the individual or organization requesting the tour shall ensure that:
 - In all cases, the Construction Manager, MSCAA and the contractor shall be advised of any tour in a timely manner prior to the tour taking place.
 - Release and Hold Harmless Agreement – Each visitor shall be required to sign a release and hold harmless agreement prior to the commencement of the tour.

- MSCAA will coordinate the tour arrangements and ensure notification to the Construction Manager
- Tour groups are limited to no more than (25) twenty-five persons.
- Visitors are required to wear appropriate clothing and shoes.
- Children under 18 years of age are not be permitted on the Project tours.
- All visitors shall comply with Contractor safety requirements.
- Site **Memphis-Shelby County Airport Authority** or designee personnel will escort Tours.

HARASSMENT-FREE WORK POLICY

Employee Harassment

It is the policy of **Memphis-Shelby County Airport Authority** to provide a workplace free from employee harassment on the basis of race, color, religion, sex, national origin, age, handicap, disability, etc. Improper interference with the ability of an employee to perform their work activities will not be tolerated. Harassment can appear in many forms, including derogatory comments, jokes, slurs, unwanted physical contact, derogatory drawings or threats.

Sexual Harassment

Unwanted sexual advances, requests for sexual favors and other verbal physical conduct of a sexual nature will not be tolerated. Sexual harassing conduct includes, but is not limited to:

- ☐ Unwelcome sexual flirtation, touching, advances or propositions
- ☐ Verbal abuse of a sexual nature, including graphic or suggestive comments about an individual's dress or degrading words used to describe and individual
- ☐ The display in the work place of sexually suggestive objects or pictures, including nude photographs
- ☐ Other verbal or physical conduct of a sexual nature can affect an employee's work performance

Reporting of Harassment

It is the policy of **Memphis-Shelby County Airport Authority** to actively investigate any alleged incidence of harassment. Anyone who believes they have been harassed should contact the project manager. Any allegation or complaint will be held in the strictest confidence.

Any employee who commits a wrongful act of harassment shall be subject to disciplinary action, up to and including termination.

REPORTING, ACCIDENT INVESTIGATION, AND RECORDKEEPING

Contractors shall provide an American Red Cross and CPR Certified First Aid representative and designate an appropriate area for the first aid and medical care to treat injured employees at the job site. A copy of the First Aid Representative's qualifications shall be submitted to the Project Safety Manager.

The contractor must designate an individual to coordinate injury treatment with the workers' compensation carrier. The contractors' designated representative should also coordinate return to work and availability of modified work.

To coordinate medical services, the contractor will complete "Employee Medical Data Sheet" and "Company Drug Screen Request" forms.

Reporting

All accidents resulting in employee injury, property damage, or involving the general public shall be reported immediately to the designated project representative and the Project Safety Manager.

The Contractor and their subcontractors and sub-subcontractors shall complete a Supervisor's Incident Report Form (See Appendix E) and submit the report to the Project Safety Manager for all job-related accidents involving any of the following:

1. Any employee injury of the contractor, any subcontractor or sub-subcontractor.
2. Any injury and/or incident with the general public (including any alleged injuries reported by a member of the general public).
3. Equipment
4. Property

A formal accident investigation report and "First Report of Injury" shall be submitted within 24 hours. Pertinent facts that are not available within the above time shall be submitted as soon as available in a supplemental report.

A drug and alcohol test shall be administered to employee(s) injured and/or any employees in a work crew involved in an accident involving bodily injury.

Record-Keeping and Files

The Contractor and all Subcontractors and sub-subcontractors shall maintain a master or central file for safety and health related documentation on the jobsite. Files shall be maintained in such a manner that distinguishes each contractor and their subcontractors from other subcontractors and sub-subcontractors.

See Insurance manual for claim reporting procedures.

Accident Investigation

All accident/incidents shall be investigated by the contractor's safety supervisor and/or their safety designee. An accident investigation report must be submitted to the Designated Project Representative, OCIP Administrator/Willis Towers Watson and OCIP Insurance Carrier within twenty-four (24) hours of the occurrence.

The accident investigation should generate appropriate recommendations for corrective actions to prevent recurrence of similar accidents. Depending upon severity of the accident, the foreman of the injured worker may be requested to appear at the job safety and coordination meeting to:

1. Describe the cause of accident.
2. Report as to what corrective action has been initiated to avoid future accidents.

The Contractor and all Subcontractors shall maintain a current OSHA 300 log. The log shall be available for review by any OCIP team member at any time.

The Contractor and all Subcontractors and Sub-Subcontractors shall submit on a monthly basis a monthly summary of accident/incidents for the project. The summary shall follow the format contained within (Appendix G).

Under the direction of MSCAA AD HOC Committee may be appointed for investigation of serious accidents that result in loss of life, injury to several workers on pedestrians or major property loss. The committee will submit a report to MSCAA at the conclusion of the investigation.

RETURN-TO-WORK

Under the OCIP Program, every effort shall be made to **return employees to work as soon as possible** after an accident and under the direction of the physician. The insurance carrier will be in contact with the physician to determine the employee's physical demands and limitations.

A return-to-work program shall be developed and implemented by each Contractor to assist workers who are temporarily disabled due to an injury or illness. The Contractor and all subcontractors shall participate in the return-to-work program.

The Contractor, Subcontractor or Sub-subcontractor shall agree that their injured employees shall be treated by an authorized medical treating facility. The medical facility shall be utilized for initial treatment and evaluation of all injured employees. Follow-up care will be provided in accordance with applicable Workers' Compensation statutes.

When employees report a work related illness or injury, they shall be taken to the approved medical facility for examination and/or treatment. If the doctor determines that the employee qualifies for "Return to Work" ("light-duty"), the doctor will complete appropriate forms indicating the restrictions and conditions for transitional work.

The Contractor, Subcontractor or Sub-subcontractor shall provide modified work until the employee is able to resume regular duties. All modified work is temporary in nature and is designed to facilitate a return to regular duties as soon as possible. Modified duty positions may be offered at any location of the project or on any shift. Modified work can also be provided at other work locations of the Contractor with approval from the OCIP Team.

In no case shall an injured employee be laid-off or terminated from a "alternative work" position, unless first discussed with the Owner and it's representatives.

WORK PRACTICE CONTROL

Overview

The primary focus of these Safety and Health Guidelines is to provide guidance for Contractors. Each Contractor shall have on site and available for employee review a written safety and health plan. This plan shall cover work exposures the contractors work operations. It is a project requirement that each and every employee conduct their operations in accordance with OSHA and all other applicable standards for all project operations

Memphis-Shelby County Airport Authority prohibits the use, possession, concealment, transportation, promotion or sale of the following controlled items:

- a. Firearms, weapons, and ammunition – except when authorized for security reasons.
- b. Switchblades.
- c. Unauthorized explosives, including fireworks.
- d. Stolen or contraband.

Hazard Communication Program

The Contractor shall develop a written Hazard Communication Program that contains at minimum the following elements:

- The name of the program coordinator.
- A list of hazardous substances present within the Contractor's workplace.
- A written system that ensures MSDS's are obtained and made readily accessible to all employees, including lower tier subcontractor personnel, on each shift. In the event of an emergency, MSDS's shall be made available on an immediate basis.
- A labeling program that ensures that containers of hazardous substances in the workplace are properly labeled with the name of the substance and any applicable hazard warnings.
- A training program regarding hazards of substances that are used in the workplace and the protective measures that must be taken by the empl0oyee or any other persons potentially exposed to the hazardous substances.

The Contractor shall ensure that each employee, prior to working with, or being potentially exposed to hazardous substances, receives initial training on the Hazard Communication Program and the safe use of the hazardous substances. Additional training shall be provided to employees whenever new substances are introduced to the workplace.

Permanent records shall be maintained by the Contractor, describing all Hazard Communication Program training.

Record-Keeping and Files

The Contractor and all Subcontractors and sub-subcontractors shall maintain a master or central file for safety and health related documentation on the jobsite. Files shall be maintained in such a manner that distinguishes each contractor and their subcontractors from other subcontractors and sub-subcontractors.

Contractors shall submit and/or have available on site:

REPORT NAME	Annual	Immediately	24 Hr.	Weekly ¹	Monthly ²	Per Occurrence	Per Request
Annual Crane Inspection	X						X
Chemical Inventory					X		X
Contractor Weekly Inspection				X			X
Critical Lift Checklist						X	X
First Report of Injury		X				X	
Incident Investigation		X				X	
MSDS's					X		X
OSHA 300 Log					X		X
OSHA Citations		X				X	
Safety Observation				X			
Safety Plan of Action or JSA ³				X		X	X
Safety Statistics					X		X
Safety Training					X		X
Substance Abuse Policy compliance notarized letter					X		X
Toolbox Safety Meetings				X			X
Daily equipment / Vehicle Inspections							X

Daily -- Daily inspections are required on all equipment / vehicles.

¹ Weekly -- Weekly reports are due the following Tuesday morning

² Monthly -- Monthly reports are due by the 6th of the following month.

³ Safety Action Plan or JSA -- As required by contract or specification

The Owner and it's Representatives shall have the right to review all documentation at any time upon request. The Contractor shall give full cooperation during these reviews.

The following documentation shall be in the safety files:

- A written project site specific Safety & Health Plan
- Hazard Communication Program, including current MSDS's. A project specific MSDS file shall be maintained on-site for employee review
- Site emergency plans
- All required safety & health permits
- Weekly safety meeting reports - including meeting topic(s) and employee attendance sheets
- Specific job hazard worker training
- Daily jobsite safety inspection reports - including documentation of corrective measures
- Equipment inspection reports
- Crane inspection reports - daily and monthly (annual certification reports required prior to equipment operation)
- Employee orientation training records
- Accident investigation reports, including near-misses
- Job hazard analysis
- Competent person qualifications
- Written safety violations
- Noise and air quality monitoring

Job Safety Analysis (JSA)

In order to provide Contractor employees with a safe workplace through pre-planning hazardous work, a Job Safety Analysis (JSA) shall be prepared. JSA's shall be required when thorough pre-job planning, it is determined that the process, equipment or procedure indicates potential for serious injury and/or property damage. The Contractor shall also prepare a JSA upon request by an OCIP Team member. JSA's will be done daily. JSA's should be kept in the work area, possibly at the tool box and/or where they are readily available to the workers. JSA's will be also be on file with the contractor.

The JSA shall be used by Contractors to analyze the jobs they perform, to identify the existing and potential hazards associated with each job step and establish controls for them. These JSA's shall be used as a task specific training tool to instruct employees, inspectors, and visitors of potential hazards and required safety precautions. Each employee working on the project shall sign a training log indicating that they understand the hazards of the project as indicated on the JSA.

Examples of activities that may require a JSA:

- Potential for collapse, (work-in trenching, tunneling. This may include demolition, etc).
- Potential release of stored energy, (electrical, pressure, explosive, etc).
- Crane supported work plate form use.
- Critical crane lifts (two cranes used to lift one load).
- Unusual crane operation as defined by the CIP Team.
- Potential exposure to uncontrolled hazardous materials or wastes.
- Blasting operations
- Abrasive /Sandblasting, Hydro blasting, etc.
- Potential injury from burns, both chemical and thermal.
- Respirator use.
- Potential oxygen-deficient environments.
- Entry into confined space.
- Potential of entanglement in, on, or between objects.
- Work in public streets and highways.
- Lockout/Tagout.
- Operations involving fall exposure.
- Structural Steel Erection.
- Use of new or Hazardous Materials, procedures, equipment.
- Material Storage & Handling.
- Powder actuated tool use.
- Suspended scaffolds.
- Scaffold erection.
- Scaffold dismantlement
- Rock drilling.
- Work on live electrical systems.

SPECIFIC PROJECT SAFETY REQUIREMENTS

Controls for possible conflicts between construction operations and aircraft

- 1) Contractor must request that a notice to Airmen (NOTAM) be issued prior to start of any construction that might affect navigable airspace or surface movement.
- 2) Barricades and temporary lighting must be installed and maintained per specs.
- 3) Operators of equipment/vehicles must be instructed on routes and haul procedures.
- 4) All personnel must stay in defined work areas. Fences/barricades are not to be crossed.
- 5) No access to active taxiways/runways will be allowed without prior authorization and direction/escort by MSCAA personnel.

Scaffolds, Stair Towers and Work Platforms

The Project requires **100% continuous fall protection** during the erection and dismantling of scaffolds where employees

may be exposed to a fall greater than (6) six feet. A competent person must be present during erection, dismantling or moving of scaffold. The Contractor/Subcontractor shall develop and use a scaffold tagging system similar to the following:

Tagging

The tagging procedure, at minimum, shall consist of three (3) tags. The appropriate tag will be placed on a scaffold approved by the competent person. Each tag must have at least the following information and be visible by all employees:

- Date tag was placed - date of the last inspection.
- Name of person inspecting. All tags must be weather resistant.

A **GREEN** tag means the scaffold complies with federal OSHA regulations and can be used by any person.

A **YELLOW** tag indicates the scaffold is complete but does not meet all federal OSHA specifications. This tag will be used only in special circumstances. Special precautions, such as wearing a safety harnesses may be required because any accessory, such as a handrail, could not be installed due to the location of the scaffold.

A **RED** tag shall be placed on a scaffold that is being erected, dismantled, damaged and/or defective. No employees except members of the erection/dismantling crew shall work from a red tagged scaffold.

Employees will be instructed to read tags before using scaffolds. If a tag is not attached to the scaffold, **DO NOT USE** the scaffold.

Exceptions: Single buck or Baker scaffolds need not be tagged.

Walking and Working Surfaces

Barrier Identification Tape

Barrier identification tape is strictly prohibited from being used for any form of personnel fall protection. Barricade tape around excavations can be used for short term (24-hours), after this period physical barriers are required.

- **YELLOW** barricade tape shall be used for **CAUTION/WARNING**
- **RED** barricade tape shall be used for **DANGER DO NOT ENTER**

Note: Once the area barricaded is free of the hazard(s) for which it was erected the tape will be removed and properly discarded.

Fall Protection

Employees shall not be exposed to fall hazards. When an employee observes a fall hazard, they will notify their supervisor of the hazard. The responsible Contractor will immediately correct the hazard. **100% continuous fall protection, for fall hazards greater than six (6') feet, shall be implemented on this Project - including steel erection and scaffold use, erection and dismantling.**

Each Contractor shall be responsible for meeting fall protection requirements in their overall safety and health program.

Each Contractor shall evaluate ALL fall exposure conditions or tasks and must develop a Fall Protection Plan which outlines what methods, procedures and/or devices will be used in their program.

Each Contractor shall be responsible for implementing the requirements to achieve fall protection in accordance with all Federal, State, local rules, regulations, and the OCIP Safety and Health Guideline.

All fall protection systems used on this project shall comply with OSHA regulations and the project safety guidelines. Fall protection shall provide a positive means of protection. **Controlled Access Zones and Safety Monitoring Systems are not considered positive means of fall protection and shall not be permitted.** Any employee exposed to a fall greater than six (6) feet shall use approved fall protection equipment or devices. Fall protection systems shall be designed and

installed under the direction of a Registered Professional Engineer or Qualified Person. Fall protection is required, as a minimum, under the following examples:

- Formwork and reinforcing steel. Each employee on the face of formwork or reinforcing steel shall be protected from falling 6 feet or more to lower levels by Personal Fall Arrest Systems, safety net systems, or positioning device systems.
- When working from a telescoping, articulating, or rotating type lifts and scissors lifts, personnel shall wear a safety harness with shock absorbing lanyard, secured to an approved anchorage point.
- When working on a ladder higher than six (6) feet from a solid surface, if the employee's torso extends past the side rails or if a vertical ladder extended a total of 20' or greater.
- When working on a platform or other support not equipped with an adequate guardrail, which is higher than six (6) feet from a solid surface.
- When working from a crane-suspended work platform, a safety harness with shock absorbing lanyard is mandatory.
- When an employee may have to be lowered into or raised from a confined space, a personal fall arrest system will be worn. The employee will be supported by an approved platform or a boatswain's chair, with certified hoisting device and fall arrest device.
- When working adjacent to an unguarded floor opening or sloped roof, a lifeline system is desirable for mobility. A positive means of fall protection must be provided unless it can be proven infeasible.
- When working adjacent to a deep excavation, pit or trench. Employees will be instructed on the proper wearing and use of personal Fall Protection Arresting Device Systems.
- **Barricade tape is not adequate fall protection.**

The Fall Protection Plan shall detail in writing when fall protection is required and exactly how this protection is to be provided. This written plan is required for any Contractor exposing workers to falls six (6) feet or greater.

The Contractor shall prepare a written training program to ensure that each employee who might be exposed to fall hazards is knowledgeable of the Fall Protection Plan requirements. The program shall enable each employee the ability to recognize the hazards of falling and shall train each employee in the procedures to be followed in order to eliminate or minimize these hazards.

The Contractor shall assure that each employee has been trained.

Personnel, who have been trained, then re-trained and continue to violate the established fall protection plan/regulations shall be removed from the project IMMEDIATELY.

Confined Space Entry

All employees required to enter a confined space shall be knowledgeable of the hazards involved with confined space entry. Prior to the start of such an entry the Contractor involved in the work will develop a Confined Space Entry Procedure. The Contractor shall train all personnel who will enter the confined space. No one shall enter a confined space area until properly instructed. Contractors shall identify all confined spaces within their work area with a sign identifying the area as a confined space.

A Confined Space Entry procedure shall be used to:

- Prevent inadvertent operation of equipment and/or work process while people are working in the confined space.
- Eliminate unexpected exposure to hazardous materials, oxygen deficient or inert/toxic gaseous atmosphere while working in confined spaces.
- Plan for a timely and effective response to an emergency during a confined space entry.

Confined Spaces are considered to be areas with limited entry and exit, or poor natural ventilation, and not intended for human occupancy. Examples of a confined space include: tanks, covered basins, vaults, columns, mixers, manholes, pipelines, sumps, ditches or excavations. All spaces shall be considered permit-required confined spaces until the pre-entry procedures demonstrate otherwise.

Safety considerations include but are not limited to: atmosphere testing for gaseous conditions/lack of oxygen, appropriate personal protective and emergency equipment, and additional personnel as needed to assure communications and assist

the individual conducting the entry.

A Permit Required Confined Space means confined space that has one or more of the following:

- May or may not potentially contain a hazardous atmosphere;
- Contains a material that has potential for engulfing entrant;
- Has internal configuration that could trap the entrant;
- Contains any other recognized serious health or safety hazard;

Contractors shall provide their own permit.

A Non-Permit Required Confined Space is a confined space that does not contain or with respect to atmospheric hazards, the potential of causing death or serious physical harm.

Employee Ground Transportation

The purpose of this section is to establish minimum acceptable guidelines for the safe transportation of all personnel traveling within the Project confines. Eliminate personal accidents and injuries resulting from improper equipment use.

Contractors are responsible for assuring that all personnel follow the requirements of this section and prohibit improper transportation of employees and visitors. Transporting employees in cargo beds of pick-ups, vans, etc. is prohibited, unless approved seats and seat belts are provided and used.

- Operators must be qualified. Vehicle operators must have valid state operator's license
- All equipment/vehicles must be identified (company logo) per specifications.
- Safe speed must be maintained and adjusted to site conditions.
- Use flashers/headlamps as directed.
- Mobile cranes, forklifts, winch trucks, front-end loaders, tractors and other materials handling equipment are not permitted to transport passengers.
- Trucks
 - A maximum of three passengers are permitted to ride inside of the truck cab unless the cab is specifically designed to accommodate additional passengers.
 - Passengers shall ride with all portions of their bodies inside the truck body or frame.
 - Passengers shall be in the seated position, with the seat belts secured and adjusted properly, before the vehicle is set in motion.
 - Riding on a vehicle's bumper or tailgate is prohibited.
 - Tailgates will be closed and latched before the vehicle is operated.
 - Passengers are not permitted to ride in the body of a dump truck, in the bed of a pickup truck or in trailers.
 - Passengers are not permitted to ride on top of the load or to hold materials from shifting.
 - Vehicles must be designed to accommodate passenger transportation or the vehicle shall not be used for that purpose.
 - Drivers transporting passengers shall follow the posted speed limit and Project traffic rules.
 - The Contractor shall establish a designated employee parking area. Employee vehicles shall not be allowed on the construction project.

Housekeeping - MUST BE A CONTINUING PROCESS

The purpose of this section is to incorporate into the day-to-day work activity a good housekeeping action plan that will be followed by all Contractors working on the project.

- Contractors, through inspection and example, are responsible for assuring that trash and debris remain out of the work areas. Contractors are responsible for all of their work areas and the work areas of their subcontractors and sub-subcontractors. If poor housekeeping practices are observed, corrective action will be discussed with the appropriate Contractor to remind them that cluttered work areas will not be tolerated and that their work area(s) pose a hazard to his employees and other personnel.

- Should the Contractor fails to address and correct their poor housekeeping upon 24 hour written notification, the "owner" may at its option, cause the same to be removed and charge the expense of such removal to the appropriate Contractor.
- Specific attention is needed for operations to the Aircraft Operation Area (AOA).
- Contractors shall monitor their work areas daily or more frequently if needed to assure that all debris is removed to minimize hazards.
- Immediately available vacuum sweeper for cleaning taxiway/runway crossings.
- Personnel immediately available for taxiway and runway cleanup. (Provide brooms to supplement cleanup by sweeper.)
- Access to taxiway/runway crossings for cleanup only at the direction of MSCAA guard.
- Loading of haulage vehicles to minimize spillage.
- Maintenance of vehicles/equipment so that no fluids will leak.
- Provide waste containers at the direction of the Construction Manager.

Project Electrical Requirements

- The Contractor shall implement an electrical safety program. This safety program element shall include safe installation, work practices, maintenance, and special equipment considerations. All electrical installations, either temporary or permanent, shall be in conformance with the National Electrical Safety Code, NFPA-70, ANSI-C1, and low and high voltage electrical safety orders OSHA code requirements. Only qualified employees shall install electrical tools and equipment, defective and/or improperly installed equipment shall be repaired immediately.
- Only qualified electricians familiar with code requirements shall be allowed to perform electrical work.
- Extension cords used with portable electrical tools and appliances shall be heavy duty (minimum 12 AWG) and of the three-wire type. Cords shall be covered, elevated or otherwise protected from damage that would create a hazard to construction site personnel.
- Electrical cords and equipment shall be visually inspected before each shift for external defects. All damaged and defective cords shall be removed from service immediately (this includes cords with the ground prong missing). Cords shall be repaired with approved heat-shrink methods, electrical tape is not permitted.
- All temporary electrical tools, cords and equipment shall be properly protected by ground fault circuit interrupters (GFCI). All portable generators shall have properly functioning GFCI outlets. GFCI receptacles shall be tested monthly with a multi-range GFCI tester (the tests shall be documented) to insure the GFCI is properly functioning and protecting the worker.
- A "task-specific" lockout/tagout safety plan shall be established to ensure power sources to equipment and/or machinery are isolated and de-energized. This plan shall establish minimum steps necessary to disable equipment and machinery to prevent the unexpected release of potentially hazardous energy. Lockout/Tagout shall be performed in accordance with 29 CFR 1910.147.

Cranes and Hoisting Equipment

- Cranes and hoists shall not be used without a current annual certificate of examination and testing issued by an accredited crane examiner. **Annual inspection certificates shall be available when cranes arrive on-site. Operators manual shall be in the cab of each crane prior to crane operation.**
- Only qualified and designated personnel shall operate cranes or hoisting equipment. Crane operators must have current (Certified Crane Operator) CCO certification and/or local or state certification.
- Rated load capacities and recommended operating speeds, special hazard warnings, or instructions, shall be conspicuously posted on all equipment; they shall be visible to the operator from his/her control station, and an accessible fire extinguisher of 10:ABC rating, shall be available at all operator stations or cabs of equipment. Crane operations position shall be kept clear of loose tools or material.
- Outrigger cribbing shall be used for all crane operations. The size of the cribbing shall be determined by taking the cranes capacity and dividing by 5 (example: 40 to crane divided by 5 = 8 sq. ft. per outrigger).
- All cranes working over shafts or lifting personnel platforms shall have anti-two block devices installed and operating properly.
- Radio or other positive means of communication shall be used to direct the operator when the point of operation is not in direct view of the operator.
- The operator shall respond to signals from only one person. The operator shall not follow any signal which is not understood, but shall always obey a stop signal.

- The operator shall be responsible for the operations and load under their control at all times. Whenever there are doubts about the safety of movement, the operator shall stop operations until safety is assured.
- A warning signal, such as a horn, shall be sounded to alert personnel to proximity of moving loads. Loads should not be passed over personnel, and personnel should not be permitted to work in the area directly under a suspended load.
- Concrete buckets - Employees shall be permitted to work under concrete buckets while the buckets are elevated.
- **Employees shall keep out from under suspended loads at all times.**
- Employees shall not ride on loads, slings, hooks, buckets or other load handling attachments.
- All repairs, adjustments, modifications, rigging assembly or dismantling shall be conducted only by qualified and authorized personnel.
- The swing radius shall be barricaded or other positive means shall be taken to prevent personnel from entering the area between the counter weight/swing radius and any stationary and/or outside obstructions.
- A critical lift checklist will be completed and submitted anytime:
 - 2 cranes are used to make a lift
 - when a lift exceeds 75% of the load chart
 - or any unusual conditions are encountered
 (See Appendix C, "Critical Lift Checklist")
- Crane suspended work platforms shall only be used if there is no other safe means to reach the work area. The Contractor shall complete a JSA prior to the lift.
- Any overhead wire shall be considered to be energized unless and until the person owning such line or operating officials of the electrical utility supplying the line assures that it is NOT ENERGIZED and it has been visibly grounded at the work site.
- Taglines shall be used to control all loads
- Daily inspection of all cranes shall be completed and documented prior to crane use

Rigging

- Major rigging operations shall be planned and supervised by Competent Personnel to ensure that the best methods and most suitable equipment and tackle are employed. This should be the superintendent or foreman in charge.
- Job site management shall ensure that:
 - Proper rigging equipment is available.
 - All rigging is inspected before use. Documented inspections are required.
 - Correct load ratings are available for the material and equipment used for rigging.
 - Rigging material and equipment are maintained in proper working condition.
- The supervisor of the hoisting operation shall be responsible for:
 - Proper rigging of the load.
 - Supervision of the rigging crew.
 - Ensuring that the rigging material and equipment have the necessary capacity for the job and are in safe condition.
 - Ensuring correct assembly of rigging material or equipment as required during the operation, such as the correct installation of lifting bolts.
 - Safety of the rigging crew and other personnel as they are affected by the rigging operation.

Excavation (Any process which disturbs soil)

- A. Contact MSCAA/FAA thru the Construction Manager at least 72 hours prior to proposed work for location of underground hazards (cables, ducts, fuel lines, etc.). A request form will be provided to the contractor.
- B. The contractor must contact Tennessee one call at least 72 hours prior to proposed excavation for location of utilities. Contractor must make arrangements to have personnel at the site when utilities are located. Documentation of the control number must be maintained on site.
- C. **Utilities must be located/marked prior to any process that disturbs the soil.**

Earthmoving Equipment and Trucks

- All earthmoving equipment shall be maintained in safe working condition and shall be appropriate and adequate for the intended use.

- Only authorized personnel shall operate equipment. Operators of equipment, machinery or vehicles shall be qualified and properly licensed for the operation involved.
- Equipment maintenance shall be performed only by qualified mechanics.
- Equipment operators and truck drivers shall make a documented pre-shift safety inspection of their equipment. Any conditions that effect safe operation will be corrected before use.
- Equipment shall not be operated unless all required safety devices are in place and functioning properly.
- Careless, reckless or otherwise unsafe operation or use of equipment shall result in discipline and may constitute grounds for dismissal.
- Before performing any service or repair work, all equipment shall be stopped and positively secured against movement or operation, locked and tagged out of service, unless it is designed to be serviced while running, following the manufacturer's instructions.
- When equipment is serviced or repaired, the operator shall dismount until the service or repair is completed and then make a complete walk-around safety check before remounting.
- All heavy equipment including: cranes, forklifts, dozers, end-loaders, skid-steers, etc., shall have a reverse signal/back-up alarm audible above surrounding background noise.
- All off-highway earthmoving equipment and trucks such as loaders, dozers, scrapers, motor graders, rock trucks, tractors, rollers and compactors shall be equipped with roll-over protective structures (ROPS) and seat belts.
- Seat belts shall be used and adjusted properly by operators of all heavy equipment.
- Mobile equipment shall not be left unattended unless parked securely to prevent movement, with all ground engaging tools lowered to the ground, brakes set and the engine off.
- Equipment parked at night shall be lighted, barricaded or otherwise clearly marked when exposed to traffic. Keys shall not be left in equipment overnight.
- Personnel shall not be transported or ride on equipment or vehicles that are not equipped with seats for passengers.
- When fueling equipment or vehicles with gasoline or liquefied petroleum gas (LPG) the engine shall be shut down.
- All equipment and vehicles shall be equipped with appropriate fire extinguisher or fire suppression system.
- Haul roads shall be designed, constructed and maintained for safe operation consistent with the type of haulage equipment in use. Standard traffic control signs shall be used where necessary.
- Elevated roadways shall have axle high beams or guards maintained on their outer banks.
- Equipment, tools, and materials hauled on pickups and flat bead trucks must be secured to prevent them from falling onto the road.

Welding & Cutting

- Welding leads and cutting hoses shall be kept clear of walkways and stairways.
- Flash arrestors shall be installed provided in both oxygen and acetylene hoses at the regulator connection.
- Welders shall wear approved eye and head protection when welding. Personnel assisting the welder shall also wear approved eye protection.
- Prior to welding or cutting a "20-ABC" rated fire extinguisher shall be within easy reach of the worker. A fire watch shall be stationed at all locations where sparks and/or flames may fall to a lower floor/work area or to another side of a wall.
- A suitable cylinder truck, with chain shall be used to keep cylinders from being knocked over while in use.
- Spent welding rods shall be picked up and disposed of daily.
- When practical all welding and cutting operations shall be shielded by non-combustible or flame-proof screens.
- Oxygen and acetylene cylinders shall not be stored inside buildings.
- Rubber boot protectors shall be provided on all welding leads were they make connections at the welding machine

Personal Protective Equipment

Eye and Face Protection

All employees shall wear safety glasses 100% of the time while on the construction site. Minimum eye protection shall include approved safety glasses **with side shields** which meet the standards specified in ANSI Z-87.1-1989 (this shall also include prescription eye wear).

Additional eye and face protection in combination shall be worn when:

- Welding, burning or cutting with torches

- Using abrasive wheels, portable grinders or files
- Chipping concrete, stone or metal
- Working with any materials subject to scaling, flaking or chipping
- Drilling or working under dusty conditions
- Using explosive actuated fastening or nailing tools
- Working with compressed air or other gases

Only clear safety glasses shall be worn inside any building(s).

Head Protection

All construction workers shall wear hard hats which meet ANSI Z 89.1-1986, 100% of the time while on the construction site. Hard hats shall display the company decal where the employee works.

All delivery personnel, vendors and visitors shall wear approved hard hats while on the project.

Hearing Protection

Work areas shall be monitored to identify areas of high noise exposure (85 dBA and higher). All work areas identified as high noise exposure shall be properly posted to warn employees of the exposure.

Appropriate hearing protection shall be worn in work areas where noise levels are 85 dBA or greater.

Respiratory Protection

Contractors whose work activities warrants that employees wear respiratory protection, shall establish and implement a respiratory protection program. The program shall meet the requirements set forth in 29 CFR 1926.134.

Foot Protection

All personnel on the construction site shall wear leather hard-soled work boots. No one is permitted to wear sneakers (including ANSI approved), tennis shoes or athletic shoes of any type, sandals, high heels or thongs on the construction site.

Clothing

Suitable clothing for construction shall be worn on the construction site. Shirts with sleeves (at least t-shirt (4 inches) in length), full length pants and reflective safety vests shall be required. Shorts, sweat pants or tank-tops are not allowed.

Appendix A - Safety Orientation

Check each box when completed - To be completed by all employees on the jobsite. To be completed by site supervision and employee prior to beginning work.

- ☐ Alcohol and/or drug use, fighting or horseplay are prohibited and will result in immediate termination
- ☐ 100 % eye protection, hard hats and reflective safety vests are required when on the construction project
- ☐ Review potential hazards on the project and the precautions to be taken to prevent injury
- ☐ Disciplinary Policy:
 - Non-serious violation**
 - First violation - Verbal warning
 - Second violation - Verbal & written warning
 - Third violation - Verbal & written warning and three day suspension without pay
 - Fourth violation - Employee discharge from company
 - Serious violation** - (see disciplinary policy)
 - First violation - Verbal & written warning
 - Second violation - Employee discharge from company
- ☐ Hazard Communication Program - location of MSDS's and written program on the project
- ☐ All accidents, injuries and unsafe conditions shall be reported to supervisor immediately
- ☐ Medical treatment protocols for injuries requiring off-site medical treatment with a doctor
- ☐ Safety meetings are held on a weekly basis (attendance is mandatory)
- ☐ All employees shall dress properly while working. Minimum attire is long pants, shirt with at least 4 inch sleeves and sturdy above the ankle work boots
- ☐ Ground fault circuit interrupters (GFCI) are required on all tools. All extension cords and power tools shall be properly grounded. Notify supervision immediately if defective equipment exists.
- ☐ All employees exposed to a fall exposure of six or greater, shall be protected by the means of fall protection. Specific training is required for fall protection.
- ☐ Employee are not allowed to work in excavations 4 feet or more in depth, unless they are properly sloped or protected by shielding or shoring
- ☐ Lockout/tagout is required when working on equipment or tools where unexpected start-up may occur or the release of energy may result in injury
- ☐ Before any employee is allowed to wear a respirator (including paper masks) they must be medically approved by a doctor and fit-tested
- ☐ Scaffolds shall be inspected and tagged prior to use by any personnel. Red tag means DO NOT USE; Yellow Tag means section of scaffold does not meet OSHA standards and Green Tag means SAFE FOR USE.
- ☐ Other hazards discussed related to the construction project:

Equipment Issued

- ☐ Hardhat
- ☐ Safety Glasses
- ☐ Orange vest
- ☐ Fall Protection Harness & Lanyard
- ☐ Respirator
- ☐ Other _____

To be completed by supervisor in the field with the employee

- ☐ Show employee around the project and discuss potential hazards
- ☐ Introduce employee to crew members
- ☐ Assign new employee to experienced work crew
- ☐ Specify work duties
- ☐ Where to eat lunch

This is to acknowledge that I have completed new employee orientation and understand that failure to comply with the Safety Program may be grounds for dismissal.

Employee Print Name: _____ Date: _____

Emergency Contact: _____

Employee Signature: _____

Supervision Signature: _____ Date: _____

Appendix B – Employee Disciplinary Guideline

The discipline policy is intended to encourage compliance with the requirements of the Federal Occupational Safety and Health Act of 1970 (OSHA) and all additions and revisions thereto, as well as other applicable federal, state and local requirements and this Safety and Health Guideline. Workers performing work in an unsafe manner that would endanger the employee, other workers or the public shall be subject to discipline or termination.

The Project Representative in conjunction with the Project Manager and Project Foreman will determine the course of action best suited to the circumstances. The steps to be taken shall be progressive, except in the most egregious circumstances and shall include:

- a) **Non-Serious** – Initial, isolated, or rare instances of violation, that do not result in danger to the employee, property, or others, should be corrected through non disciplinary discussion and instruction. Safety violations of a less serious nature will be handled as follows:

First Offense	Verbal Warning
Second Offense	Written Warning
Third Offense	Employee given three-day suspension without pay
Fourth Offense	Employee Discharge

- b) **Serious** – One which could result in serious injury or loss of life or serious loss of property, shall be subject to:

First Offense	Employee given three-day suspension without pay
Second Offense	Employee Discharge

- c) **Supervisor Accountability** – If two or more employees working for the same supervisor are found in serious violation as described above, that subcontractor supervisor is also subject to disciplinary action up to and including immediate discharge.

Documentation - Notice of safety violation (written) shall be given to the employee, and a copy sent to the Project Safety Representative.

Appendix C - Critical Lift Checklist

Project: _____

Date: _____

Description of Lift: _____

Name of supervisor in charge of lift: _____

Name of crane operator(s): _____

Name of signal person(s): _____

Crane Data:

Make and Model: _____

Boom Length: _____

Counterweight: _____

Capacity: _____

Load Data:

Gross Load Weight: _____

Rigging Weight: _____

Load block & line Weight: _____

Max. Load Radius: _____

Min. Load Angle: _____

Max. Boom Angle: _____

Min. Boom Angle: _____

Net Load Weight: _____

Pre-Lift Requirements:

- _____ Load is within chart limits.
- _____ Has the Center of Gravity of the Load been established and marked?
- _____ Is rigging adequate and in good condition?
- _____ Load chart utilized is for exact crane model; boom type, length, tip; counterweight.
- _____ Competent person in charge of lift: Name _____
- _____ Competent signal person identified: Name _____
- _____ Pre-pick meeting held with crew
- _____ Written crane inspection completed within 1 day of critical pick
- _____ Swing path not over personnel
- _____ Footing is sound and level (soil conditions/compaction, underground tunnel or utilities).
- _____ Pre-planning for radio or hand signal communications.
- _____ Minimum clearances from power lines can and will be maintained.
- _____ The load radius has been measured with tape measure.
- _____ Weather conditions have been checked, including wind speed.
- _____ Load will not touch boom at any time.
- _____ For dual crane lift – diagrams have been prepared.

_____ Pad blocking is adequate and substantial.

_____ Outriggers are fully extended.

Signed: _____
Supervisor in Charge

Appendix D – Substance Abuse

Policy Statement

The Owner **Memphis-Shelby County Airport Authority** and the OCIP Team are committed to providing project employees with a drug-free and alcohol-free workplace. It is our goal to protect the health and safety of these employees and visitors to our job site, promote a productive workplace, and protect the reputation of our project.

Consistent with those goals, the use, possession, distribution or sale at project sites of drugs, drug paraphernalia or alcohol is prohibited. A program of drug and alcohol testing will be instituted to monitor compliance with this policy.

Contractors / Subcontractors refusing to comply with this Drug and Alcohol Policy will not be permitted to work on this OCIP project and will be noted as being in violation of their contract with the (Project Name) / or other contractors & subcontractors working on this project.

This Policy does not represent a contract between the Owner **Memphis-Shelby County Airport Authority**, Design and Development, the OCIP Team, Owners of project, Construction Managers, General Contractors, Subcontractors, employees or perspective employees of the project.

Policy Administration

It is our combined goal to protect the health and safety of personnel, craft workers, and visitors to our job site; to promote a productive workplace, and protect the reputation of this OCIP.

Prohibited Substances

1. Drugs or Drug is defined as any substance which may impair mental or motor function including but not limited to illegal drugs, controlled substances, designer drugs, synthetic drugs, look alike drugs, and under circumstances described in this policy -prescription drugs.
2. Alcohol is defined as any beverage or substance containing alcohol, ethyl alcohol or ethanol. "Alcohol Testing or Alcohol test means testing by certified breath-alcohol technician using a DOT approved initial screening device or urine alcohol testing conducted by a certified laboratory and confirmed by gas chromatography/mass spectroscopy (GC/MS)". Test levels must not meet or exceed .04 grams per 210 liter of breath.

Pre-Project Testing

Prior to the beginning work on this Project, employers will be required to insure that all employees have met the requirements of this policy with a negative (passing) test result. Employers and employees not meeting the requirements will not be allowed to work on this OCIP job site.

Additional Testing of Employees

1. **Post-Accident:** It is agreed that drug and alcohol testing of employees shall be required after each and every work related incident. This testing shall take place at the medical facility providing treatment for the injury. A work related accident is defined as an accident resulting in an injury requiring treatment by a physician to the employee or other employees injured and / or resulting in damage to property or equipment.
2. **Reasonable Suspicion:** Is defined as supervision having a reason to suspect employee drug or alcohol use. The employer will bear the cost of this test.

Points of Understanding Regarding Substance Abuse Testing

1. The employer, the medical facility and the testing laboratory agree that the results of the described tests are to be held in strictest **CONFIDENCE** between the employer, the OCIP Workers Compensation Carrier and the

medical facility (MRO). This is an issue of employee – employer relationship (employment) and falls under the requirements within the employers program.

2. This statement is noted for the purpose of adjudicating a workers compensation claim. The OCIP Workers Compensation Carrier requires the employer to report all accident related drug and alcohol test results to them immediately.

Testing Procedures

1. At a minimum pre-project and post-accident testing is required.
2. Testing shall include the following drugs at a minimum:
Marijuana, Cocaine, Opiates, Amphetamines, Phencyclidine, Barbiturates, Benzodiazepines, Methadone, Propoxyphene
3. For reasons of safety, any employee subject to a reasonable suspicion test shall be suspended until test results are available.

Prescription Drugs

The use of current valid prescription Drugs that may impair an Employee's ability to safely perform his or her duties must be reported to the safety director, supervisor and management personnel.

Alcoholic Beverages

Under no circumstances are alcoholic beverages allowed on the project site.

Disciplinary Action

1. A positive pre-project or post-accident test will result in worker dismissal from this project site
2. Employees found using, selling, possessing or manufacturing drugs shall be removed from this project and may be reported to local law enforcement.

Confidentiality

All actions taken under this policy will be in conformance with the Local Drug Testing Act

Subcontractors and Vendors

Subcontractors, sub-tiered contractors, vendors and their employees shall cooperate with this policy in achieving a drug-free and alcohol-free workplace.

Amendments to Policy

Amendments to this policy may be issued to comply with project owner requirements, state or local laws, or federal contract requirements.

Company Name _____

**DRUG AND ALCOHOL POLICY
ACKNOWLEDGMENT AND ACCEPTANCE STATEMENT**

I certify that I have read and understand the statement and policy. I further understand that prior to employment and during employment, I am subject to drug and alcohol screening tests. I agree to provide the specimen appropriate to such drug or alcohol test(s) as may be required. I further understand that my property and I may be subject to search under the terms of this policy while I am on the Owner's premises. Failure to provide the appropriate specimen, or to permit a search, will subject me to removal from this site.

I also understand that I will not be allowed to go to work prior to the reporting of my pre-employment drug test results.

If I am an employee of a subcontractor company, an employee of an affiliate company assigned to the job site, or a contract staff, I understand that I am subject to pre-employment drug testing and all testing conditions of this Policy. Failure to provide the appropriate specimen or to permit a search or a positive test result will result in my immediate removal from this job site.

Signature

Date

Print Name and Title

Witness

Guidelines for Reasonable Suspicion

Observation Checklist

1. Walking	☐ Stumbling	☐ Staggering	☐ Falling	☐ Unable to Walk
	☐ Swaying	☐ Unsteady	☐ Holding On	☐ Normal
2. Standing	☐ Swaying	☐ Rigid		☐ Unable to Stand
	☐ Staggering	☐ Sagging at Knees		☐ Feet Wide Apart
3. Speech	☐ Shouting	☐ Silent	☐ Whispering	☐ Slow
	☐ Rambling	☐ Mute	☐ Slurred	☐ Slobbering
	☐ Incoherent	☐ Confused	☐ Normal	
4. Demeanor	☐ Cooperative	☐ Polite	☐ Calm	☐ Sleepy
	☐ Silent	☐ Talkative	☐ Crying	☐ Excited
	☐ Sarcastic	☐ Fighting		
5. Actions	☐ Resisting	☐ Fighting	☐ Threatening	☐ Erratic
	☐ Communications			
	☐ Drowsy	☐ Profanity	☐ Hyperactive	☐ Hostile
	☐ Calm			
6. Eyes	☐ Bloodshot	☐ Watery	☐ Dilated	☐ Glassy
	☐ Droopy	☐ Closed	☐ Normal	
7. Face	☐ Flushed	☐ Pale	☐ Sweaty	☐ Normal
8. Appearance/ Clothing	☐ Unruly	☐ Messy	☐ Dirty	☐ Partially Dressed
	☐ Body	☐ Stains	☐ Neat	☐ Normal
	☐ Excrement			
9. Breath	☐ Alcoholic	☐ Faint Alcohol	☐ No Odor	
	☐ Odor	☐ Odor		
10. Movement	☐ Fumbling	☐ Jerky	☐ Slow	☐ Hyperactive
	☐ Nervous	☐ Normal		
11. Eating/ Chewing	☐ Gum	☐ Candy	☐ Mints	☐ Other – identify
12. Other observations: (Visible drug use, possession, sale, etc.: attendance; poor work performance or accident; tampering with drug test; credible reports, etc.)				

Observed by: _____ Observed by: _____

Date: _____ Time: _____ Location: _____

Appendix E - Supervisor's Report of Bodily Injury

Date of Accident _____ Date Returned to Work: _____

Location of Accident _____ Time of Accident _____ am/pm

Contractor/Subcontractor Involved _____

First Aid: _____ Recordable _____ Lost Time _____ Fatality _____

Damage* _____ Fire _____ Property _____

Equipment _____

Injured Person: _____ SSN: _____

Address: _____ Occupation: _____

_____ Home Phone: _____

Male _____ Female _____ Age _____

Nature of Injury: _____

First Aid Administered By: _____

Hospital _____

Physician _____

Witnesses: _____

Equipment and/or Materials Involved: _____

Cause Of Accident: _____

Superintendent's Corrective Action: _____

Employee's Signature: _____

Supt. Signature _____

Date of report: _____

*Attach a list of damaged property and/or equipment excluding motor vehicles. Indicate owner's names and addresses. Complete "Report of Damage to Equipment or Property" (Appendix F).

Appendix F - Report of Damage to Equipment or Property

Date _____

Contractor/Subcontractor _____

Location of Accident _____

Equipment Involved _____

Personal injuries Yes _____ No _____

Damage Estimate \$ _____

Witness to Accident

Statement Obtained

Statement Attached

Yes No

Yes No

Yes No

Yes No

Yes No

Yes No

Yes No

Yes No

Remarks _____

Time of Accident _____ AM _____ PM _____ Date _____

Weather Conditions _____ Temperature _____

Roadway or surface type _____ Wet _____ Dry _____ Other _____ *

*If other, explain _____

If more space is required, use back of this sheet for additional information and sketches.

Signed _____

Title _____

Employee Name _____

Appendix G - Contractor Monthly Report of Safety Statistics

MONTHLY ACCIDENT EXPERIENCE SUMMARY	CONTRACT NO:		
	CONTRACTOR/SUBCONTRACTOR NAME:		
	MONTH	YEAR	
	REPORTING PERIOD: THROUGH:		
	THIS MONTH	YEAR TO DATE	PROJECT TO DATE
HOURS WORKED			
PAYROLL			
A. FIRST-AID CASES B. OSHA RECORDABLE CASES C. LOST TIME CASES (list each under comments) D. TOTAL LOST WORK DAYS E. PROPERTY DAMAGE F. EQUIPMENT G. GENERAL PUBLIC			
OSHA Recordable Incidence Rate* Lost Time Incident Rate*			
COMMENTS:			
Prepared By:	Date	PM/Superintendent	Date

Appendix H – Safety Improvement Team Guidelines

The Owner recognizes that a cooperative effort is required to insure a safe construction project. Therefore, the Contractor shall establish a Safety Improvement Team to facilitate the proper cooperative attitude.

The Safety Improvement Team shall be composed of an equal number of employee and management representatives. The management personnel (4) will consist of one Owner representative, one person from the Contractor, one from the workers' compensation/general liability insurance carrier and a representative of subcontractor supervision. The employee members (4) shall be selected from the various subcontractor trades on a voluntary basis or by nomination to serve a minimum of one year each.

The Contractor's Safety Manager shall serve as the Safety Improvement Team advisor and is responsible for providing meeting agendas and minutes, giving assignments to the committee, and publicizing committee accomplishments. Safety Improvement Team meeting minutes and attendance roster shall be maintained.

The Contractor's Safety Manager is responsible for assuring that Committee members are adequately trained to perform their duties and responsibilities.

The Contractor's Safety Manager is responsible for assuring that subcontractors with 25 or more employees establish their own Safety Improvement Team commensurate with the NRS requirements.

The primary purpose of the Safety Improvement Team is to evaluate safety and health program effectiveness, suggestions, hazard reports, hotline reports, etc., and to provide suggestions and recommendations to improve workplace safety.

Additional duties include advising and educating employees in safe working practices, investigating accidents and their causes, recommending preventative measures, inspecting work areas, and other duties as assigned

Meetings shall be held at least monthly, discussion items shall include:

- Inspection Reports

- Accident Reports

- The safety of construction methods and practices

- Review and make recommendations on employee hazard reports, hotlines, etc.

The Safety Improvement Team members will receive their regular rates of pay while performing Safety Improvement Team duties. Time spent performing Safety Improvement Team duties shall be documented using normal time reporting procedures.

**EXHIBIT E
TO
UNIT PRICE CONSTRUCTION CONTRACT
FOR
SRE BUILDING – BUILDING PACKAGE - CONSTRUCTION**

**BY AND BETWEEN
THE MEMPHIS-SHELBY COUNTY AIRPORT AUTHORITY
AND
CONTRACTOR**

FAA REQUIRED CONTRACT PROVISIONS

FAA REQUIRED CONTRACT PROVISIONS – ALL CONTRACTS

Federal laws and regulations require that recipients of federal assistance (Sponsors) include contract provisions in certain contracts, requests for proposals, or invitations to bid. The provisions are as follows:

1. Title VI Clauses for Compliance with Nondiscrimination Requirements (FAA Provision A6.4.1). (Reference: 49 USC § 47123)

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

Compliance with Regulations: The contractor (hereinafter includes consultants) will comply with the Title VI List of Pertinent Nondiscrimination Acts And Authorities, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.

Non-discrimination: The contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, or national origin, creed, sex, age, or disability in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor will not participate directly or indirectly in the discrimination prohibited by the Nondiscrimination Acts and Authorities, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR part 21 including amendments thereto.

Solicitations for Subcontracts, Including Procurements of Materials and Equipment: In all solicitations, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the contractor of the contractor's obligations under this contract and the Nondiscrimination Acts And Authorities on the grounds of race, color, or national origin.

Information and Reports: The contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the sponsor or the Federal Aviation Administration to be pertinent to ascertain compliance with such Nondiscrimination Acts And Authorities and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the contractor will so certify to the sponsor or the Federal Aviation Administration, as appropriate, and will set forth what efforts it has made to obtain the information.

Sanctions for Noncompliance: In the event of a contractor's noncompliance with the Non-discrimination provisions of this contract, the sponsor will impose such contract sanctions as it or the Federal Aviation Administration may determine to be appropriate, including, but not limited to:

- a. Withholding payments to the contractor under the contract until the contractor complies; and/or
- b. Cancelling, terminating, or suspending a contract, in whole or in part.

Incorporation of Provisions: The contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant

thereto. The contractor will take action with respect to any subcontract or procurement as the sponsor or the Federal Aviation Administration may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the contractor may request the sponsor to enter into any litigation to protect the interests of the sponsor. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

2. Title VI List of Pertinent Nondiscrimination Acts and Authorities (FAA Provision A6.4.5).

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d *et seq.*, 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin);

49 CFR part 21 (Non-discrimination In Federally-Assisted Programs of The Department of Transportation—Effectuation of Title VI of The Civil Rights Act of 1964) including amendments thereto;

The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);

Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 *et seq.*), as amended, (prohibits discrimination on the basis of disability); and 49 CFR part 27 (Nondiscrimination on the Basis of Disability in Programs or Activities Receiving Federal Financial Assistance);

The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 *et seq.*), (prohibits discrimination on the basis of age);

Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);

The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);

Titles II and III of the Americans with Disabilities Act of 1990 (42 U.S.C. § 12101, *et seq.*) (which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities) as implemented by Department of Transportation regulations at 49 CFR parts 37 and 38; and

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.*).

3. Federal Fair Labor Standards Act (FAA Provision A17). (Reference: 29 U.S.C. § 201, *et seq.*)

All contracts and subcontracts that result from this solicitation incorporate by reference the provisions of 29 CFR part 201, the Federal Fair Labor Standards Act (FLSA), with the same force and effect as if given in full text. The FLSA sets minimum wage, overtime pay, recordkeeping, and child labor standards for full and part time workers.

The Contractor has full responsibility to monitor compliance to the referenced statute or regulation. The Contractor must address any claims or disputes that arise from this requirement directly with the U.S. Department of Labor – Wage and Hour Division.

4. Occupational Safety and Health Act of 1970 (FAA Provision A20). (Reference: 29 CFR part 1910)

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

5. General Civil Rights Provisions (FAA Provision A5). (Reference: 49 U.S.C. § 47123)

In all its activities within the scope of its airport program, 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 is in addition to that required by Title VI of the Civil Rights Act of 1964.

The above provision binds the contractor and subcontractors from the bid solicitation period through the completion of the contract.

FAA REQUIRED CONTRACT PROVISIONS – AIP CONTRACTS

6. Buy American Preference (FAA Provision A3). (Reference: 49 USC § 50101)

The contractor agrees to comply with 49 USC § 50101, BABA and other related Made in America Laws,¹ U.S. statutes, guidance, and FAA policies, which provides that Federal funds may not be obligated unless all iron, 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.

The bidder or offeror must complete and submit the certification of compliance with FAA's Buy American Preference, BABA and Made in America laws included herein with their bid or offer. The Airport Sponsor/Owner will reject as nonresponsive any bid or offer that does not include a completed certification of compliance with FAA's Buy American Preference and BABA.

The bidder or offeror certifies that all construction materials, defined to mean an article, material, or supply other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives that are or consist primarily of: non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber; or drywall used in the project are manufactured in the U.S.

The contractor certifies procurement of certain rolling stock using FAA grant funds will prohibit airports from using Federal financial assistance to procure buses or rail car vehicle rolling stock from covered entities.

CERTIFICATE OF BUY AMERICAN COMPLIANCE FOR CONSTRUCTION PROJECTS

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, BABA and other related Made in America Laws, U.S. statutes, guidance, and FAA policies, 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, BABA and other related U.S. statutes, guidance, and policies of the FAA by::

- a) Only installing steel and manufactured products produced in the United States;
- b) Only installing construction materials defined as: an article, material, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives that are or consist primarily of non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber or drywall that have been manufactured in the United States.
- c) 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
- d) 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 or the FAA 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.
- 4. Certify that all construction materials used in the project are manufactured in the U.S.

☐ 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 being selected as the responsive bidder, 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 result 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) Completed Content Percentage Worksheet and Final Assembly Questionnaire including;
- b) 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)
- c) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly and installation at project location.
- d) 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 – (Unreasonable Costs) - Applying this provision for iron, steel, manufactured goods or construction materials would increase the cost of the overall project by more than 25 percent. The required documentation for this waiver is:

- a) A completed Content Percentage Worksheet and Final Assembly Questionnaire from
- b) At minimum two comparable equal bids and/or offers;
- c) Receipt or record that demonstrates that supplier scouting called for in Executive Order 14005, indicates that no domestic source exists for the project and/or component;
- d) Completed waiver applications for each comparable bid and/or offer.

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

CERTIFICATE OF BUY AMERICAN COMPLIANCE FOR EQUIPMENT/ BUILDING PROJECTS

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, BABA and other Made in America Laws, U.S. statutes, guidance, and FAA policies by selecting one on the following certification statements. These statements are mutually exclusive. Bidder must select one or the other (not both) by inserting a checkmark (✓) or the letter "X".

☐ Bidder or offeror hereby certifies that it will comply with 49 USC § 50101, BABA and other related U.S. statutes, guidance, and policies of the FAA by:

- a) Only installing steel and manufactured products produced in the United States;
- b) Only installing construction materials defined as: an article, material, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives that are or consist primarily of non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber or drywall that have been manufactured in the United States.
- c) 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;
- d) 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 product.
- 3. To furnish US domestic product for any waiver request that the FAA rejects.
- 4. 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 being selected as the responsive bidder, 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 result 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 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 the item components and subcomponents produced in the United States is more than 60% of the cost of all components and subcomponents of the "item". The required documentation for a type 3 waiver is:

- a) Completed Content Percentage Worksheet and Final Assembly Questionnaire including;
- b) Listing of all product components and subcomponents 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).

- c) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly at place of manufacture.
- d) Percentage of non-domestic component and subcomponent cost as compared to total "item" component and subcomponent costs, excluding labor costs associated with final assembly at place of manufacture.

Type 4 Waiver – (Unreasonable Costs) - Applying this provision for iron, steel, manufactured goods or construction materials, would increase the cost of the overall project by more than 25 percent. The required documentation for this waiver is:

- a) Completed Content Percentage Worksheet and Final Assembly Questionnaire from
- b) At minimum two comparable equal bidders and/or offerors;
- c) Receipt or record that demonstrates that supplier scouting called for in Executive Order 14005, indicates that no domestic source exists for the project and/or component;
- d) Completed waiver applications for each comparable bid and/or offer.

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

7. Clean Air and Water Pollution Control (FAA Provision A6). (Reference 2 CFR § 200, Appendix II(G))

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

Contractor must include this requirement in all subcontracts that exceeds \$150,000.

8. Contract Workhours and Safety Standards Act Requirements (FAA Provision A7). (Reference: 2 CFR § 200, Appendix II (E))

1. Overtime Requirements.

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

2. Violation; Liability for Unpaid Wages; Liquidated Damages.

In the event of any violation of the clause set forth in paragraph (1) of this clause, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1) of this clause, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1) of this clause.

3. Withholding for Unpaid Wages and Liquidated Damages.

The Federal Aviation Administration (FAA) or the Owner shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime

contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 2 of this clause.

4. Subcontractors.

The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs (1) through (4) and also a clause requiring the subcontractor to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1) through (4) of this clause.

9. Debarment and Suspension (FAA Provision A10). (Reference: 2 CFR part 180 (Subpart C); 2 CFR part 1200; DOT Order 4200.5)

CERTIFICATION OF OFFERER/BIDDER REGARDING DEBARMENT

By submitting a bid/proposal under this solicitation, the bidder or offeror certifies that neither it nor its principals are presently debarred or suspended by any Federal department or agency from participation in this transaction.

CERTIFICATION OF LOWER TIER CONTRACTORS REGARDING DEBARMENT

The successful bidder, by administering each lower tier subcontract that exceeds \$25,000 as a "covered transaction", must verify each lower tier participant of a "covered transaction" under the project is not presently debarred or otherwise disqualified from participation in this federally assisted project. The successful bidder will accomplish this by:

1. Checking the System for Award Management at website: <http://www.sam.gov>.
2. Collecting a certification statement similar to the Certificate Regarding Debarment and Suspension (Bidder or Offeror), above.
3. Inserting a clause or condition in the covered transaction with the lower tier contract.

If the FAA later determines that a lower tier participant failed to disclose to a higher tier participant that it was excluded or disqualified at the time it entered the covered transaction, the FAA may pursue any available remedies, including suspension and debarment of the non-compliant participant.

10. Access to Records and Reports (FAA Provision A1). (Reference: 2 CFR § 200.333, 2 CFR § 200.336)

The Contractor must maintain an acceptable cost accounting system. The Contractor agrees to provide the sponsor, 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.

11. Copeland "Anti-Kickback" Act (FAA Provision A8). (Reference: 2 CFR § 200, Appendix II (D), 29 CFR Parts 3 & 5)

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

12. Davis-Bacon Requirements (FAA Provision A9). (Reference: 2 CFR § 200, Appendix II (D), 29 CFR Part 5)

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 (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 (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 determination; 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.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination 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.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(ii) (B) or (C) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

- (iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.
- (iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, *Provided*, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding.

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

3. Payrolls and basic records.

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

- (4) 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.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

- (iii) The contractor or subcontractor shall make the records required under paragraph (3)(i) of this section available for inspection, copying or transcription by authorized representatives of the sponsor, the Federal Aviation Administration or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the contractor, sponsor, applicant or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and Trainees.

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

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.

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.

7. Contract Termination: Debarment.

A breach of the contract clauses in paragraph 1 through 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.

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. 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.

10. Certification of Eligibility.

- (i) By entering into this contract, the contractor certifies that neither it (nor 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. 1001.

13. Disadvantaged Business Enterprises (FAA Provision A11). (Reference: 49 CFR part 26)

- (a) The requirements of 49 CFR Part 26 including any amendments thereto apply to this contract. It is the policy of the Owner 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.
- (b) **Contract Assurance (§ 26.13)** - 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 Owner deems appropriate, which may include, but is not limited to:

- 1) Withholding monthly progress payments;
- 2) Assessing sanctions;
- 3) Liquidated damages; and/or
- 4) Disqualifying the Contractor from future bidding as non-responsible.

- (c) **Prompt Payment (§26.29)** - The prime contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than ten (10) days from the receipt of each payment the prime contractor receives from Memphis-Shelby County Airport Authority. The prime contractor agrees further to return retainage payments to each subcontractor within ten (10) days after the subcontractor's work is satisfactorily completed. Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval of the Memphis-Shelby County Airport Authority. This clause applies to both DBE and non-DBE subcontractors.

14. Lobbying and Influencing Federal Employees (FAA Provision A16). (Reference: 31 U.S.C. § 1352, 49 CFR part 20, Appendix A)

The bidder or offeror certifies by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

- (1) 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 employee 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.
- (2) 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.
- (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.

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, U.S. 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 each such failure.

15. Rights to Inventions (FAA Provision A19). (Reference: 2 CFR § 200, Appendix II(F), 37CFR § 401)

Contracts or agreements that include the performance of experimental, developmental, or research work must provide for the rights of the Federal Government and the Owner in any resulting invention as established by 37 CFR part 401, Rights to Inventions Made by Non-profit Organizations and Small Business Firms under Government Grants, Contracts, and Cooperative Agreements. This contract incorporates by reference the patent and inventions rights as specified in 37 CFR §401.14. Contractor must include this requirement in all sub-tier contracts involving experimental, developmental or research work.

16. Trade Restriction Certification (FAA Provision A23). (Reference: 49 USC § 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 –

- 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 as published by the Office of the United States Trade Representative (U.S.T.R.);
- 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 U.S.T.R.; 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 U.S.T.R.

This certification concerns a matter within the jurisdiction of an 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, United States Code, Section 1001.

The Offeror/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 subcontractors 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 U.S.T.R.; or
- (2) whose subcontractors are owned or controlled by one or more citizens or nationals of a foreign country on such U.S.T.R. list; or
- (3) who incorporates in the public works project any product of a foreign country on such U.S.T.R. list.

Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by this provision. The knowledge and information of a contractor is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

The Offeror agrees that, if awarded a contract resulting from this solicitation, it will incorporate this provision for certification without modification in all lower tier subcontracts. The contractor may rely on the certification of a prospective subcontractor that it is not a firm from a foreign country included on the list of countries that discriminate against U.S. firms as published by U.S.T.R, unless the Offeror has knowledge that the certification is erroneous.

This certification is a material representation of fact upon which reliance was placed when making an award. If it is later determined that the Contractor or subcontractor knowingly rendered an erroneous certification, the Federal Aviation Administration may direct through the Owner cancellation of the contract or subcontract for default at no cost to the Owner or the FAA.

17. Veteran's Preference (FAA Provision A24). (Reference: 49 USC § 47112(c))

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.

18. Procurement of Recovered Materials (FAA Provision A18). (Reference: 2 CFR § 200.322, 40 CFR part 247)

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

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

The list of EPA-designated items is available at www.epa.gov/smm/comprehensive-procurement-guidelines-construction-products.

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

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

19. Seismic Safety (FAA Provision A20). (Reference: 49 CFR part 41)

- (a) In the performance of design services, the Consultant agrees to furnish a building design and associated construction specification that conform to a building code standard which provides a level of seismic safety substantially equivalent to standards as established by the National Earthquake Hazards Reduction Program (NEHRP). Local building codes that model their building code after the current version of the International Building Code (IBC) meet the NEHRP equivalency level for seismic safety. At the conclusion of the design services, the Consultant agrees to furnish the Owner a "certification of compliance" that attests conformance of the building design and the construction specifications with the seismic standards of NEHRP or an equivalent building code.
- (b) The contractor agrees to ensure that all work performed under the 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.

20. Distracted Driving (FAA Provision A13). (Reference: Executive Order 13513, DOT Order 3902.10)

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

In support of this initiative, the Owner encourages the Contractor to promote policies and initiatives for its employees and other work personnel that decrease crashes by distracted drivers, including policies that ban text messaging while driving motor vehicles while performing work activities associated with the project. The Contractor must include the substance of this clause in all sub-tier contracts exceeding \$10,000 which involve driving a motor vehicle in performance of work activities associated with the project.

21. Tax Delinquency and Felony Conviction (FAA Provision A21).

CERTIFICATION OF OFFERER/BIDDER REGARDING TAX DELINQUENCY AND FELONY CONVICTIONS

The applicant 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 applicant agrees that, if awarded a contract resulting from this solicitation, it will incorporate this provision for certification in all lower tier subcontracts.

Certifications

- a) 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.
- b) 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.

Note

If an applicant responds in the affirmative to either of the above representations, the applicant 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 applicant therefore must provide information to the owner about its tax liability or conviction to the Owner, who will then notify the FAA Airports District Office, 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.

22. Domestic Preferences for Procurements (FAA Provision A25)

CERTIFICATION REGARDING DOMESTIC PREFERENCES FOR PROCUREMENTS

The Bidder or Offeror certifies by signing and submitting this bid or proposal that, to the greatest extent practicable, the Bidder or Offeror has provided a preference for the purchase, acquisition, or use of goods, products, or materials produced in the United States (including, but not limited to, iron, aluminum, steel, cement, and other manufactured products) in compliance with 2 CFR § 200.322.

23. Prohibition on Certain Telecommunications and Video Surveillance Services or Equipment (FAA Provision A13)

PROHIBITION ON CERTAIN TELECOMMUNICATIONS AND VIDEO SURVEILLANCE SERVICES OR EQUIPMENT

Contractor and Subcontractor agree to comply with mandatory standards and policies relating to use and procurement of certain telecommunications and video surveillance services or equipment in compliance with the National Defense Authorization Act [Public Law 115-232 § 889(f)(1)].

24. Prohibition of Covered Unmanned Aircraft Systems (UAS) (FAA Provision A26)

The Bidder or Offeror certifies that they are aware of and comply with relevant Federal statutes and regulations, including those from the Federal Aviation Administration (FAA), for operating unmanned aircraft systems (UAS) in accordance, and in compliance with all related requirements in the FAA Reauthorization Act of 2024 (Public Law 118-63), section 936 (49 U.S.C. § 44801 note). Contractor warrants that all UAS operations will be conducted in full compliance with all applicable Federal Aviation Administration (FAA) regulations, including but not limited to 14 CFR Part 107, and any other applicable local, state, or Federal laws and regulations. Sponsors and subgrant recipients cannot use AIP grant funds to enter into, extend, or renew a contract related to covered unmanned aircraft systems (UAS). This includes both procurement and operational contracts, as well as contracts with entities that operate such systems.

**EXHIBIT F
TO
CONSTRUCTION CONTRACT
FOR
SRE BUILDING – BUILDING PACKAGE - CONSTRUCTION**

**BY AND BETWEEN
THE MEMPHIS-SHELBY COUNTY AIRPORT AUTHORITY
AND
CONTRACTOR**

STATE REQUIRED CONTRACT PROVISIONS

STANDARD TERMS AND CONDITIONS:

Grantees shall not assign an Aeronautics Grant Contract or enter into a subcontract for any of the services performed under an Aeronautics Grant Contract without obtaining the prior written approval of the State. If such subcontracts are approved by the State, each shall contain, at a minimum, sections of the Aeronautics Grant Contract pertaining to "Conflicts of Interest," "Lobbying," "Nondiscrimination," "Public Accountability," "Public Notice," and "Records" (as identified by the section headings). Notwithstanding any use of approved subcontractors, the Grantee shall remain responsible for all work performed.

CONTRACT CLAUSES:

- F.1. Conflicts of Interest. Contractor warrants that no part of the total contract amount shall be paid directly or indirectly to an employee or official of the State of Tennessee as wages, compensation, or gifts in exchange for acting as an officer, agent, employee, subcontractor, or consultant to MSCAA in connection with any work contemplated or performed relative to this Contract.
- F.2. Lobbying. The Contractor certifies, to the best of its knowledge and belief, that:
- a. No federally appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee 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.
 - b. If any funds other than federally 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 contract, grant, loan, or cooperative agreement, the Promisor shall complete and submit Standard Form-LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.
 - c. The Contractor 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 subrecipients 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 and is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. § 1352.
- F.3. Nondiscrimination. Contractor hereby agrees, warrants, and assures that no person shall be excluded from participation in, be denied benefits of, or be otherwise subjected to discrimination in the performance of this Grant Contract or in the employment practices of the Contractor on the grounds of handicap or disability, age, race, color, religion, sex, national origin, or any other classification protected by federal, Tennessee state constitutional,

or statutory law. The Contractor shall, upon request, show proof of nondiscrimination and shall post in conspicuous places, available to all employees and applicants, notices of nondiscrimination.

- F.4. Public Accountability. If the Contractor is subject to Tenn. Code Ann. § 8-4-401 *et seq.*, or if this Contract involves the provision of services to citizens by Contractor on behalf of the State, Contractor agrees to establish a system through which recipients of services may present grievances about the operation of the service program. The Contractor shall also display in a prominent place, located near the passageway through which the public enters in order to receive Grant supported services, a sign at least eleven inches (11") in height and seventeen inches (17") in width stating:

NOTICE: THIS AGENCY IS A RECIPIENT OF TAXPAYER FUNDING. IF YOU OBSERVE AN AGENCY DIRECTOR OR EMPLOYEE ENGAGING IN ANY ACTIVITY WHICH YOU CONSIDER TO BE ILLEGAL, IMPROPER, OR WASTEFUL, PLEASE CALL THE STATE COMPTROLLER'S TOLL-FREE HOTLINE: 1-800-232-5454.

The sign shall be on the form prescribed by the Comptroller of the Treasury. MSCAA shall obtain copies of the sign from the Tennessee Department of Transportation, Aeronautics Division, and upon request from the Contractor, provide Contractor with any necessary signs.

- F.5. Public Notice. All notices, informational pamphlets, press releases, research reports, signs, and similar public notices prepared and released by the Contractor in relation to this Contract shall include the statement, "This project is funded under a grant contract with the State of Tennessee." All notices by the Contractor in relation to this Contract shall be approved by the State.
- F.6. Records. The Contractor and any approved subcontractor shall maintain documentation for all charges under this Contract. The books, records, and documents of the Contractor and any approved subcontractor, insofar as they relate to work performed or money received under this Grant Contract, shall be maintained in accordance with applicable Tennessee law. In no case shall the records be maintained for a period of less than five (5) full years from the date of the final payment. The Contractor's records shall be subject to audit at any reasonable time and upon reasonable notice by the Tennessee Department of Transportation, the Comptroller of the Treasury, or their duly appointed representatives.

The records shall be maintained in accordance with Governmental Accounting Standards Board (GASB) Accounting Standards or the Financial Accounting Standards Board (FASB) Accounting Standards Codification, as applicable, and any related AICPA Industry Audit and Accounting guides.

In addition, documentation of grant applications, budgets, reports, awards, and expenditures will be maintained in accordance with U.S. Office of Management and Budget's *Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards*.

Contract expenditures shall be made in accordance with local government purchasing policies and procedures and purchasing procedures for local governments authorized under state law.

The Contractor shall also comply with any recordkeeping and reporting requirements prescribed by the Tennessee Comptroller of the Treasury.

The Contractor shall establish a system of internal controls that utilize the COSO Internal Control - Integrated Framework model as the basic foundation for the internal control system. The Contractor shall incorporate any additional Comptroller of the Treasury directives into its internal control system.

Any other required records or reports which are not contemplated in the above standards shall follow the format designated by the head of the Tennessee Department of Transportation, the Central Procurement Office, or the Commissioner of Finance and Administration of the State of Tennessee.

- F.7. No Boycott of Israel. Pursuant to T.C.A. § 12-4-119, Contractor certifies that it is not currently engaged in, and will not for the duration of services herein engage in, a boycott of Israel.

DIVISION 0 – SECTION 00605
CERTIFICATE OF SECRETARY

AS TO RESOLUTION ADOPTED BY BOARD OF DIRECTORS

On _____

I, _____, hereby certify that I am the duly authorized Secretary of _____, charged with keeping the records and the seal of said Corporation, and that the following is a true and correct copy of a resolution adopted at a meeting of the Board of Directors of the Corporation duly held on _____, which resolution is now in full force and effect.

RESOLVED, that _____, (President, Vice President) of _____ is hereby authorized to execute contracts, performance bonds and labor materials bonds on behalf of the Corporation.

WITNESS my hand as Secretary, and the seal of the Corporation this ____ day of _____, 20____.

 Secretary

BEFORE ME, a notary public of the state and county mentioned, personally appeared

_____, with whom I am personally acquainted, and who, upon oath,

acknowledged such person to be _____, and officer authorized to execute the

instrument, of _____, the within named bargainor, a corporation, and that such

officer, as such _____, executed the foregoing instrument for the purposes therein contained, by personally signing their name of the corporation as _____.

WITNESS my hand and seal, at office, this _____ day of _____, 20____.

 Notary Public

(SEAL)

My Commission Expires: _____

END OF SECTION 00605

ISSUED FOR BID

00605
 Page 1

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PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: that

as Principal, hereinafter called Contractor or Principal, and

as Surety, hereinafter called Surety, are held and firmly bound unto

MEMPHIS-SHELBY COUNTY AIRPORT AUTHORITY

hereinafter called Owner, or Obligee, in the amount of _____ Dollars, for the performance whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly, severally, and solidarily, firmly by these presents.

The penal sum of this Performance Bond shall be increased by the amount that the Contract, as herein below defined, is increased during the term of the Performance Bond.

WHEREAS, Principal has entered into a written agreement with the Owner (hereinafter referred to as "Contract") for:

in accordance with Drawings and Specifications prepared and to be prepared by

Foth Infrastructure & Environment, LLC

which Contract is by reference incorporated herein and made a part hereof.

WHEREAS, the Surety represents that it possesses an A-VIII rating or higher in the most recent edition of Best Insurance Reports and that Surety is authorized to execute and deliver bonds in the State of Tennessee.

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Principal shall promptly and faithfully perform each and every term, condition, obligation and provision of said Contract, including but not limited to, completion and delivery of the work described in the Contract within the scheduled time as such time may be extended from time to time as permitted in the Contract, then this obligation shall be null and void; otherwise, it shall remain in full force and effect.

The Surety shall within sixty (60) days from notice by Owner to the Surety, either

1. Proceed to complete the performance of the Contract timely in accordance with the terms and conditions of the Contract, including but not limited to:

(a) The responsibilities of the Principal for completion of the Work, correction of defective Work, warranty Work and payment for the Work; and

(b) Payment of liquidated damages specified in the Contract, or

2. Pay to the Owner the amount of its costs and damages, up to the penal sum of this bond, that would be owed by the Principal to the Obligee under the Contract to complete the obligations of the Principal, including any liquidated damages that may be due and any additional legal, design professional or delay costs resulting from the Contractor's default less any remaining contract funds.

The Surety hereby waives notice of any alteration or extension of time made by the Owner. The Surety hereby waives notice of any change in the scope of the Contract.

Any suit under this Performance Bond must be instituted in a court of competent jurisdiction, in Shelby County, Tennessee, and not elsewhere within four (4) years from Substantial Completion as defined in the Contract.

No right of action shall accrue on this bond to or for the use of any person, partnership or corporation other than the Owner or the heirs, executors, administrators, successors or assigns of the Owner.

Notice of claim to the Surety under the bond shall be sent to the following address:

SIGNED AND SEALED this ____ day of _____, 20 ____.

PRINCIPAL

TITLE: _____

SURETY

TITLE: _____

ADDRESS

CITY STATE ZIP CODE

LABOR AND MATERIAL PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: that

as Principal, hereinafter called Contractor or Principal, and

as Surety, hereinafter called Surety, are held and firmly bound unto

MEMPHIS-SHELBY COUNTY AIRPORT AUTHORITY

hereinafter called Owner or Obligee, in the amount of _____ Dollars, for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly, severally, and solidarily, firmly by these presents.

The penal sum of this Labor and Material Payment Bond shall increase by the amount that the Contract, as herein below defined, is increased during the term of the Labor and Material Payment Bond.

WHEREAS, Principal has entered into a written agreement with the Owner (hereinafter referred to as the "Contract") for:

in accordance with Drawings and Specifications prepared and to be prepared by

Foth Infrastructure & Environment, LLC

which Contract is by reference incorporated herein and made a part hereof.

WHEREAS, the Surety represents that it possesses an A--.VIII rating or higher in the most recent edition of Best Insurance Reports and that Surety is authorized to execute and deliver bonds in the State of Tennessee.

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Principal shall promptly and faithfully complete the work as defined in the Contract free and clear of all claims, liens and any other contractual, statutory, or legal rights the Claimants, as hereinbelow defined, may have for the payment of amounts owed in connection with or arising out of the Contract ("Claims"); and the Principal shall make prompt payment to all persons having a Claim or lien pursuant to any statute or law of the State of Tennessee, then this obligation shall be void; otherwise, it shall remain in full force and effect.

1. A Claimant is defined as one having a contract with the Principal or a subcontractor or supplier of any tier for labor, materials, equipment used or reasonably required for use in the performance of the Contract, labor and materials being construed to include water, power, gas, light, heat, oil, gasoline, or telephone services applicable to the Contract.
2. No suit or action shall be commenced by any Claimant:
 - a) After the expiration of two (2) years following the date which Substantial Completion as defined in the Contract is achieved. However, if any limitation embodied in this bond is prohibited by any law controlling the construction hereof, such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

- b) Other than in a court of competent jurisdiction in Shelby County, Tennessee, and not elsewhere.
3. Upon written notice to Surety from the Owner, Surety shall, within forty-five (45) days after receipt of said notice, pay or cause to be paid all Claims made or if the Surety contests in good faith the validity of any Claim, the Surety shall, within forty-five (45) days after receipt of said notice, cause bonds to be posted in an amount and form acceptable to Oblige to bond off such Claims. Surety shall indemnify, defend and hold Oblige harmless from any such Claims together with any and all attorney's fees, costs and expenses or liability in any manner arising out of or in connection therewith.
4. The Surety hereby waives notice of any alteration or extension of time made by the Owner. The Surety hereby also waives notice of any changes in the scope of the Contract, including changes to the contract amount.

Notice of claim to the Surety under the bond shall be sent to the following address.

SIGNED AND SEALED this the _____ day of _____, 20____.

PRINCIPAL

TITLE: _____

SURETY

TITLE: _____

ADDRESS

CITY STATE ZIP CODE



MEMPHIS INTERNATIONAL AIRPORT

APPLICATION FOR PAYMENT NO. ____

TO: MEMPHIS-SHELBY COUNTY AIRPORT AUTHORITY

REGARDING CONTRACT FOR:

MSCAA PROJECT NO. 23-1476-17-02
SRE BUILDING - BUILDING PACKAGE - CONSTRUCTION

CONTRACTOR:

CONTRACTOR

FOR WORK ACCOMPLISHED FROM __ TO __

STATUS OF CONTRACT:

ORIGINAL CONTRACT PRICE:

\$0.00

APPROVED CONTRACT AMENDMENTS:

No. 1 Approved	MM/DD/YYYY	Adds <u>0</u> days	<u>\$0.00</u>
No. 2 Approved	MM/DD/YYYY	Adds <u>0</u> days	<u>\$0.00</u>
No. 3 Approved	MM/DD/YYYY	Adds <u>0</u> days	<u>\$0.00</u>
No. 4 Approved	MM/DD/YYYY	Adds <u>0</u> days	<u>\$0.00</u>
No. 5 Approved	MM/DD/YYYY	Adds <u>0</u> days	<u>\$0.00</u>
No. 6 Approved	MM/DD/YYYY	Adds <u>0</u> days	<u>\$0.00</u>
Total time extension:		Adds <u>0</u> days	<u>\$0.00</u>

TOTAL AMENDED CONTRACT PRICE

\$0.00

NOTICE TO PROCEED DATE:

ORIGINAL COMPLETION DATE:

AMENDED COMPLETION DATE:

REMARKS:

TOTAL INSTALLED TO DATE		
previously installed to date	\$0.00	
this application installed	<u>\$0.00</u>	\$0.00
plus STORED MATERIALS		
previously stored materials	\$0.00	
this application stored materials	<u>\$0.00</u>	\$0.00
less PREVIOUSLY CERTIFIED FOR PAYMENT		\$0.00
equals AMOUNT DUE THIS APPLICATION		<u>\$0.00</u>

CONTRACTOR'S CERTIFICATION:

The undersigned Contractor certifies that (1) all previous progress payments received from Owner on account of Work done under the Contract referred to above have been applied to discharge in full all obligations of Contractor incurred in connection with Work covered by prior Application for Payment number 0 through ____ inclusive; and (2) title to all materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all liens, claims, security interests and encumbrances (except such as covered by Bond acceptable to Owner). Progress status is as described in schedule under monthly construction payment request.

Dated: MM/DD/YYYY

State of: TennesseeCounty of: Shelby

Subscribed and sworn to before me this _____ day of _____, YYYY.

Notary Public:

CONTRACTOR:

Contractor

BY: _____

Signatory

Title

My Commission Expires:

PROGRAM MANAGER'S RECOMMENDATION:

Payment of the above AMOUNT DUE THIS APPLICATION to CONTRACTOR is recommended.

DATED:

BY: _____

Program Manager Signatory

Title

ISSUED FOR BID

00630
Page 1

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DIVISION 0 – SECTION 00661
DAVIS-BACON WAGE DETERMINATION

"General Decision Number: TN20260200 05/18/2026

State: Tennessee

Construction Types: Building

Counties: Tennessee Counties of
Fayette and Shelby

Modification Number	Publication Date
0	01/02/2026
1	05/18/2026

ASBE0086-002 03/01/2025

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR.....	\$ 38.17	18.82

CARP0345-001 05/01/2024

	Rates	Fringes
CARPENTER.....	\$ 30.20	14.74

ELEC0474-002 08/04/2025

	Rates	Fringes
ELECTRICIAN (EXCLUDES LOW VOLTAGE WIRING).....	\$ 36.75	16.19

IRON0492-002 05/01/2025

	Rates	Fringes
IRONWORKER: ORNAMENTAL.....	\$ 35.32	17.07
IRONWORKER, STRUCTURAL.....	\$ 35.32	17.07
IRONWORKER, REINFORCING.....	\$ 35.32	17.07

SHEE0004-008 01/01/2024

	Rates	Fringes
SHEET METAL WORKER (HVAC UNIT INSTALLATION ONLY)....	\$ 34.95	16.66
SHEET METAL WORKER (HVAC DUCT INSTALLATION ONLY)....	\$ 34.95	16.66

SHEE0004-009 01/01/2024

	Rates	Fringes
SHEET METAL WORKER (EXCLUDES HVAC DUCT INSTALLATION).....	\$ 34.95	16.66

SUTN2017-053 04/16/2021

	Rates	Fringes
TRUCK DRIVER: DUMP TRUCK.....	\$ 15.28	0.00
TILE SETTER.....	\$ 19.65	0.00
TILE FINISHER.....	\$ 14.00	0.00
ROOFER.....	\$ 16.29	0.00
PLUMBER.....	\$ 26.86	10.40
PIPEFITTER.....	\$ 29.54	12.41
PAINTER (BRUSH AND ROLLER).....	\$ 17.00	0.00
OPERATOR: ROLLER.....	\$ 14.35	0.00
OPERATOR: PAVER (ASPHALT, AGGREGATE, AND CONCRETE).....	\$ 14.70	0.00
OPERATOR: FORKLIFT.....	\$ 15.00	0.00
OPERATOR: DRILL.....	\$ 26.50	4.09
OPERATOR: CRANE.....	\$ 25.70	7.75
OPERATOR: BULLDOZER.....	\$ 28.19	9.65
OPERATOR: BOBCAT/SKID STEER/SKID LOADER.....	\$ 16.84	0.00
OPERATOR: BACKHOE/EXCAVATOR/TRACKHOE.....	\$ 23.06	0.00
LABORER: PIPELAYER.....	\$ 14.99	2.41
LABORER: MASON TENDER - CEMENT/CONCRETE.....	\$ 15.33	0.00
LABORER: MASON TENDER - BRICK.....	\$ 13.54	0.00
LABORER: COMMON OR GENERAL.....	\$ 13.97	1.30
LABORER GRADE CHECKER.....	\$ 13.01	0.00
LABORER DEMOLITION.....	\$ 16.74	0.00
GLAZIER.....	\$ 16.99	3.70
ELECTRICIAN (LOW VOLTAGE WIRING).....	\$ 25.31	9.18
CEMENT MASON/CONCRETE FINISHER.....	\$ 20.25	0.00
BRICKLAYER.....	\$ 20.00	0.00

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 <https://www.dol.gov/agencies/whd/government-contracts>.

Note: Executive Order 13658 generally applies to contracts subject to the Davis-Bacon Act that were awarded on or between January 1, 2015 and January 29, 2022, and that have not been renewed or extended on or after January 30, 2022. Executive Order 13658 does not apply to contracts subject only to the Davis-Bacon Related Acts regardless of when they were awarded. If a contract is subject to Executive Order 13658, the contractor must pay all covered workers at least \$13.65 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract from May 11, 2026, through December 31, 2026. The applicable Executive Order minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under Executive Order 13658 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) (iii)).

The body of each wage determination lists the classifications and wage rates that have been found to be prevailing for the type(s) of construction and geographic area covered by the wage determination. The classifications are listed in alphabetical order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a supplemental classification rate.

Union Rate Identifiers

A four-letter identifier beginning with characters other than SU , UAVG , SA , or SC denotes that a union rate was prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate 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. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates in the collective bargaining agreement (CBA) governing the classification.

Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for the classifications reflected union rates. EXAMPLE: UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio. The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

Survey Rate Identifiers

The SU identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey data for that classification. FL indicates the State of Florida. 2022 is the year of the 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. The date, 6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier.

SU wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6(c)(1).

State Adopted Rate Identifiers

The SA identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the SA identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

- a) a survey underlying a wage determination
- b) an existing published wage determination
- c) an initial WHD letter setting forth a position on a wage determination matter
- d) an initial conformance (additional classification and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to davisbaconinfo@dol.gov or by mail to:

Branch of Wage Surveys
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to BCWD-Office@dol.gov or by mail 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 an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via email to dba.reconsideration@dol.gov or by mail 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 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.

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END OF GENERAL DECISION

"

END OF SECTION 00661

DIVISION 0 – SECTION 00663**LABOR STANDARDS INTERVIEW**

In accord with Davis-Bacon Requirements, the Contractor shall permit Owner to conduct interviews with employees during working hours on the job. These interviews will be conducted at least once every three months with one person employed by the Contractor and one person employed by each of the subcontractors (and sub-subcontractors to all tiers of the project, as applicable). Any and all employees subject to payment minimum wages per Davis-Bacon Requirements may be selected for interviews. The frequency and quantity of interviews may be increased or decreased at the Owner's sole discretion. The interview form on the next page will be used to conduct each interview and will be available to the Contractor upon request.

END OF SECTION 00663

Memphis-Shelby County Airport Authority
Labor Standards Interview Form



SECTION 1 – TO BE COMPLETED BY INTERVIEWER UNDER INTERVIEWEE’S OBSERVATION

Project Name: Snow Removal Equipment Building - Building Package - Construction Project Number: 23-1476-17-02

Interviewee’s Name: _____

Work Classification: _____ Interviewee’s Wage Rate: _____

Interviewee’s Employer: _____

Interviewee’s Supervisor: _____

Do you work over 8 hours per day? Yes ☐ No ☐

Do you work over 40 hours per week? Yes ☐ No ☐

Are you paid at least time and a half for overtime hours? Yes ☐ No ☐

Are you receiving any cash payments for fringe benefits required by the posted wage determination decision? Yes ☐ No ☐

Are there deductions other than taxes and social security made from your pay? Yes ☐ No ☐

If yes to previous question, describe deductions: _____

What tools do you use? _____

The above information is correct to the best of my knowledge

Interviewee’s Signature: _____ Date: _____

Interviewer’s Signature: _____ Date: _____

SECTION 2 – TO BE COMPLETED BY INTERVIEWER SEPARATE FROM INTERVIEWEE

Work being completed by interviewee at time of interview: _____

Are wage rates and posters displayed? Yes ☐ No ☐

SECTION 3 – TO BE COMPLETED BY PAYROLL CHECKER

Is interviewee properly classified and paid? Yes ☐ No ☐

Is above information in agreement with payroll data? Yes ☐ No ☐

5/26/26

MSCAA 23-1476-17-02

Checker's Signature: _____ Date: _____

DIVISION 0 – SECTION 00765
SUPPLEMENTAL PROVISIONS

00765-01 CONTRACTOR'S FIELD OFFICE

A Contractor's field office is not required for this project. Contractor shall keep on file at the project site copies of contract drawings, shop drawings, specifications, and other records pertaining to the project, in good condition, and readily accessible to the Contractor, Owner, Engineer, and all parties concerned.

00765-02 PROTECTION OF PERSONS AND PROPERTY

00765-02.1 The Contractor shall be responsible for initiating, maintaining and supervising safety and anti-substance abuse precautions and programs in connection with the Work, and shall provide all protection to prevent injury to all persons involved in any way in the Work and all other persons, including, without limitation, the employees, agents, guests, visitors, invitees and licensees of the Owner who may visit or be affected thereby. These precautions shall include, but in no event be limited to: the posting of danger signs and personal notification to all affected persons of the existence of a hazard of whatever nature; the furnishing and maintaining of necessary traffic control barricades and flagman services; the use, or storage, removal and disposal of required explosives or other hazardous materials only under the supervision of qualified personnel and after first obtaining permission of all applicable governmental authorities; and the maintenance of adequate quantities of both hose and operable fire extinguishers at the job site. The Contractor shall set forth in writing its safety and anti-substance abuse precautions and programs in connection with the Work and, if requested by the Owner, submit the same to the Owner for review. The Owner may, but shall not be obligated to, make suggestions and recommendations to the Contractor with respect thereto.

00765-02.2 All Work, whether performed by the Contractor, its Subcontractors or Sub-Subcontractors, or anyone directly or indirectly employed by any of them, and all equipment, appliances, machinery, materials, tools and like items incorporated or used in the Work, shall be in compliance with, and conform to: (a) all applicable laws, ordinances, rules, regulations and orders of any public, quasi-public or other governmental authority relating to the safety of persons and their protection against injury, specifically including, but in no event limited to, the Federal Occupational Safety and Health Act of 1970, as amended, and all rules and regulations now or hereafter in effect pursuant to said Act; and (b) all codes, rules, regulations and requirements of the Owner and its insurance carriers relating thereto. In the event of conflicting requirements, the more stringent shall govern.

00765-02.3 The Contractor shall designate a responsible member of its organization at the Job site as the Project Safety Officer, whose duties it shall be to enforce the Contractor's safety and anti-substance abuse programs, to assure compliance with the Contract Documents and to prevent accidents. This person shall have enforcement authority and be responsible for carrying out the relevant duties and be designated in writing by the Contractor and approved by the Owner. The Contractor shall further cause each of its Subcontractors and Sub-Subcontractors to designate a responsible supervisory representative to assist the Contractor's Project Safety Officer representative in the performance of their duties as aforesaid.

00765-02.4 Should the Contractor fail to provide a safe area for the performance of the Work or any portion thereof, the Owner shall have the right, but not the obligation, to suspend Work in the unsafe area. All costs of any nature (including, without limitation, overtime pay) resulting from the suspension, by whomsoever incurred, shall be borne by the Contractor.

00765-02.5 The Contractor shall provide to each worker on the job site the proper safety equipment for the duties being performed by that worker and will not permit any worker on the job site who fails or refuses to use the same. The Owner shall have the right, but not the obligation, to order the Contractor to send a worker home for the day or to discharge a worker for their failure to comply with safe practices or anti-substance abuse policies, with which order the Contractor shall promptly comply.

00765-02.6 The Contractor shall indemnify the Owner, from and against any and all liability, public or private, penalties, contractual or otherwise, losses, damages, costs, attorney's fees, expenses, causes of action, claims or judgments resulting either in whole or in part from any failure of the Contractor, its Subcontractors or Sub-Subcontractors or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, to comply with the provisions of the Contract. The Contractor shall not be relieved of its responsibilities under the Contract, should the Owner act or fail to act pursuant to its rights hereunder, nor shall the Owner thereby assume, nor be deemed to have assumed, any responsibilities otherwise imposed upon the Contractor by this Construction Contract, in any manner whatsoever.

00765-02.7 The Contractor shall, throughout the performance of the Work, maintain adequate and continuous protection of all Work and temporary facilities against loss or damage from whatever cause, shall protect the property of the Owner and third parties from loss or damage from whatever cause arising out of the performance of the Work and shall comply with the requirements of the Owner, its designated agents, and its insurance carriers and with all applicable laws, codes, rules and regulations with respect to the prevention of loss or damage to property as a result of fire or other hazards. The Owner may, but shall not be required to, make periodic patrols of the job site as a part of its normal security program. In such event, however, the Contractor shall not be relieved of its aforesaid responsibilities.

END OF SECTION 00765

DIVISION 0 – SECTION 00801**AIRPORT CONSTRUCTION SAFETY REQUIREMENTS****PART 1 GENERAL****1.01 SUMMARY**

- A. This section contains the minimum level of safety requirements for construction projects at Memphis International Airport, General DeWitt Spain Airport, and/or Charles W. Baker Airport.
- B. Related work:
 - 1. Other contract documents affecting construction safety include, but are not limited to, the DIVISION 0 AND DIVISION 1 specifications.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION**3.01 CONTRACTOR PERSONNEL SAFETY ORIENTATION**

- A. The Contractor shall be responsible for briefing all construction personnel on the requirements contained in this section prior to their working in the construction area and at periodic intervals throughout the course of the contract. These briefings will be documented in writing.

3.02 SCHEDULING WORK

- A. See Specification section 01100, SEQUENCE OF CONSTRUCTION & LIQUIDATED DAMAGES.
- B. See General Provision Section 80, Paragraph 80-04, Limitation of Operations.

3.03 CONSTRUCTION SECURITY

- A. See Specification section 00802, AIRPORT SECURITY REQUIREMENTS.

3.04 LIMITATION ON CONSTRUCTION

- A. The limits of construction, material storage areas, equipment parking and other areas defined as available for the contractor's exclusive use during construction shall be identified and defined by the contractor prior to starting work on the project. Temporary barricades, flagging and flashing caution lights may be required at access points, taxiway crossings and pavement tie-ins. The type markings, barricades and flashing caution lights are designated on the construction plans and must be inspected and approved by the Airport Authority.
- B. The Contractor shall store all materials and park construction equipment, when not in use only in the areas designated on the plans or during the pre-construction conference.
- C. Stockpiling of dirt and construction materials shall be constrained in a manner preventing movement resulting from jet blast or wind in excess of 10 knots.
- D. Construction debris, waste, wrappings or loose material capable of causing damage to aircraft engines, propellers, or landing gear shall not be allowed on active aircraft movement areas.

Material meeting this criteria shall be contained and removed immediately from the AOA.

- E. Open flame, welding, or torch cutting operations are prohibited in the construction area unless written permission has been given by the Airport Authority and adequate fire and safety precautions have been taken.
- F. The use or possession of explosives is prohibited on Airport property.
- G. Extensive stockpiles of construction materials will not be permitted near runway ends, runway edges, taxiways or aircraft parking aprons.
- H. Excavation and open trenches may be permitted within runway safety areas and up to the edge of structural pavement on taxiways and aprons, on a case-by-case basis, i.e. cable trenches, pavement tie-ins, etc.; but only with prior approval of the Owner and, where required, the FAA.
- I. Hazardous areas, into which no part of an aircraft may enter, (i.e., excavations, open trenches, material stockpiles, etc.) must be permanently delineated by use of barricades with alternate orange and white markings. The barricades are to be supplemented with orange flags (20x20 inch minimum) made and installed so that they are always in the extended position and properly oriented. For nighttime use, the barricades are supplemented with flashing red lights. Light intensity and barricade spacing must adequately delineate the hazardous area. Flare pots are prohibited.

Note: The Contractor shall designate an individual by name who is on call 24 hours per day for emergency maintenance of airport hazard lighting and barricades.

- J. FAA approval is required in advance of scheduled operation of any crane or other construction equipment with top elevation exceeding 300 feet mean sea level or that will penetrate any navigable surface as defined under FAR PART 77. Advance notification of intended use will be provided by the Owner well in advance of intended use.

3.06 CONSTRUCTION VEHICLE TRAFFIC

- A. Access to the construction site is as shown on the plans or as directed by the Owner. No other access point is authorized unless designated in writing by the Airport Authority. Construction traffic will operate only on designated haul routes within the construction area limits.
- B. Drivers of construction vehicles will be knowledgeable of construction routes or will be escorted by other Contractor or Owner designated personnel who are knowledgeable.
- C. The Contractor will be responsible for traffic control in the various construction areas of the work site. The Contractor will not permit unauthorized personnel or vehicles on the construction site.
- D. The Contractor shall be responsible for immediate cleanup of any debris deposited along construction routes, as result of his construction traffic.
- E. Directional signing at the construction access gate and along the delivery route to work site temporary storage areas shall be as designated and approved by the Owner.
- F. Construction vehicle identification shall be as prescribed in Specification Section 00802, AIRPORT SECURITY REQUIREMENTS.
- G. No construction vehicle is authorized on any active AOA pavement surface or to enter runway safety areas without specific authorization from the Owner.

3.07 REPORTING PROPERTY DAMAGE OR PERSONNEL INJURY

- A. All persons involved in any accident whether personal injury, aircraft or automotive, occurring on Airport property, shall make a full report to the Airport Police (922-8298) as soon after the accident as possible. The report shall include, but not be limited to, the names, addresses of all principals and witnesses, if known, and a statement of the facts. Construction accidents fall under this category.
- B. In the event of personnel injury requiring ambulance response, the Airport Police Dispatcher, upon notification, telephone 922-8333, will call the ambulance and arrange Airport Police escort to the injury site. A written report will be prepared by the Airport Police after the injury is treated.

END OF SECTION 00801

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DIVISION 0 – SECTION 00802**AIRPORT SECURITY REQUIREMENTS****PART 1 GENERAL****1.01 CONTRACTORS SECURITY AND VEHICLE PROCEDURES OVERVIEW**

- A. This overview outlines procedures concerning Airport security requirements, vehicle operation, and maintenance requirements for contractors at Memphis International Airport or any airport owned and operated by the Memphis-Shelby County Airport Authority. The sponsor Memphis-Shelby County Airport Authority (Airport Authority), airline, tenant, or concessionaire at the Airport who has hired the contractor is responsible for ensuring the contractor understands and complies with all the rules and regulations. This is a consolidated synopsis of the contractor requirements from the Airport Security Program and the Airport Rules and Regulations.

1.02 DEFINITIONS

- A. **Aircraft** - shall mean any contrivance known or hereinafter invented, used or designed for navigation of or flight in the air.
- B. **Air Operations Area (AOA)** - that part of the Airport used or intended to be used for landing, taking off, surface maneuvering, loading, unloading, or servicing the aircraft.
- C. **Airport** - shall mean the Memphis International Airport and/or the General DeWitt Spain Airport and/or the Charles W. Baker Airport – where applicable.
- D. **Airport Restricted Area** - area of Memphis International Airport that is not intended for public uses or access. These are areas designated by the Airport Authority as restricted areas and clearly identified with signs designating those areas as "RESTRICTED AREA." The restricted area also includes the AOA.
- E. **AOA Driver's Permit** - permit issued by the Airport Authority for operating unescorted motor vehicles on the AOA.
- F. **Construction Restricted Area** - any area, inside or outside of the Airport Restricted Area, which is fenced, or in some like manner defined by the Contractor. The Contractor is responsible for the security of the Construction Restricted Area.
- G. **Director** - shall mean the Director of Operations and Public Safety or his duly authorized representatives.
- H. **Job Site** - a predetermined geographic area with specific boundaries established by the Airport Authority.
- I. **Movement Area** - runways, taxiways, and other areas of the Airport used for taxiing, takeoff, and landing of aircraft, except loading ramps and parking areas.
- J. **Personal Escort** - remaining within sight of the individual under escort at all times while in the Airport restricted areas at a distance not to exceed 20 feet.
- K. **Public Area** - any area within Airport facilities open to the general public.
- L. **SIDA** - Security Identification Display Area.

- M. **Unescorted Identification Badge** - pictured identification badge issued by the Airport Authority, which allows bearer to enter Airport Restricted Areas where there is a job related need.
- N. **Vehicle Escort** - means the following of an authorized escort vehicle into the Airport Restricted Areas.

PART 2 PRODUCTS

(No products are required in this Section.)

PART 3 EXECUTION

3.01 AMENDMENTS AND SPECIAL NOTICES

- A. The Contractor will be bound by any future amendments, additions, deletions, or corrections of the Airport Rules and Regulations promulgated by the Airport Authority, as dictated by changes in Federal Transportation Security Administration (TSA) regulations, as dictated by changes in Federal Aviation Administration (FAA) regulations, or safety requirements at Memphis International Airport or any airport owned and operated by Memphis-Shelby County Airport Authority.
- B. Special regulations, notices, memoranda, or directions of an operations nature of interest to persons engaged in business with the Airport Authority, as generated by the Director, shall be issued under the authority of the Airport Regulations and shall have the same effect as the Airport Rules and Regulations.
- C. The Director is authorized to interpret and construe these regulations wherever necessary, either by directions of general or specific application, and his interpretation and construction should be deemed a part of the regulations and binding upon all persons.

3.02 ENFORCEMENT AND COMPLIANCE WITH AIRPORT REGULATIONS

- A. The uniformed Airport Police Officers of the Airport Authority and other representatives as designated by the Director are empowered to require compliance with Airport Rules and Regulations, ordinances of the City of Memphis, laws of the State of Tennessee, and federal rules and regulations. No authority is either hereby expressed or implied, however, that would permit any individual other than the Director to change, alter, or amend Airport Rules and Regulations.
- B. It shall be unlawful for any person to do or commit any act forbidden herein or fail to perform any act required by Airport Rules and Regulations.

3.03 SCOPE

- A. All users of and persons on Airport property shall be governed by the Airport Rules and Regulations and directions of the Director. Airport Rules and Regulations are subject to change by the Airport Authority Board of Directors at any time.
- B. Airport Rules and Regulations are not intended to amend, modify or supersede federal, state, or local laws or regulations.
- C. If any portion of the Airport Rules and Regulations shall be invalid or unenforceable, all other portions shall remain in effect and be construed to achieve the purposes hereof.

3.04 IDENTIFICATION REQUIREMENTS

- A. Entry into the SIDA is controlled by an automated access control system as mandated under CFR 49 Part 1540 and 1542. All persons in the SIDA must display, on the outermost garment, below the head and above the waist, an Airport-approved identification media unless under Airport approved escort.
- B. The Airport Authority will issue Airport Identification badges to the Contractor's employees who require access to the Airport Secured/Restricted Areas. The extent of the background check necessary for access into any worksite will be determined on a project by project basis. AIRPORT ID BADGES REMAIN AIRPORT AUTHORITY PROPERTY. Other identification procedures must be authorized by the Director in accordance with TSA regulations.
- C. Recent changes to Federal TSA Regulations provide for individual sanctions against employees who violate regulatory requirements. Individual employees may be subject to federal enforcement action by the TSA to include civil penalties. Some examples of punishable actions would include:
 - 1. Loaning a badge to someone else for use in the system.
 - 2. "Tailgating" through restricted area doors (or not using their own badge when entering or exiting).
 - 3. Failing to challenge unauthorized individuals in Airport restricted areas.
 - 4. Failing to notify proper authorities for individuals violating prescribed security regulations.
- D. The Memphis International Airport Identification Badge is the property of the Memphis-Shelby County Airport and must be surrendered upon termination of employment or completion of the project. The bearer will be held personally responsible for its return and is subject to any fines or penalties imposed. The badge is mandated through federal government guidelines and any misuse or tampering of badges is punishable under federal guidelines.
- E. Any employee attempting to bypass security measures will be subject to having their badge confiscated and access privileges terminated. Further, any efforts by an employee to circumvent prescribed security measures could result in arrest and the imposition of penalties from the TSA to the employee and to the related employer.
- F. Identification badges will be issued following the procedures listed below.
 - 1. Identification Badge Application – To be issued at Pre-Construction Meeting.
 - a. Prior to the issuance of an Airport identification badge to a contract employee of the Airport or Airport tenant, a badge application form must be prepared and submitted to the Airport Authority Identification Office.
 - b. Badge applications must be completed before badges will be issued. Employees should be instructed to print all information clearly and legibly. After an employee completes the employee and applicant portions of the application, certification by a designated MSCAA Approved Certifying Official is required.
 - c. Access is limited to only those restricted areas predicated on the Contractor's duties determined by the Development and Operations Divisions.
 - d. The Aviation Transportation Security Act (ATSA), which was passed by Congress on November 19, 2001, changed the requirements for SIDA access by requiring immediate fingerprint based background checks of all persons applying for and currently with unescorted SIDA access.

In addition, the number of disqualifying criminal offenses has increased. (See Attachment) The fingerprint based check must be complete and not reveal any disqualifying crimes in the last 10 years prior to any applicant receiving unescorted access to the SIDA.

- e. For employees unable to produce a legible set of fingerprints, they will submit to a manual criminal history check by the TSA. The process will take 30 days or more.

2. Airport Security Briefing

- a. Each employee requesting an Airport identification badge must attend a security training class. This briefing is conducted Monday through Friday. Contact the Airport Authority Identification Office at 922-8005 for the correct time.

3. Accountability

- a. In accordance with TSA guidelines, no more than 5% of identification badges issued by the Airport Authority can be unaccounted for at any time. A badge is considered unaccounted for if it is lost, stolen or not returned. If 5% of issued identification badges are unaccounted for, all badges must be reissued. Contractors will be assessed a fee for each badge leading to this reissuance. See Section 3.04, Identification Requirements, paragraph H.1.h below for the applicable fee.
- b. Federal regulations require immediate notification of employee terminations and lost badges to the operator in charge of deleting access privileges, which, in our case, would be the Control Center, 922-8298.
- c. When the Contractor has reason to believe that the terminated employee may pose a threat to the Airport or air carrier operations, the Contractor is responsible to immediately notify the Airport Authority Identification Office in person, via telephone, or in writing whichever is most expeditious.
- d. Routine termination of employee access authority will be accomplished by the Airport Authority Identification Office **within 8 hours** of notification. The identification badge must be returned to the Airport Authority Identification Office or the Airport Authority Security Coordinator **within 24 hours** of employee dismissal or resignation. Identification cards recovered from the employee at the time of routine termination are considered to be denied access.
- e. It is the Contractor's responsibility to retrieve the Airport identification badge IMMEDIATELY upon an employee's termination (voluntary or involuntary), transfer, retirement, death, reassignment, or completion of work assignment.
- f. Reportedly lost or stolen identification badges must be thoroughly investigated and closely scrutinized. Replacement Identification badges will be issued only upon written request from the employer. Such request must be on company letterhead stationary, must state the circumstances surrounding the loss, and must be signed by an authorized company representative on file with the Airport Authority. A fee will be charged for a lost badge.
- g. Identification badges shall be valid only during the term of the contract for which it is issued.

- h. If the Airport Authority Identification Office receives notification from an outside source (e.g. Airport Police Department, etc.) that immediate denial should be enacted, then our office will contact the proper company officials to notify them of the change that is being requested.

H. Identification Badge Fees.

- 1. After the Contractor meets all requirements, the Airport Authority shall issue the Contractor's employees automated photo identification badges for the following fees. Payment must be made according to the arrangement made with the Finance Division as indicated on the badge application. The following fees will be implemented as of September 1, 2018.

a.	Fingerprint Fee (required initially and every two years)	\$27.00
b.	Fingerprint Admin Fee	\$10.00
c.	Initial ID Badge (Includes \$11 lifetime STA fee)	\$25.00
d.	Deposit Per Badge	\$100.00
e.	Badge Renewal Fee	\$10.00
f.	1 st Lost Badge Fee (Refund of \$50 upon return)	\$100.00
g.	2 nd Lost Badge Fee (Refund of \$75 upon return)	\$150.00
h.	3 rd Lost Badge Fee (Refund of \$100 upon return)	\$200.00*
i.	Non-Returned Badge	\$100.00
j.	Badge Replacement	\$10.00
k.	Damaged Badge	No Charge

*Requires meeting with Project Manager and Security Coordinator before identification badge can be replaced.

2. Deposits.

- a. Badge deposits are due prior to the release of any badges.
- b. Payments may be made by check, money order or cashier's check. Absolutely no cash will be accepted.
- c. The fee for expired badges will be deducted from the deposit until the badge is returned. If an update for the expired badge is requested, the Contractor must bring the amount on deposit to \$100 before the badge can be released.
- d. Deposits will be reimbursed to the Contractor upon receipt of the identification badges once a project has been completed or badging is no longer required.

- 3. Employees challenged in the Airport Restricted Areas without an Airport Identification Badge PROPERLY DISPLAYED will be transported to the Airport Police Office where a fine of \$25.00 will be assessed and access authority removed for a minimum of 5 days. FINES NOT PAID WITHIN 14 DAYS OF THE VIOLATION WILL RESULT IN THE SUSPENSION OF THE EMPLOYEE'S ACCESS TO AIRPORT RESTRICTED AREAS.

I. Airport Access Gate Control.

- 1. At the Contract preconstruction conference a specific airfield security gate will be designated in writing for Contractor ingress and egress to and from the construction site. The Contractor's, suppliers, and subcontractors are required to use **only** this gate unless designation is made in writing by the Director of Operations and Public Safety, authorizing use of a different gate.
- 2. Under normal circumstances the designated access gate will be manned by security personnel under contract with the Airport Authority. These gates are manned only during

specific hours. Contractors scheduling work are required to coordinate with the Construction Security Coordinator, 922-8021, a minimum of 24 hours in advance of required gate use.

3. If a gate other than the regular construction gate is necessary, the Contractor must provide a guardhouse for the Airport security guard. If the Airport Authority does not have a portable guard house available for the Contractor's use, the Contractor will be required to furnish a guard house which meets the requirements as set forth in Exhibit B.
4. The Contractor will submit a projected estimate of the guard services required for the following week. This projection must be submitted by noon each Thursday to the Security Coordinator. (Exhibit C)

J. Clearance Procedures.

1. Gate guards will perform the following procedures for all persons requesting entrance into restricted areas:
 - a. The guard will take possession of the badge of each person entering an access gate.
 - b. The photo is checked against the holder.
 - c. The badge information is checked against the stop list.
(1) If a badge is on the stop list the guard will retain the badge and notify the Airport Police.
 - d. Expiration date is checked to ensure that the badge has not expired.
 - e. The vehicle will be checked for an authorizing decal, debris and unauthorized items. A request to enter a restricted area IMPLIES CONSENT TO SEARCH.
 - f. The person or vehicle (if applicable) will be logged in by entering name, employer, destination, license number, time in and badge expiration date.
 - g. Clear persons to be escorted (if required) to destination.
2. Under special circumstances, Contractors may have airfield security gates designated for their contract use, which are not manned by security personnel. In this event the Airport Authority, with the concurrence of the TSA, will furnish the Contractor with written requirements for the control of authorized access gates proper to the beginning of any construction.

K. Escorts Into An Airport Restricted Area.

1. Contractors who do not have a valid Airport identification badge wishing to enter a restricted area must be escorted by a person holding a valid Airport identification badge.
2. All vehicles operated in a restricted area must either be driven by or escorted by a person holding an Airport identification badge and an Airport Driver's Permit.

L. Operating Without Escort.

1. The Airport Authority will take under consideration, on a case-by-case basis, the issuance of an Airport Driver's Permit to one project supervisor on each shift. The Contractor will be required to justify, in writing to the Director of Public Safety, the need for unescorted vehicle movement. This Airport Driver's Permit does not permit the holder to escort other vehicles.
2. If a Contractor is authorized by the Airport Authority to provide their own vehicle escorts, the Airport Police will conduct the necessary training. This training will consist of approximately 16 hours of classroom and practical exercises.

M. Exiting Restricted Areas.

1. Construction workers must exit the same gate they entered.
2. Upon exiting the restricted area, vehicles may be required to stop and all persons in the vehicle may be required to present an Airport photo identification badge to the gate guard.

N. Flag Persons.

1. The Airport Authority will provide flag persons within the Airport Restricted Area.

3.05 VEHICLE PARKING AND OPERATION

A. General.

1. All streets on the Airport shall have the status of dedicated city streets for the purpose of traffic enforcement.
2. Motor vehicles operated on the public roadways and parking lots of the Airport shall be governed by the traffic ordinance of the city and state laws applicable and, in addition thereto, the following regulations shall be applicable.

B. Traffic Rules and Regulations in the Air Operations Area.

1. The driver of any motor vehicle operating within the Airport boundary shall comply with the lawful orders, signals or directives of Airport Police Officers.
2. All drivers operating motor vehicles within the Airport boundary must possess a valid state driver's license.
3. Only drivers possessing a valid Airport Driver's Permit issued by the Airport Authority are authorized to operate any motorized vehicle unescorted on the AOA of Memphis International Airport. (The Security Coordinator may designate certain construction areas as void of this requirement)
4. Riding on trailer hitches, fenders, or on any portion of a vehicle not equipped with proper seats, running boards, or handholds is prohibited. Standing up in a moving motor vehicle, riding outside of a moving motor vehicle, or riding with arms or legs protruding from the body of the vehicle is prohibited.
5. All vehicle lights shall be lighted during the hours of darkness or during the time of reduced visibility when said vehicle is being operated in the restricted area.
6. No person shall operate any motorized vehicle when vision is restricted due to the load being carried, or for any other reason.
7. No person under the influence of alcoholic beverages or narcotic drugs shall operate any motor vehicle or motorized equipment on the Airport.
8. It shall be the responsibility of the operator to ascertain that the vehicle is in good operating condition. Operators are required to check proper operation of the vehicle's brakes before commencing any operation on airport.

9. Vehicles dripping oil, gasoline, water, or debris of any kind, shall be restricted.
10. Pedestrians and aircraft shall at all times have right-of-way over vehicular traffic. All vehicles must pass to the rear of taxiing aircraft.

C. Radio Equipment.

1. All vehicles operating in the aircraft movement area must be equipped with a two-way radio and, when the movement area is being controlled, be in continuous communication with the Control Tower, unless being escorted by authorized escort vehicle.
2. The installation of two-way radios does not permit the operation of vehicles on the Airport without proper authorization of the Director.

D. Contractor Employee Parking.

1. Employee parking is not available on the job site. The Contractor must provide for remote parking for employees and transport them to the job site.

E. Authorized Contractor Vehicles.

1. Unless otherwise authorized, the Contractor and each subcontractor shall be permitted to have no more than one (1) vehicle per trade on the job site. All Contractor vehicles authorized access to Airport restricted areas shall be:
 - a. Owned or hired by the Contractor or subcontractor;
 - b. Insured under company policy;
 - c. On a pre-approved list; and
 - d. Marked in accordance with Airport regulations.
2. Passenger type vehicles, including pickup trucks, must have the company name displayed on each front door of the vehicle. The company name must be readable, but at a minimum (the letter size shall be 4.5"). The vehicle must display the appropriate Airport registration decal. Specialized equipment such as bulldozers, cranes, etc., will be exempted from this requirement.
3. Cranes used during daylight hours shall have a red flag affixed to the top of boom. Cranes shall have a red obstruction light on the top of boom when used at night. Crane booms shall not be left erect when not in use or following end of workday.

F. Emergency Vehicles and Conditions.

1. Any person operating a motor vehicle on the air operations area shall immediately yield the right-of-way to the police, ambulance, fire department, or other emergency vehicle giving an audible or visual signal or as otherwise directed by an Airport law enforcement officer or fire/rescue department personnel.
2. Emergency conditions existing on the air operations area will not mitigate or cancel existing regulations for non-emergency vehicles in areas not affected by the emergency.
3. Under emergency conditions such as an aircraft accident or fire, access to the scene is denied to all vehicles or persons except those whose duties require their presence. Permits and licensing shall be rendered invalid in the area of emergency conditions and the Airport Authority shall determine when normal operations may be resumed.

G. Passing Aircraft.

1. All vehicles shall pass to the rear of taxiing aircraft and shall pass no nearer than 200 feet horizontal distance.
- H. Passenger Concourse.
1. No motorized vehicles or carts of any type shall be used in any concourse or terminal lobby unless approved by the Director.
 2. No vehicle or motorized equipment shall be driven under concourses except at authorized vehicle pass-throughs designated by the Director.
- I. AOA Driving Lanes.
1. Vehicles on the aircraft parking apron at the terminal and air cargo buildings shall be operated within the marked driving lanes and in compliance with marked traffic control signs except for the following:
 - a. Authorized vehicles engaged in parking apron repair and inspection; and
 - b. Vehicles exceeding a width of 12 feet which shall follow marked lanes as closely as possible.
 2. Vehicles shall enter and exit designated driving lanes at a point nearest to the origin and destination.
 3. No vehicles or equipment shall be parked in a manner as to obstruct any portion of the driving lanes.
- J. Taxiing Aircraft.
1. Vehicles shall yield to taxiing aircraft or aircraft under tow.
- K. Speed Limits.
1. No person shall operate a motor vehicle or other motorized equipment at a speed greater than the following:
 - a. Five miles per hour in designated drives under the terminal;
 - b. Fifteen miles per hour on paved service roads in the vicinity of the terminal and air cargo buildings; or
 - c. Twenty-five miles per hour on all aprons or ramps unless the area has an otherwise posted speed limit.
 - d. Fifteen miles per hour on all aprons or ramps at General DeWitt Spain Airport and Charles W. Baker Airport unless the area has an otherwise posted speed limit.
- L. Inspection of Vehicles.
1. Contractors authorized to operate vehicles on the air operations area shall be responsible for ensuring that each motor vehicle is inspected at least each 12 months by a qualified mechanic, is in good mechanical condition and has all the required safety equipment.
 2. The Contractor shall remove from service any vehicle, which, in the opinion of the Director, is defective and in need of repair and said vehicle will not be returned to service until properly repaired.

M. Violations of Restricted Area Traffic Regulations.

1. The penalties for a violation of restricted area traffic regulations shall be as follows:
 - a. First offense within any 12-month period: retraining;
 - b. Second offense within any 12 month period: retraining and fine not to exceed \$50.00;
 - c. Third offense within any 12 month period: retraining and fine not to exceed \$100.00; and
 - d. Fourth offense within any 12 month period: revocation of privilege to drive in restricted area (unescorted or escorted).
2. The above set penalties do not negate the right of the Airport Authority to immediately revoke driving privileges, dependent upon the seriousness of the violation.

N. Vehicle Registration.

1. The Contractor shall list all construction vehicles requiring passage through the access gate on the "AOA Access Decal Request Form," which will be provided upon request.
2. Each vehicle approved will be issued a windshield decal, which must be affixed to the driver's side of the windshield. This decal is not transferable. Only those vehicles so marked will be allowed through the access gate with the following exceptions:
 - a. dump trucks;
 - b. concrete trucks;
 - c. vehicles making deliveries; and
 - d. cranes, tractor, etc.

O. Delivery Vehicles.

1. Each day the Contractor shall give the access gate guard a written list of deliveries expected. No delivery will be cleared into the restricted area unless it is on the list or the construction supervisor is contacted for clearance.

3.06 GENERAL INFORMATION

A. Access to Public Facilities.

1. Contractor employees are not authorized to use public facilities, (i.e., rest rooms, eating facilities, boarding gate hold rooms or other public areas of the terminal), except as specifically authorized by the Airport Authority and as necessary for access to job site.
2. Contractors shall provide adequate rest room and break facilities within the job site and staging areas as appropriate.
3. All public areas authorized for use by the Contractor's employees are to be kept in a clean and sanitary manner, free of all construction debris.

B. Accident Reports.

1. All persons involved in any accident whether personal injury, aircraft or automotive, occurring on Airport property, shall make a full report to the Airport Police (922-8298) as soon after the accident as possible. The report shall include, but not be limited to, the names,

addresses of all principals and witnesses, if known, and a statement of the facts. Construction accidents fall under this category

2. To request paramedics call 922-8333.

C. Airport Rules and Regulations.

1. The Contractor shall conform to the "Memphis-Shelby County Airport Authority Rules and Regulations."
2. The Contractor shall conform to "Memphis-Shelby County Airport Authority's Air Operations Area Rules and Regulations and its Airport Security Program."

D. Alcoholic Beverages and Narcotic Drugs.

1. No person shall have any alcoholic beverages or narcotic drugs on Airport property.

E. Damages.

1. Contractors shall be fully responsible for all damages to buildings, equipment, real property and appurtenances in the ownerships or custody of the Airport Authority caused by negligence, abuse or carelessness on the part of their employees, agents, customers, visitors, suppliers or persons with whom they do business.

F. Disorderly Conduct.

1. No person shall commit any disorderly, obscene or indecent act nor commit any nuisance.
2. Abusive behavior by Contractor supervisors or their employees will not be tolerated.

G. Debris and Cleanup.

1. No person shall dispose of any garbage, trash, refuse or any other material on the Airport except in the receptacles provided for that purpose.
2. No person shall dispose of any fill or building materials or any other materials on Airport property except in such areas as are specifically designated by the Director.
3. Contractors are responsible for the cleanliness of the job site and access to the job site as appropriate. All Contractors must establish an active ongoing program to eliminate any foreign objects which may cause damage to aircraft or cause personal injury to other persons. Contractors must pay particular attention to haul routes used to and from the job site to clean up any debris which may be tracked onto or dropped on the air operations area. Contractor will immediately remove such debris to eliminate the hazard. **END OF THE WORKDAY CLEANUP WILL NOT SUFFICE.** Cleanup shall be done to the satisfaction of the Airport Authority. All Active taxiway crossings and work areas adjacent to the taxiways shall be kept clean.
4. If it should become necessary for the Airport Authority to remove debris left by a Contractor, the Contractor shall be billed at 2 1/2 times the actual cost of the cleanup or a minimum of \$250 per trip whichever is greater.

H. Firearms and Explosives.

1. No person shall have any firearm, explosive or incendiary device on or about their person or accessible property while on Airport property.

I. Fire Equipment.

1. All Contractors shall supply and maintain adequate and readily accessible fire extinguishers for the particular hazard involved as directed by the Airport Authority or the Fire Marshal. All fire apparatus shall be maintained in first class operable condition.
2. The Contractor shall maintain the following items on site:
 - a. Two-pound dry chemical extinguisher, or
 - b. Four-pound carbon dioxide extinguisher.
3. Carbon tetrachloride chlorobromethene or other vaporizing liquid extinguishers are not permitted inside buildings due to their high toxicity unless approved in writing by the Fire Marshal.

J. Gambling.

1. No person shall conduct gambling in any form or operate gambling devices anywhere on Airport property.

K. Hazards.

1. No person shall use flammable volatile liquids having a flash point of less than 100°F in cleaning of parts, appliances, or for any other purpose unless such operations are conducted in the open air not within 50 feet of an aircraft, away from structures and equipment or in properly ventilated, approved paint booths.
2. No person shall keep or store any flammable liquids, gases, oil, oil wastes, flares, paints, or other similar material in any building within the Airport boundary except that such materials may be kept in specially provided rooms or receptacles approved by the Fire Marshal.
3. Contractors shall provide suitable metal receptacles with covers for the storage of wastes, rags, or other rubbish.
4. No person shall start any open fires of any type, including flare posts, torches or fires in containers formerly used for oil, paint, or similar materials on any part of an Airport without permission of the Director.

L. Picketing and Public Demonstrations.

1. Subject to applicable federal, state and local regulations and laws, no persons shall walk in a picket line as a picketer or take part in any labor or other public demonstration on any Airport property or facilities therein except in those places which may be specifically assigned for use of such picket lines or other public demonstration by the Director.

M. Restricted Areas.

1. No persons shall enter any area posted as being restricted or closed to the public except for the following:
 - a. Persons assigned to duty therein;
 - b. Persons authorized by the Director; or

- c. Persons under contractual agreement with the Airport Authority or tenants of the Airport Authority.
 - 2. All persons in restricted areas of Memphis International Airport must be duly authorized and must have displayed on their person an official identification badge which will clearly establish the individual by name, contractor affiliation, and construction project completion date.
 - 3. The identification badge must be worn on the outermost garment above the waist except in those cases where there exists an overriding safety consideration approved by the FAA.
- N. Signs on the Airport.
- 1. Signs may not be installed in public view on the Airport without prior approval of the Airport Authority. Proposals should be documented and submitted to the Airport Authority with an accompanying sketch depicting the general appearance and location of the desired sign, and the name and telephone number of an individual to contact.
- O. Smoking.
- 1. No person shall smoke or carry lighted cigars, cigarettes, pipes, matches or any naked flame in or on any fuel storage areas, Air Operations Area, public aircraft parking and storage area, in any other place where smoking is specifically prohibited by signs or upon any open space within 50 feet of any fuel carrier which is not in motion. Smoking by tank vehicle drivers, helpers, repairmen, or other personnel is prohibited while they are driving, making deliveries, filling or making repairs to tank vehicles. No person shall smoke or permit any open flame within 100 feet of any aircraft undergoing fuel service or within at least 50 feet of any hangar or building.
- P. Storage of Equipment.
- 1. Contractors shall store or stock material or equipment in a neat and orderly manner and in a manner not to constitute a hazard to personnel or property.
- Q. Trash Containers.
- 1. Areas to be used for trash and garbage containers shall be designated by the Director and no other areas shall be used. Only trash containers approved by the Director shall be used by contractors for the collection of trash and garbage. The placement of trash or garbage outside approved containers is strictly prohibited.
- R. Utilities.
- 1. The following instructions must be adhered to without exception:
 - a. No contractor or employee for any craft shall turn off any utilities without contacting the Airport Authority. This includes water, electrical and HVAC;
 - b. No one shall open any electrical substations, distribution or motor control centers without first notifying the Airport Authority. No branch circuits shall be turned off or on, without obtaining permission from the Airport Authority; and
 - c. No one shall turn off the water or the HVAC or open any drain lines without notifying the Airport Authority.

2. All notifications for utility disruption must be made through the Airport Authority and coordinated with as much notice as possible but a minimum of 72 hours prior to scheduled shutoff.
3. The Airport Authority has a responsibility to keep the Airport in operation; it is your responsibility to conform to the above instructions. You may contact the Airport Authority.

FOR ANY QUESTIONS CONCERNING SECURITY REGULATIONS CONTACT THE SECURITY COORDINATOR AT 901/922-8021.

END OF SECTION 00802

EXHIBIT B**GUARD HOUSE SPECIFICATIONS**

1. No less than 5' x 8'
2. Heated, air conditioned and lighted
3. Counter or table (minimum size 16" x 36")
4. House must have two doors to allow guards to check entering and exiting vehicles.
5. Windows on all sides, large enough for guard to observe restricted areas from a seated position.
6. Chair with turning radius of 360 degrees, at a height which allows guards to observe restricted areas through windows.
7. Trash can (dumping daily responsibility of Contractor)

PORTABLE TOILETS

1. Daily cleanliness responsibility of Contractor
2. Restricted to guards only. NO CONSTRUCTION PERSONNEL PERMITTED.

PLACEMENT OF GUARD HOUSES AND PORTABLE TOILETS

1. Area to be designated by Airport Authority
2. Clear Accessibility (paved or gravel)

The Contractor is responsible for supplying and maintaining power source for the guard houses. The contractor is also responsible for maintaining the heating and cooling of same.

END OF EXHIBIT B

EXHIBIT C

CONTRACT SECURITY SERVICE PROJECTION FORM (.PDF VERSION IS AVAILABLE)



CONTRACT SECURITY SERVICE PROJECTION FORM

CONSTRUCTION

A CONTRACT SECURITY SERVICE PROJECTION FORM SHOULD BE SUBMITTED TO THE AIRPORT SECURITY COORDINATOR EACH THURSDAY NO LATER THAN 12:00 PM FOR THE FOLLOWING WEEK. CONTRACT SECURITY SERVICES MAY NOT BE AVAILABLE IF AN ACCURATE PROJECTION FORM IS NOT RECEIVED ON TIME. IF YOU HAVE ANY QUESTIONS CONTACT THE MSCAA SECURITY COORDINATOR AT 901-922-8021 OR EMAIL @CROBINSON@FLYMEMPHIS.COM.

IMPORTANT NOTE: THIS FORM MUST BE FILLED OUT COMPLETELY & SIGNED PRIOR TO SUBMITTAL.

PROJECTED SCHEDULE FOR THE WEEK OF:		SCHEDULE				
COMPANY NAME:		DAY	DATE	OPEN TIME	CLOSE TIME	SIGN IN TIME (FOR OFFICIAL USE ONLY)
PROJECT NAME:		SUNDAY				
PROJECT NUMBER:		MONDAY				
LOCATION:		TUESDAY				
POINT OF CONTACT:		WEDNESDAY				
PHONE#:		THURSDAY				
		FRIDAY				
		SATURDAY				

IMPORTANT NOTE: A 24 HOUR NOTICE IS REQUIRED FOR ANY CHANGES TO A SUBMITTED SCHEDULE.

COMPANY AUTHORIZED SIGNATORY AUTHORIZATION/VERIFICATION

(LAST NAME)
(FIRST)
(MI)
(SIGNATURE)

(COMPANY)
(DATE)
(CONTACT TEL #)

ALL REQUESTS FOR SERVICE MUST BE MADE BY AN AIRPORT AUTHORIZED SIGNATORY

CS FM03 - CONTRACT SECURITY SERVICE PROJECTION FORM

END OF EXHIBIT C

Part 1 – General Contract Provisions

Section 10 Definition of Terms

When 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 defined 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).

Paragraph Number	Term	Definition
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 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	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. 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.
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

Paragraph Number	Term	Definition
		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, 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

Paragraph Number	Term	Definition
		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	a. Contract Force Account - A method of payment that addresses extra work performed by the Contractor on a time and material basis. b. Owner Force Account - Work performed for the project by the Owner's employees.
10-31	Intention of Terms	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. 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.
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

Paragraph Number	Term	Definition
		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.
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 Memphis-Shelby County Airport Authority .
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.'

Paragraph Number	Term	Definition
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 Engineer or RPR. May also be referred to as Engineer's, Owner's, or QA Laboratory.
10-50	Resident Project Representative (RPR) / Program Manager	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. RPR and Program Manager are used interchangeably.
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

Paragraph Number	Term	Definition
		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	See Section 150 General Provisions Addendum for additional terms.

END OF SECTION 10

Section 20 Proposal Requirements and Conditions

20-01 Advertisement (Notice to Bidders). See specification section 00100, Legal Notice to Bidders.

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*.

See sections C-105, 00405, and 01100 for information on Mobilization.

See Section 00200 Instructions to Bidders for information on the Pre-Bid Meeting.

20-04 Issuance of proposal forms. The Owner reserves the right to refuse to issue a proposal form to a prospective bidder if the bidder is 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 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 to the character, quality, and quantities of work to be performed, materials to be furnished, and 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 to the conditions to be encountered in performing the work and the requirements of the proposed contract, plans, and specifications.

20-07 Preparation of proposal. The bidder shall submit their 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 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.

20-09 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 or by fax or email 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 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 seven (7) 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

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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 bid 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 Section 20, paragraph 20-09, *Irregular Proposals*.

b. If the bidder is disqualified for any of the reasons specified 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 ninety (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 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 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 paragraph 30-05, *Requirements of Contract Bonds*, of this section, within fifteen (15) 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 liquidated damages to the Owner.

END OF SECTION 30

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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 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 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 the 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. Unless otherwise specified herein, the Contractor will not be required to furnish snow removal for such existing road, street, or highway.

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 cleanup. 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 the 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 their 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 Sponsor and FAA, to use sound engineering judgment in their determinations to accept work that is not in strict conformity, but will provide a finished product equal to or better than that required 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. NOT APPLICABLE

50-05 Cooperation of Contractor. The Contractor shall be supplied with one (1) hard copy or an electronic PDF of the plans and specifications. The Contractor shall have available on the construction site at all times one hardcopy 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 hold 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 their 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.

50-07 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.

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.

See Section 01321 for additional surveying requirements.

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

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 copy of all Contractor QC test data shall be provided to the RPR daily, along with printed reports, in an approved format, 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. NOT REQUIRED

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.

END OF SECTION 60

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: NONE

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 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's worksite and facilities shall comply with applicable federal, state, and local requirements for health, safety and sanitary provisions.

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 sheets G-PH-01 to G-PH-05 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.

When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work, or in consequence of the non-execution thereof by the Contractor, the Contractor shall restore, at their expense, such property to a condition similar or equal to that existing before such damage or injury was done, by repairing, or otherwise 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.

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.

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 own surety.

70-15.1 FAA facilities and cable runs. The Contractor is hereby advised that the construction limits of the project include existing facilities and buried cable runs that are owned, operated and maintained by the FAA. The Contractor, during the execution of the project work, shall comply with the following:

a. The Contractor shall permit FAA maintenance personnel the right of access to the project work site for purposes of inspecting and maintaining all existing FAA owned facilities.

b. The Contractor shall provide notice to the FAA Air Traffic Organization (ATO)/Technical Operations/System Support Center (SSC) Point-of-Contact through the airport Owner a minimum of seven (7) calendar days prior to commencement of construction activities in order to permit sufficient time to locate and mark existing buried cables and to schedule any required facility outages.

c. If execution of the project work requires a facility outage, the Contractor shall contact the FAA Point-of-Contact a minimum of 72 hours prior to the time of the required outage.

d. Any damage to FAA cables, access roads, or FAA facilities during construction caused by the Contractor's equipment or personnel whether by negligence or accident will require the Contractor to repair or replace the damaged cables, access road, or FAA facilities to FAA requirements. The Contractor shall not bear the cost to repair damage to underground facilities or utilities improperly located by the FAA.

e. If the project work requires the cutting or splicing of FAA owned cables, the FAA Point-of-Contact shall be contacted a minimum of 72 hours prior to the time the cable work commences. The FAA reserves the right to have a FAA representative on site to observe the splicing of the cables as a condition of acceptance. All cable splices are to be accomplished in accordance with FAA specifications and require approval by the FAA Point-of-Contact as a condition of acceptance by the Owner. The Contractor is hereby advised that FAA restricts the location of where splices may be installed. If a cable splice is required in a location that is not permitted by FAA, the Contractor shall furnish and install a sufficient length of new cable that eliminates the need for any splice.

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 their surety, or both, such overpayment as may be sustained, or by failure on the part of the Contractor to fulfill their 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 their 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 RPR. The RPR 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 Section 80, paragraph 80-07, *Determination and Extension of Contract Time*.

70-21 Insurance Requirements. See Article 19 of Section 00500 Construction Contract.

END OF SECTION 70

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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 thirty (30) 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 (NTP). The Owners notice to proceed will state the date on which contract time commences. The Contractor is expected to commence project operations within ten (10) days of the NTP date. The Contractor shall notify the RPR at least 24 hours (24) 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, signage and associated lighting is in place as provided in 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: N/A

The Contractor shall be required to conform to safety standards contained in AC 150/5370-2, Operational Safety on Airports During Construction and the approved CSPP.

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 SPCD and that they implement and maintain all necessary measures.

No deviation or modifications may be made to the approved CSPP and SPCD unless approved in writing by the Owner. 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:

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 paragraph 80-07, *Determination and Extension of Contract Time*) the sum specified in the contract and proposal as liquidated damages (LD) will be deducted from any money due or to become due the Contractor or their own 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
Substantial Completion	\$1,000 per calendar day	120 calendar days
Final Completion & Demobilization Phase	\$500 per calendar day	45 calendar 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 waiver 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 RPR.

Termination of the contract or a portion thereof shall neither relieve the Contractor of their responsibilities for the completed work nor shall it relieve their 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.

Term	Description
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.
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	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. 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

Term	Description
	scale, but not less than one pound (454 grams). The use of spring balances will not be permitted. 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%. 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. Beams, dials, platforms, and other scale equipment shall be so arranged that the operator and the RPR can safely and conveniently view them. 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. 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 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 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 own unbalanced allocation of overhead and profit among the contract items, or from any other cause.

90-04 Payment for omitted items. As specified in 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 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. Retainage will not be withheld on this project. No retainage will be withheld by the Owner from progress payments due the prime Contractor. Retainage by the prime or subcontractors is prohibited, and no retainage will be held by the prime from progress due subcontractors.
- 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. 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 project 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.

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 stored or stockpiled.
- e. The Contractor has furnished the Owner evidence that the material 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 their 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 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 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 Section 50, paragraph 50-16, *Claims for Adjustments and Disputes*, or under the provisions of this paragraph, 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.

a. 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.

See technical specifications for additional equipment with extended warranties.

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 fourteen 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.

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

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

90-11 Contractor Final Project Documentation. Approval of final payment to the Contractor is contingent upon completion and submittal of the items listed below. The final payment will not be approved until the RPR approves the Contractor's final submittal. The Contractor shall:

a. Provide two (2) copies of all manufacturers warranties specified for materials, equipment, and installations.

b. Provide weekly payroll records (not previously received) from the general Contractor and all subcontractors.

c. Complete final cleanup in accordance with Section 40, paragraph 40-08, *Final Cleanup*.

d. Complete all punch list items identified during the Final Inspection.

e. Provide complete release of all claims for labor and material arising out of the Contract.

f. Provide a certified statement signed by the subcontractors, indicating actual amounts paid to the Disadvantaged Business Enterprise (DBE) subcontractors and/or suppliers associated with the project.

g. When applicable per state requirements, return copies of sales tax completion forms.

h. Manufacturer's certifications for all items incorporated in the work.

i. All required record drawings, as-built drawings or as-constructed drawings.

j. Project Operation and Maintenance (O&M) Manual(s).

k. Security for Construction Warranty.

l. Equipment commissioning documentation submitted, if required.

See Section 01770 for additional closeout procedures.

END OF SECTION 90

Section 150 General Provisions Addendum

150-10 GENERAL PROVISIONS ADDENDUM - Section 10 Definition of Terms

Whenever the following terms are used in these specifications, in the contract, in any documents or other instruments pertaining to construction of the project where these specifications govern, the intent and meaning shall be interpreted as follows; and whenever one of the following capitalized words, terms or phrases is used herein, it shall be interpreted or construed first as defined in Specification Section GP-10, second as defined below, third according to its generally accepted meaning in the construction industry, and fourth according to its common and customary usage.

150-10-101 ACCESS ROAD

As defined in GP-10 and shall further be defined to include “or an internal roadway for construction or maintenance.”

150-10-102 ADDENDA

Written or graphic instructions issued prior to the opening of Proposals, which clarify, correct or change the bidding documents or the Contract Documents.

150-10-103 AIRPORT OPERATIONS or OPERATIONS

Depending on use, airport operations may refer to a department of the Airport Authority or the movement of aircraft on, or approaching the airfield.

150-10-104 BID ITEMS

The proposal provides for quotation of a price, for one or more bid items, which may be lump sum bid prices, alternate bid prices, unit bid prices, or a combination thereof. No payment will be made for items not set up in the proposal, unless otherwise provided by contract amendment. Bidders are cautioned that they should include in the prices quoted for various bid items all necessary allowances for the performance of all work required for the satisfactory completion of the project.

150-10-105 BUILDER

A term to be used interchangeably with “Contractor.”

150-10-106 CONTRACT AMENDMENT

A term to be used interchangeably with “Change order.”

150-10-107 CONTRACT FOR PROFESSIONAL SERVICES

A written agreement between the Owner and a Professional for provision of services and related items required to design, engineer or program manage all or part of a Project.

150-10-108 DEFECTIVE

An adjective which when modifying the word Work refers to Work that is unsatisfactory, faulty or deficient, or does not conform to the Contract Documents, or does not meet the requirements of any Inspection, reference standard, test or approval referred to in the Contract Documents, or has been damaged prior to the Program Manager's recommendation of final payment.

150-10-109 DRAWINGS

A term to be used interchangeably with “Plans.”

150-10-110 ENGINEER or PROFESSIONAL

As defined in GP-10 and shall further be defined to include “Engineer will not supervise, direct, control, or have authority over or be responsible for Contractors means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with laws and regulations applicable to performance of the Work. Foth Infrastructure & Environment, LLC is the Engineer for this Project.”

150-10-111 FINAL COMPLETION

The stage of construction when the Work has been 100% completed including all punch list items, record drawings, O&M manuals, lien waivers, maintenance training, warranties, consent of surety to final payment, and all other required closeout documentation.

150-10-112 GP

Abbreviation for General Provision.

150-10-113 HAZARDOUS SUBSTANCES

The term "Hazardous Substance" shall have the same meaning and definition as set forth in the Comprehensive Environmental Response Compensation and Liability Act as amended, 42 U.S.C. § 6901 *et seq*, and regulations promulgated thereunder (collectively "CERCLA") and any corresponding state or local law or regulation, and shall also include: (a) any Pollutant or Contaminant as those terms are defined in CERCLA; (b) any Solid Waste or Hazardous Constituent as those terms are defined by, or are otherwise identified by, the Resource Conservation and Recovery Act as amended, 42 U.S.C. § 6901 *et seq*, and regulations promulgated thereunder (collectively "RCRA") and any corresponding state or local law or regulation; (c) crude oil, petroleum and fractions of distillates thereof; (d) any other material, substance or chemical defined, characterized or regulated as toxic or hazardous under any applicable law, regulation, ordinance, directive or ruling; and (e) any infectious or medical waste as defined by any applicable federal or state laws or regulations.

150-10-114 INTENTION OF TERMS

As defined in GP-10 and shall further be defined to include “The use of any such term shall not be effective to assign to Program Manager any duty or authority to supervise or direct the furnishing or performance of the work. Wherever in the specifications or on the drawings the words "install," "furnish," "provide," or words of like import are used, they mean the Contractor shall install, furnish, or provide, as the case may be complete and ready for Owner's use.”

150-10-115 LUMP SUM PRICE

The dollar amount for which a Contractor agrees to perform the Work or a specific component of the Work as set forth in a Contract for construction.

150-10-116 MAJOR SUBCONTRACTOR

A major subcontractor shall be any subcontractor who is responsible for 15 percent or more of the full amount of the contract.

150-10-117 OWNER or SPONSOR

As defined in GP-10 and shall further be defined to include “The Owner shall mean the Memphis-Shelby County Airport Authority.”

150-10-118 PARTIAL COMPLETION

The stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents when the Owner can satisfactorily occupy or beneficially use a finite portion of completed Work for its intended purpose. Partial completion and acceptance of a finite portion of the work will in no way imply the overall project is substantially complete or start of the project warranty.

150-10-119 PROGRAM MANAGER

The individual, partnership, firm, or corporation duly authorized by the Owner (sponsor) to be responsible for engineering supervision during construction and acting directly or through an authorized representative. The term Program Manager means the person, person or organization named by the Owner to act as their representative. Program Manager will not supervise, direct, control, or have authority over or be responsible for Contractors means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with laws and regulations applicable to performance of the Work. All authority granted to the Engineer by these construction documents shall also be available to the Program Manager, at the discretion of the Owner. Foth Infrastructure & Environment, LLC is the Program Manager for this Project.

150-10-120 PUNCHLIST ITEM

Any item of work, in whole or in part, which the Program Manager has identified as being unsatisfactory after an inspection of the project. A punch-list item may be further classified as being either "major" or "minor". A "major" punch-list item is defined as any punch-list item the correction of which is, in the Program Manager's determination, necessary for the Owner to use the completed project for its intended purpose. A "minor" punch-list item is defined as any punch-list item not classified as "major" by the Program Manager.

150-10-121 SHOP DRAWINGS

All drawings, diagrams, illustrations, schedules and other data which are specifically prepared by or for the Contractor to illustrate some portion of the Work and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams and other information prepared by a supplier, manufacturer, subcontractor or fabricator and submitted by the Contractor to illustrate material or equipment for some portion of the Work.

150-10-122 SITE

The geographical location of a Project, usually defined by legal boundary lines, and the location characteristics including, but not limited to, grades and lines of streets, alleys, pavements and adjoining structures, rights-of-way, restrictions, easements, encroachments, zoning, deed restrictions, existing buildings and improvements, and service and utility lines.

150-10-123 SUBSTANTIAL COMPLETION

The stage in the progress of the Work when the Work is substantially complete in accordance with the Contract Documents and the Owner can occupy or beneficially use satisfactorily completed Work for its intended purpose.

150-20 GENERAL PROVISIONS ADDENDUM - PROPOSAL REQUIREMENTS AND CONDITIONS

150-20-01 ADVERTISEMENT (NOTICE TO BIDDERS)

General Provisions 20-01 shall include: “See Section LEGAL NOTICE TO BIDDERS for the ADVERTISEMENT notifying prospective Bidders of this project.”

150-20-05 INTERPRETATION OF ESTIMATED PROPOSAL QUANTITIES

General Provisions 20-05 shall include: “The proposal provides for quotation of a price, for one or more bid items, which may be lump sum bid prices, alternate bid prices, unit bid prices, or a combination thereof. No payment will be made for items not set up in the proposal, unless otherwise provided by contract amendment. Bidders are cautioned that they should include in the prices quoted for various bid items all necessary allowances for the performance of all work required for the satisfactory completion of the project.”

150-20-07 PREPARATION OF PROPOSAL.

General Provisions 20-07 shall include “The bidder shall state the unit price and extension, written in ink or typed, for which he proposes to do each pay item furnished in the proposal. In case of conflict between the unit price and extension, the unit price, unless obviously incorrect, shall govern.”

150-20-09 IRREGULAR PROPOSALS

General Provisions 20-09 item f) shall include:

- f.** If the proposal does not meet the SBE participation requirement specified in Section SBE REQ.

150-20-10 BID GUARANTEE.

General Provisions 20-10 shall include

“Each proposal shall be accompanied by either a cashier's check or a certified check drawn on a solvent bank, or a Bidder's bond executed by the Bidder and a surety company acceptable to the Memphis-Shelby County Airport Authority, in the amount of not less than five (5) percent of the total bid price, made payable without conditions to the Memphis-Shelby County Airport Authority, as a guarantee that if the proposal is accepted, the Bidder will enter into a contract and execute a Performance and Payment Bond with legally responsible surety within ten (10) days after contract award is made by the Memphis-Shelby County Airport Authority. Bidder's Bond (if used) shall be executed on the form prescribed within these documents.

“In the event that the Bidder's proposal is accepted and the contract is awarded by the Memphis-Shelby County Airport Authority, and the Bidder fails or refuses to execute the contract and furnish the required Performance and Payment Bond within ten (10) days after such award is made by the Memphis-Shelby County Airport Authority, unless given a written extension of time by the Memphis-Shelby County Airport Authority, then the Bidder will be considered as having abandoned his proposal, and his proposal guarantee will be retained by the Memphis-Shelby County Airport Authority as liquidated damages and not as a penalty, IT NOW BEING AGREED that the amount of the proposal guarantee is a fair estimate of the amount of damages that the Memphis-Shelby County Airport Authority will sustain in case the Bidder fails to enter into the contract and furnish the required Performance and Payment Bond within ten (10) days after receiving notice of such award.”

150-20-14 DISQUALIFICATION OF BIDDERS.

General Provisions 20-14 item d) shall include:

- d.** Failure to show evidence of possessing a valid state of Tennessee Contractor's License, as required by law.

150-20-15 EXPLANATIONS AND INTERPRETATIONS OF CONTRACT DOCUMENTS

All explanations desired by Bidders regarding the meaning or interpretation of the drawings and specifications must be requested with sufficient time allowed for a written reply to reach them before the submission of their bids. Oral explanation or instructions will not be given. All necessary explanations or interpretations will be made in the form of written addenda to the specifications or drawings, and will be furnished to all Bidders, and the receipt thereof shall be acknowledged by each Bidder on his proposal.

150-20-16 SBPP/SBE REQUIREMENTS

All Bidders shall submit with his/her proposal the SBE's Assurance Statement/Letter of Intent for each SBE subcontractor (subcontractors' signatures not required) Subcontractors' bids to the Prime Contractor with items included in the bid either circled and/or highlighted, SBE's Current Certification for each SBE Subcontractor, Respondent SBE Goals Accomplishment Statement, and Information on All Firms that Provide Bids or Quotes, which have been provided in the bid envelope. There must be one SBE's Assurance Statement/Letter of Intent for each proposed SBE subcontractor properly completed and signed by the Bidder.

Within 24 hours of the proposal submittal deadline, all Bidders shall submit the SBE's Assurance Statement/Letter of Intent for each SBE subcontractor (subcontractors' signatures required). There must be one SBE's Assurance Statement/Letter of Intent for each proposed SBE subcontractor properly completed and signed by the SBE subcontractor, and if applicable the 2nd/3rd Tier Subcontractor's, and the Bidder.

See specification section SMALL BUSINESS PARTICIPATION PROGRAM (SBPP) REQUIREMENTS for additional proposal requirements and conditions.

150-40 GENERAL PROVISIONS ADDENDUM - SCOPE OF WORK

150-40-04 EXTRA WORK.

General Provisions 40-04 shall include “When determined by the Program Manager to be in the Owner's best interest, the Owner may order the Contractor to proceed with extra work by time and materials as provided in Section GP-150-90.”

150-50 GENERAL PROVISIONS ADDENDUM - CONTROL OF WORK

150-50-04 COOPERATION OF CONTRACTOR.

General Provisions 50-04 shall include “The Owner shall allocate the work and designate the sequence of construction in case of controversy between contractors.”

150-70 GENERAL PROVISIONS ADDENDUM - LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC

150-70-01 LAWS TO BE OBSERVED.

General Provisions 70-01 shall include “Applicable laws, ordinances, regulations, orders, and decrees shall be considered as MINIMUM requirements, and everything shown or specified in excess of these minimum requirements shall be installed in excess thereof, as shown or specified. No instructions given in the contract documents shall be construed as an authorization to violate any law, ordinance, regulation, order, or decree.

“If the Contractor observes that the drawings or specifications are at variance with any applicable law, ordinance, regulation, order, or decree, he shall immediately notify the Program Manager in writing, and obtain the Program Manager's decision before proceeding with the portion of the work involved.

“The Contract shall be governed by the law of the State of Tennessee. Any action brought which involves the Contract, the Work or the Project shall be brought and determined in accordance with the Laws of the State of Tennessee.”

150-70-14 CONTRACTOR'S RESPONSIBILITY FOR WORK

General Provisions 70-14 shall include “The Program Manager shall not be responsible for the methods and means employed by the Contractor in the performance of the Contractor's work. The Program Manager shall have no responsibility for the safety of workmen and others who may be injured during the course of the Contractor's work.”

150-70-21 CONTINUANCE OF WORK NOTWITHSTANDING DISPUTES, ETC.

Unless otherwise agreed in writing, the Contractor shall, notwithstanding any dispute, proceeding, or litigation, proceed forthwith in accordance with the Program Manager's written decision and/or direction and shall continue the Work and maintain its progress. The Owner shall continue to make payments to the Contractor to the extent that the sums due and owing the Contractor are not in dispute, in accordance with the Contract Documents.

150-70-22 SCOPE OF PROGRAM MANAGER’S RESPONSIBILITIES TO CONTRACTOR AND OWNER

The Program Manager is to act as Owner’s representative, and shall have the duties and responsibilities and the rights and authority assigned to Program Manager in the Contract in connection with completion of the Work in accordance with the Contract. Neither the Program Manager’s authority to act under the Contract, nor any decision made by him in good faith either to exercise or not to exercise authority under the Contract, shall give rise to any duty or responsibility of the Program Manager to the Contractor, any Subcontractor, any of their agents or employees. However, nothing contained herein shall exculpate in any manner nor relieve the Program Manager of his duties and responsibilities to the Owner in accordance with the Contract and in accordance with any other agreements between the Program Manager and Owner establishing the Program Manager’s duties and responsibilities to properly administer the Contract and to correctly apply the requirements of the Contract to the Work.

150-80 GENERAL PROVISIONS ADDENDUM - PROSECUTION AND PROGRESS

150-80-01 SUBLETTING OF CONTRACT

General Provisions 80-01 shall include “The Contractor shall obtain prior approval from the Owner before subcontracting any portion of this contract. Only those subcontractors who are known for doing quality, first class airport work of the type required of the subcontract will be approved by the Owner. For each proposed subcontract, the Contractor shall supply the Program Manager with the subcontractor's name, the amount of the subcontract, their previous, related experience, their available appropriate equipment both owned and leased, and their available personnel. The Contractor shall also submit to the Program Manager those items of the contract to be performed directly by his own organization. The amounts of these items and the amounts of all items awarded to all subcontractors shall correspond to the contract price for the entire project. The Owner reserves the right to withhold approval of any subcontractor who, in the Owner's opinion, is not qualified to perform the work. If the Owner withholds approval of a subcontractor the Contractor shall be required to find an alternate subcontractor that meets the approval of the Owner or he shall perform the work himself. In either event, contract pay items shall not be adjusted. The contract will not be signed until all major subcontractors have been approved by the Owner. In case of approval, the Contractor shall file copies of all subcontracts with the Program Manager.”

150-80-07 DETERMINATION AND EXTENSION OF CONTRACT TIME

General Provisions 80-07 shall include “Time extension for delays caused by the effects of inclement weather are justified only when rains or other excessive inclement weather conditions or related adverse soil conditions prevent the Contractor from productively performing critical activities of work resulting in:

1. The Contractor being unable to work at least 50% of the normal work day on pre-determined critical path items due to adverse weather conditions or;
2. The Contractor being required to make major repairs to the work damaged by excessive weather, provided that the damage was not attributable to the Contractor's negligence or failure to perform, and provided that the Contractor was unable to work an available day as defined under GP-10.

“The Contractor will be granted a time extension based on weather days in excess of the anticipated days during the original contract completion. After the new contract completion date has been established by the Program Manager, additional anticipated days as identified by SC-120 Section 3.05 paragraph E for the months covered within the contract extension period will be granted. Once the Contractor reaches the revised completion date and has not completed the project due to additional weather delays, the Contractor will be granted, only the verified lost weather days leading to the revised contract completion. No other weather days will be granted beyond the established final completion date.

“If the Contractor finds it impossible for reasons beyond his/her control to complete the work within the contract time as specified or as extended he may, within ten (10) days after commencement of the cause of delay make a written request to the Program Manager for an extension of time setting forth the reasons which he believes will justify the granting of his/her request; otherwise, such claim will be waived. The Contractor's plea that insufficient time was specified is not a valid reason for extension of time. If the Program Manager finds that the work was delayed because of conditions beyond the control and without the fault of the Contractor, he may recommend the Owner extend the time for completion in such amount as the conditions justify. The extended time for completion shall then be in full force and effect, the same as though it were the original time for completion. Should the contract time require extension it shall be by change order or supplemental agreement”

150-80-09 DEFAULT AND TERMINATION OF CONTRACT

General Provisions 80-09 shall include “The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause. Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall:

- a. Cease operations as directed by the Owner in the notice;

- b. Take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- c. Except for the Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing Subcontractors and purchase orders and enter into no further Subcontracts and purchase orders.

“In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment from the Owner for Work executed and for proven loss with respect to materials, equipment, tools and construction equipment and machinery, including reasonable overhead, profit and damages.”

150-90 GENERAL PROVISIONS ADDENDUM - MEASUREMENT AND PAYMENT

150-90-05 PAYMENT FOR EXTRA WORK OR TIME AND MATERIALS WORK

General Provisions 90-05 shall include:

“EXTRA Work and TIME and MATERIALS Work will be paid in accordance with the paragraphs below and will include documented costs for labor, labor burden, insurance and taxes, materials, equipment, plus a set allowance for combined overhead and profit to be included in the total cost to the Owner. The Contractor is responsible for preparing detailed daily reports documenting all labor, material, and equipment charges incurred and signed by both Contractor and Program Manager for all TIME and MATERIALS work.

When the change order or supplemental agreement authorizing extra work or time and materials work is prepared, compensation will be based on actual expended labor, equipment, and materials costs as follows:

a. Labor. For all labor (skilled and unskilled) and foremen in direct charge of a specific time and materials item, the Contractor shall receive the rate of wage (or scale) for every hour that such labor or foreman is actually engaged in the specified time and materials work. Such wage (or scale) shall be the same U.S. Secretary of Labor wage determination as is included in the originally awarded contract.

The Contractor shall receive the actual costs paid to, or on behalf of workers by reason of subsistence and travel allowances, health and welfare benefits, pension fund benefits or other benefits, when such amounts are required by collective bargaining agreement or other employment contract generally applicable to the classes of labor employed on the work.

The Contractor shall submit an audited labor burden percentage for review and approval which, after approval, will also be paid to the Contractor based upon actual labor costs expended. The Contractor's audited labor burden rate will include any and all insurance costs not paid by OCIP, unemployment insurance contributions, and social security taxes paid on the employees behalf. The Contractor shall furnish satisfactory evidence of the rate or rates paid for such insurance and taxes.

c. Materials. For materials accepted by the Program Manager and used exclusively for the Extra or Time and Materials Work, the Contractor shall receive the actual cost of such materials delivered on the work, including transportation charges paid by him (exclusive of machinery rentals as hereinafter set forth) and applicable sales or use tax.

d. Equipment. For any machinery or special equipment (other than small tools) including fuel, lubricants, and transportation costs, the use of which has been authorized by the Program Manager, the Contractor shall receive the current published "Blue Book" rental rates for the actual time that such equipment is committed to the work.

e. Miscellaneous. No additional allowance will be made for general superintendence, the use of small tools, or other costs for which no specific allowance is herein provided.

The Contractor and the Program Manager shall compare records of the cost of TIME AND MATERIALS WORK at the end of each day. Agreement shall be indicated by signature of the Contractor and the Program Manager or their duly authorized representatives. Failure to obtain the Program Manager's signature shall constitute a waiver on the part of the Contractor of any right to collect reimbursement for such costs.

No payment will be made for work performed on an EXTRA WORK or TIME AND MATERIALS basis until the Contractor has furnished the Program Manager with itemized statements and all required backup documentation of the cost of such extra or time and materials work.

The fixed percentage allowance for combined overhead and profit to be added to the total of the labor, materials, and equipment costs above will be based on the following schedule:

- a. For the Contractor, for Work performed by the Contractor's own forces, ten percent (10%) of the cost.
- b. For the Contractor, for Work performed by the Contractor's Subcontractor, five percent (5%) of the amount due the Subcontractor.
- c. For each Subcontractor or Sub-subcontractor involved, for Work performed by that Subcontractor's or Sub-subcontractor's own forces, fifteen percent (15%) of the cost.
- d. For each Subcontractor, the Work performed by the Subcontractor's Subcontractor, five percent (5%) of the amount due the Subcontractor's Subcontractor.

The total payment will be based on the total documented labor, material, and equipment cost plus the fixed percentages for combined overhead and profit specified above. This total payment shall constitute full compensation for all items of expense not specifically provided for the extra work or time and materials work.

150-90-07 PAYMENT FOR MATERIALS ON HAND

General Provisions 90-07 shall include "Request for partial payments must be accompanied by a completed, accurate stored material work sheet. The stored material work sheet will be supplied by the Program Manager upon request by the Contractor."

END OF SECTION GP-150

DIVISION 1 – SECTION 01100**SUMMARY OF THE WORK, SEQUENCE OF CONSTRUCTION & LIQUIDATED DAMAGES****PART 1 GENERAL**

Related Work:

1. Documents affecting work of this Section include, but are not necessarily limited to Division 0 and Division 1 and other Sections of these Specifications.

1.01 SUMMARY**SUMMARY OF WORK**

- A. The "Project," of which the "Work" of this Contract is a part, is titled Snow Removal Equipment Building - Building Package - Construction, MSCAA Project 23-1476-17-02.
- B. The "Work" of this Contract is defined in the Contract Documents to include, but not be limited to, demolition of existing infrastructure, grading/earthwork, storm drainage, utility installation (fiber optic/electrical/water), erosion control, Portland cement concrete pavement (including subgrade preparation), joint sealing, asphalt pavement, sodding, chain link fencing, and other efforts normally required for site preparation.
- C. Airport Improvement Program Project: The work in this contract is included in an Airport Improvement Program Project (which project is subject to receipt of confirmation of federal funds) which is being undertaken and accomplished by the Owner in accordance with the terms and conditions of an agreement between the Memphis-Shelby County Airport Authority and the United States, under the provision of Title 49, United States Code, herein called Title 49, USC, pursuant to which the United States Government has agreed to pay a certain percentage of the costs of the project that are determined to be allowable project costs under that Act. The United States Government is not a party to this contract and no reference in this contract to the FAA or any representative thereof, or to any rights granted to the FAA or any representative thereof, or the United States Government, by the contract, makes the United States Government a party to this contract.
- E. FAA Inspection and Review: The Contractor shall allow any authorized representative of the FAA to inspect and review any work or materials used in the performance of this contract.
- F. Subcontracts: The Contractor shall insert in each of his subcontracts the provisions contained in paragraphs C. and D., of this section and also a clause requiring the subcontractors to include these provisions in any lower tier subcontracts which they may enter into, together with a clause requiring this insertion in any further subcontracts that may in turn be made.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION**3.01 PROJECT PHASING AND COMPLETION**

- A. This is a fixed-duration Contract required to be substantially completed within one hundred and twenty (120) calendar days from the Notice to Proceed ("NTP") date. The project scope of work is as stated in Paragraphs 1.01 (A) and (B) above. Final Completion of the project shall be within forty-five (45) days of the Substantial Completion Date.

“Substantial Completion” of the project shall be defined as the stage of construction when work is substantially completed and excludes all punch list items, record drawings, O&M manuals, lien waivers, maintenance training, warranties, consent of surety to final payment, and all other required closeout documentation.

“Final Completion” of the project shall be defined as work that is 100% complete including all punch list items, record drawings, O&M manuals, lien waivers, maintenance training, warranties, consent of surety to final payment, and all other required closeout documentation. Final Completion shall include Demobilization.

“Demobilization” shall consist of all activities by the Contractor and subcontractors necessary for 100% completion of the work and final contract closeout as listed above and all cleanup work and operations, including but not limited to, removal of personnel, equipment, contractor-owned stockpiles, supplies, and incidentals from the project site; return of any and all airport-issued security identification badges; cleanup of all offices, buildings, batch plant, staging/lay-down areas, and other facilities; and restoration of all areas to preconstruction condition or better or to other condition as stipulated in the project plans and specifications; completion and delivery to the Owner of all contract closeout documentation and any other documentation request by Owner, including but not limited to, Operations and Maintenance Manuals, Warranties, Final Lien-waivers, Owner Controlled Insurance Program closeout paperwork, SBPP/SBE paperwork, Final Project Record Documents and finalization of any and all punch list items.

- B. The actual NTP date will be negotiated and mutually agreed by both parties (Owner and Contractor) prior to issuance of the NTP. If mutual agreement cannot be reached between the parties, the Owner reserves the right to establish the actual Notice to Proceed date. The NTP letter will state the date on which the Contractor will begin construction and from which date contract time will be charged. Contractor shall be mobilized and on site ready for work on the date stated in the Notice to Proceed.
- C. “Mobilization” shall consist of all preparatory work and operations needed to begin construction activities on the date mutually agreed including but not limited to, movement of personnel, equipment, stockpiles, supplies and incidentals to the project site; the establishment of all offices, buildings, batch plant, staging/lay-down areas and other facilities necessary for work on the project; all other work and operations which must be performed or costs incurred prior to beginning work on the various items on the project site, and utility services for all offices, buildings, batch plant, staging/ lay-down areas, and other facilities. The Mobilization lump sum amount becomes fixed and will not change for the duration of contract.
- D. All days are calendar days.
- E. The work site will be available as described on the plans and applicable sections of these specifications. Work is permitted 24 hours per day, 7 days per week except that only non-noise producing activities shall be permitted between 11:00 PM and 6:00 AM, except with prior written approval of the Owner.
- F. The Contractor shall proceed with the work at such rate of progress to ensure full completion within the specified duration. It is expressly understood and agreed, by and between the Contractor and the Owner, that the contract time for the completion of the work described herein is a reasonable time, taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the work.
- G. If the Contractor experiences weather related delays, he shall submit a report documenting the weather conditions and delays, if any, experienced during any calendar month.
- H. If the Contractor is prevented from working due to any other legitimate reason he shall notify the

Owner in writing as per the Lump Sum Construction Contract of the delay and request a corresponding increase in the number of contract days.

- I. The Owner shall be the sole judge as to whether or not a request for a contract time extension is legitimate.
- J. The Owner reserves the right to adjust limits of construction to accommodate the Owner's requirements for maintenance of Airport Operations and Public Traffic with minimum interruption during the construction of this project. Any required adjustment of limits of construction will be at no additional cost to the Owner.

3.02 LIQUIDATED DAMAGES

- A. The OWNER and the CONTRACTOR recognize that time is an essential element of this contract and that delay in completing this project will result in damages due to public inconvenience, obstruction to aviation and vehicular traffic, interference with businesses both on and off the airport, increased operational costs to airport users, and increased costs to the OWNER associated with engineering services, inspections, testing, and project administration. It is therefore agreed that in view of the difficulty of making a precise determination of such damages, the CONTRACTOR will pay the OWNER, sums of money in the amounts herein stipulated, not as a penalty, but as Liquidated Damages for not meeting the schedule for specific critical Project Milestones.
- B. If the CONTRACTOR fails to deliver equipment or materials, or perform any services within the times and dates specified in this Contract to achieve the established Milestones, or any extensions granted in writing, the CONTRACTOR shall pay to the OWNER as Liquidated Damages, the sums specified in Table 1, below:

Table 1

<i>Milestone</i>	<i>Completion Date</i>	<i>Liquidated Damages</i>
Substantial Completion	120 days	\$1,000 per Day or any portion thereof
Final Completion and Demobilization Phase	45 days	\$500 per Day or any portion thereof

- D. Application of Liquidated Damages is not a Change to the Contract. The application of any Liquidated Damages to one Milestone shall not effect a change in the subsequent Contract Milestone dates or relieve CONTRACTOR of his responsibility to meet all construction schedules. If multiple Milestone dates are missed, Liquidated Damages for more than one Milestone will be imposed concurrently.
- E. If Liquidated Damages are imposed, the OWNER shall deduct the same from any amounts due the CONTRACTOR at the time Liquidated Damages are imposed. If sufficient amounts are not due to the CONTRACTOR to cover such Liquidated Damages, then the OWNER shall invoice the CONTRACTOR for the amounts due to the OWNER. Such invoices shall become due and payable immediately upon receipt by the CONTRACTOR.
- F. Liquidated Damages are in addition to any other damages or penalties which may be assessed and withheld under other provisions of this contract.

3.03 COMPLETION BONUS

NO completion bonus has been budgeted for this project.

END OF SECTION 01100

ISSUED FOR BID

DIVISION 1 – SECTION 01210**ALLOWANCES****PART 1 GENERAL****1.01 SUMMARY**

- A. To provide adequate budget and bonding to cover items not precisely determined by the Owner prior to bidding, allow within the proposed Contract Sum the amounts described in this Section.
- B. Unless stated otherwise herein, all allowances are to be paid as Time and Materials Work per GP-150.
- C. Related Work:
 - 1. Documents affecting Work of this Section include, but are not necessarily limited to, Division 0, Division 1 and other Sections of these Specifications.
 - 2. Other provisions concerning Allowances may be stated in other Sections of these Specifications.

1.02 SPECIFIC ALLOWANCES – The following cash allowances are included within this Contract:

- A. None.

END OF 01210

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DIVISION 1 – SECTION 01230**ALTERNATES****PART 1 GENERAL****1.01 SUMMARY**

- A. This selection includes identification of each Alternate by number, and describes the basic changes to be incorporated into the Work if a particular Alternate is made a part of the Work by specific provisions in the Agreement between the Owner and the Contractor.
- B. Related Work:
 - 1. Documents affecting Work of this Section include, but are not necessarily limited to, Division 0, Division 1 and other Sections of these Specifications.
 - 2. Materials and methods to be used in the Base Bid and in the Alternates also may be described on the Drawings and/or in pertinent other Sections of these Specifications.
 - 3. Method for stating the proposed Contract Sum is shown on the Bid Form.

1.02 SUBMITTALS

- A. All Alternates described in this Section are required to be reflected on the Bid Form as submitted by the Bidder.
- B. Do not submit Alternates other than as described in this Section.

1.03 SELECTION OF ALTERNATES

- A. Immediately after award of the Contract, or as soon thereafter as the Owner has made a decision on which, if any, of the Alternates will be selected, thoroughly and clearly advise necessary personnel and suppliers as to the nature of Alternates selected by the Owner.
- B. If the Owner elects to proceed on the basis of one or more of the described Alternates, make modifications to the Work required in providing the selected Alternate or Alternates to the approval of the Owner and at no additional cost to the Owner except as proposed in the Bid.

1.04 ADVANCE COORDINATION

- A. Immediately after award of the Contract, or as soon thereafter as the Owner has made a decision on which, if any, of the Alternates will be selected, thoroughly and clearly advise necessary personnel and suppliers as to the nature of Alternates selected by the Owner.

PART 2 **ALTERNATES** – The following alternates are included within this Contract:

- A. None.

END OF SECTION 01230

DIVISION 1 – SECTION 01250**AMENDMENT PROCEDURE****PART 1 GENERAL****1.01 SUMMARY**

- A. Make such changes in the Work, in the Contract Price, in the Contract Time, or any combination thereof, as are described in written Amendments signed by the Owner and the Contractor and issued after execution of the Construction Contract, in accordance with the provisions of this Section.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, Division 0, Division 1, and other Sections of these Specifications.
 - 2. Any proposal for a change in the Work shall include SBE participation consistent with the required SBE percentage for this Contract. If the Contractor is unable to meet said SBE percentage, a written justification of the good faith efforts made shall be submitted along with the response to the Engineer's or Owner's proposal request.
 - 3. Engineer or Owner supplemental instructions:
 - a. From time to time during progress of the Work the Engineer or Owner may issue supplemental instructions, which interpret the Contract Documents or order minor changes in the Work without change in Contract Sum or Contract Time.
 - b. Should the Contractor consider that a change in Contract Sum or Contract Time is required, he shall submit an itemized proposal to the Engineer or Owner immediately and before proceeding with the Work. If the proposal is found to be satisfactory and in proper order, the supplemental instructions in that event will be superseded by an Amendment.
 - 4. Proposal requests:
 - a. From time to time during progress of the Work the Engineer or Owner may issue a Request for Proposal (RFP) proposal request for an itemized quotation for changes in the Contract Price and/or Contract Time incidental to proposed modifications to the Contract Documents.
 - b. This will not be an Amendment, and will not be a direction to proceed with the changes described therein.

1.02 QUALITY ASSURANCE

- A. Include within the Contractor's quality assurance program such measures as are needed to assure familiarity of the Contractor's staff and employees with these procedures for processing Amendment data.

1.03 PROCESSING PROPOSAL REQUESTS

- A. Make timely written reply to the Engineer or Owner in response to each proposal request. Proposal requests will be numbered in sequence and dated.
1. State proposed change in the Contract Sum, if any.
 2. State proposed change in the Contract Time of Completion, if any.
 3. Clearly describe other changes in the Work, if any, required by the proposed change or desirable therewith.
 4. State amount of SBE participation applicable to the proposed changes.
 5. Include full backup data such as subcontractor's letter of proposal or similar information.
 6. Submit this response in single copy.
- B. When cost or credit for the change has been agreed upon by the Owner and the Contractor, or the Owner has directed that cost or credit be determined in accordance with provisions of Division 0 and Division 1 Specifications, the Engineer or Owner will prepare an Amendment for execution by the Owner and Contractor.

1.04 PROCESSING AMENDMENTS

- A. Amendments will be numbered in sequence, and dated.
1. The Amendment will describe the change or changes, will refer to the proposal requests or supplemental instructions involved, and will be signed by the Contractor and Owner, in sequence.
 2. The Engineer or Owner will issue two copies of each Amendment to the Contractor.
 - a. The Contractor shall promptly sign all copies and return all copies to the Engineer or Owner for further processing by the Owner.
 - b. The Engineer or Owner will forward all copies to the Owner with a request for complete processing.
 - c. The Owner will sign and return a copy to the Contractor for distribution.

END OF SECTION 01250

DIVISION 1 – SECTION 01310**PROJECT MANAGEMENT AND COORDINATION****PART 1 PROJECT MANAGEMENT****1.01 DESCRIPTION**

- A. The Contractor will be required to utilize an integrated construction project management software platform for coordination, meeting organization, submittals, payment applications, project records, drawings, specifications, reports, punch-lists, and schedules throughout the duration of the project.
 - 1. Project Management software platform utilized for this project will be Procore.
- B. The project management software will be provided by the Owner. The Contractor will be allowed seat licenses with access to the project management software as needed for the duration of the project.
- C. Any training required in order for the Contractor to become proficient in the utilization of the construction project management software, shall be the responsibility of the Contractor at no additional cost to the Owner.

PART 2 PRECONSTRUCTION CONFERENCE**2.01 SUMMARY**

- A. To help clarify construction contract administration procedures, the Engineer or Owner will schedule a Preconstruction Conference prior to start of the Work, as described in this Section.
- B. Related Work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, Division 0 and Division 1 Specification Sections.

2.02 AGENDA AND MEETING SUMMARIES

- A. To the maximum extent practicable, advise the Engineer or Owner at least 24 hours in advance of the Conference as to items to be added to the agenda.
- B. The Engineer or Owner will compile summaries of the Conference, and will furnish copies of the summaries to the Contractor. The Contractor may make and distribute such other copies as he wishes.

2.03 QUALITY ASSURANCE

- A. For those persons designated by the Contractor, his subcontractors, and suppliers to attend the Pre-Construction Conference, provide required authority to commit the entities they represent to schedules and solutions agreed upon in the Conference.

2.04 PRECONSTRUCTION CONFERENCE

- A. The Conference will be held at a time and date established by the Engineer or Owner. If requested by the Engineer or Owner, additional conferences will be held.
- B. Attendance:

1. Insure attendance by authorized representatives of the Contractor and major Subcontractors.
 2. The Engineer or Owner will advise other interested parties, including the Owner, and request their attendance.
- C. Minimum agenda:
1. Organizational arrangement of Contractor's forces and personnel and those of subcontractors, material suppliers, and the Engineer or Owner;
 2. Channels and procedures for communications;
 3. Construction schedule, including sequence of critical work;
 4. Contract Documents, including distribution of required copies of Drawings and revisions;
 5. Processing of Shop Drawings and other data submitted to the Engineer or Owner for review;
 6. Processing of field decisions and Change Orders;
 7. Rules and regulations governing performance of the Work;
 8. Procedures for safety and first aid, security, quality control, housekeeping, and related matters; and
 9. Reports required and schedule for submittal.
 10. Items requiring long lead time and special requirements.

PART 3 PROGRESS MEETINGS

3.01 DESCRIPTION

- A. Work included: To enable orderly review during progress of the Work, and to provide for systematic discussion of problems, the Engineer or Owner will conduct project meetings throughout the construction period.
- B. Related work:
1. Documents affecting work of this Section include, but are not necessarily limited to, General Provisions, and other Sections of these Specifications.
 2. The Contractor's relations with his subcontractors and materials suppliers, and discussions relative thereto, are the Contractor's responsibility and normally are not part of project meetings content.

3.02 SUBMITTALS

- A. Agenda items: To the maximum extent practicable, advise the Engineer or Owner at least 24 hours in advance of project meetings regarding items to be added to the agenda.
- B. Summaries:

1. The Engineer or Owner will compile summaries of each project meeting, and will furnish copies to the Contractor and the Owner.
2. Recipients of copies may make and distribute such other copies as they wish.

3.03 QUALITY ASSURANCE

- A. For those persons designated by the Contractor to attend and participate in project meetings, provide required authority to commit the Contractor to solutions agreed upon in the project meetings.

PART 4 EXECUTION

4.01 MEETING SCHEDULE

- A. Project meetings will be held at times as determined by the Engineer or Owner.
- B. Coordinate as necessary to establish a mutually acceptable schedule for meetings.

4.02 MEETING LOCATION

- A. The Engineer or Owner will establish the meeting location.

4.03 PROJECT MEETINGS

- A. Attendance:
 1. To the maximum extent practicable, assign the same person or persons to represent the Contractor at project meetings throughout progress of the Work.
 2. Subcontractors, materials suppliers, and others may be invited to attend those project meetings in which their aspect of the Work is involved.
- B. Minimum agenda:
 1. Review, revise as necessary, and approve summaries of previous meetings.
 2. Review progress of the Work since last meeting, including status of outstanding submittals.
 3. Identify problems which may impede planned progress.
 4. Develop corrective measures and procedures to reestablish planned schedule.
 5. Discuss other current business.
- C. Revisions to summaries:
 1. Unless published summaries are challenged in writing prior to the next regularly scheduled progress meeting, they will be accepted as properly stating the activities and decisions of the meeting.
 2. Persons challenging published summaries shall reproduce and distribute copies of the challenge to all indicated recipients of the particular set of summaries.
 3. Challenge to summaries shall be settled as priority portion of "old business" at the next

regularly scheduled meeting.

END OF SECTION 01310

DIVISION 1- SECTION 01320**SCHEDULES AND REPORTS****PART 1 GENERAL****1.01 SUMMARY**

- A. The work under this Contract shall be planned, scheduled and reported using computerized precedence diagram format of the Critical Path Method in calendar days, unless otherwise specifically provided in the Contract Documents. The Detailed Construction Schedule shall be developed by using the latest revision of Microsoft Project, or approved equal computer software.
- B. Related Work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, other Sections of these Specifications.
 - 2. Other provisions concerning Schedules and Reports are stated to Specification Sections:
 - 01100 – Summary of Work, Sequence of Construction & Liquidated Damages
 - General Provision Section 60 - Control of Materials
 - General Provision Section 90 - Measurement and Payment

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION**3.01 GENERAL REQUIREMENTS**

- A. The Detailed Construction Schedule shall be developed by using the latest revision of Microsoft Project, or approved equal computer software that is compatible with Owner's scheduling software.
- B. The primary objectives of the requirements of this section are:
 - 1. to insure adequate planning and execution of the Work by Contractor;
 - 2. to assist Owner and Engineer in evaluating the progress of the Work;
 - 3. to provide a mechanism or tool for use by the Owner, Engineer and Contractor in determining and monitoring any actions of the Contractor which may be required in order to comply with the requirements of the Contract relating to the timely completion of the various portions of the Work
- C. The Detailed Construction Schedule, defined in Paragraph 3.04, shall represent the Contractor's commitment and intended plan for completion of the Work in compliance with the Contract. The Contractor will not:
 - 1. Misrepresent to the Owner its planning, scheduling, and coordination of the work;
 - 2. Utilize schedules different from those provided to the Owner and Engineer for the direction, execution and coordination of the work;
 - 3. Utilize schedules which are not feasible or realistic; or

4. Prepare schedules, updates, revisions or reports which do not accurately reflect the Contractor's actual intent or the Contractor's reasonable and actual expectations as to: the sequences of activities, labor availability, productivity, or efficiency; expected or reasonably foreseeable inclement weather conditions; the percentage complete of any activity or path of activities; completion of any item of work or activity; projected dates of completion; delays, slippage, or problems encountered or expected and Subcontractor requests for time extensions,
- D. Once approved by the Engineer or Owner, the Detailed Construction Schedule will become the Schedule of Record for coordinating the work, scheduling the work, monitoring the work, issuing progress payments, evaluating time extension requests, and all other objectives listed in Paragraph 3.01.B. The Contractor is required to employ whatever means he deems necessary to implement the Detailed Construction Schedule and to comply with the requirements of this Section. Updates shall be provided to the Engineer or Owner at each construction progress meeting or as requested by the Engineer or Owner. Updates shall be both electronic media and hard copy.
- E. Contractor is responsible for determining the sequence of activities, the time estimates of the detailed construction activities and the means, methods, techniques and procedures to be employed. Each construction schedule shall represent the Contractor's best judgment of how he will prosecute the Work in compliance with the Contract.
- F. Contractor shall consult with his Subcontractors and Suppliers (if any) relating to the preparation of each construction schedule. Subcontractors shall receive copies of each construction schedule and shall be continually advised of any updates or revisions to each construction schedule as the Work progresses.
- G. When there are separate contractors working concurrently on Airport whose work must interface or be coordinated with the Work of Contractor, Contractor shall coordinate his activities with the activities of the separate contractors and shall, prior to the submission of any construction schedule to the Engineer or Owner, obtain written approval of his construction schedule by the separate contractors.
- H. To carry out the intent of this Section, the Contractor agrees that the reasonable exercise of any rights under this Section by the Engineer or Owner shall not be grounds for any claim by Contractor or any of his Suppliers, Subcontractors or Sub-subcontractors of alleged interference, lack of cooperation, delay, disruption, negligence or hindrance by Owner or Engineer, and Contractor covenants not to sue therefor.
- I. It is understood and agreed that the Detailed Construction Schedule, defined in Paragraph 3.04, is to represent Contractor's best plan and commitment for the Work; however, Contractor acknowledges that the Detailed Construction Schedule may have to be revised from time-to-time as progress proceeds. Contractor further acknowledges and agrees that the Owner and Engineer do not guarantee that:
 1. Any changes, modifications or adjustments to any schedule by Contractor can only be made by the written approval of the Engineer or Owner.
- J. It is understood and agreed that should the Engineer or Owner provide the Contractor, at Contractor's request, with any advice relating to the scheduling or coordination of the Work or any other matter that:
 1. Owner and Engineer shall not be liable to Contractor for any errors, omissions, negligence or deficiencies which may in any way occur because of same;
 2. Such advice is provided solely as aids in the development by Contractor of a

representation of Contractor's actual construction plan and schedule in accordance with the requirements of the Contract Documents, and Owner and Engineer shall not be liable to Contractor should Contractor rely on such advice or counsel to his detriment;

3. Such advice shall not relieve Contractor of any responsibility under Paragraph 3.01.E hereof for all construction means, methods techniques, sequences and procedures and for planning, scheduling and coordinating all portions of the Work; and
 4. Any advice provided by the Engineer or Owner or the lack or alleged untimeliness thereof will not in any way take the place of or relieve the Contractor of full responsibility for compliance with all requirements of the Contract, including, but not limited to the obligations to complete the Work within the Contract.
- K. Approval or acceptance by the Owner or Engineer of any Contractor's construction schedule, or any revisions or updates thereto, shall not relieve the Contractor of the responsibility for accomplishing the Work by the Project Substantial Completion date.
- L. Contractor shall be solely responsible for expediting the delivery of all materials and equipment to be furnished by him so that the progress of construction shall be maintained according to the currently approved construction schedule for the Work. Contractor shall notify the Owner or Engineer in writing, and in a timely and reasonable manner, whenever Contractor determines or anticipates that the delivery date of any material or equipment to be furnished by Contractor will be later than the delivery date indicated by the currently approved construction schedule, or the current update thereof as herein provided.

3.02 NOT USED

3.03 DETAILED CONSTRUCTION SCHEDULE DRAFT

- A. No later than two (2) weeks after the Notice to Proceed, the Contractor shall complete a draft of the Detailed Construction Schedule in accordance with the requirements of this Paragraph 3.03.
- B. Except for procurement activities, Contractor shall differentiate activities of the Detailed Construction Schedule Draft so that no single activity shown has a duration longer than twenty-eight (28) calendar days, unless the Engineer, in its sole discretion, shall approve a longer duration for certain specific activities.
- C. The Detailed Construction Schedule Draft shall represent the Contractor's commitment and intended plan for completion of the Work in compliance with Contract Times listed elsewhere in the Contract. The Detailed Construction Schedule Draft shall take into account all foreseeable activities to be accomplished by any separate contractors, and interface dates with utility owners, the Owner's operations and others. The Detailed Construction Schedule Draft shall anticipate all necessary manpower and resources to accomplish the activities within the durations set forth therein.
- D. The Detailed Construction Schedule Draft shall consist of a time-scaled, detailed network graphic representation of all activities, which are part of the Contractor's construction plan. The Detailed Construction Schedule Draft submission shall include, but not be limited to, the following information:
 1. Project name;
 2. Activities of completed Work ready for use by next trade, Owner, etc.;
 3. Activities relating to different areas of responsibility, such as subcontracted Work, which is distinctly separate from that being done by the Contractor directly;
 4. Activities relating to different categories of Work as distinguished by craft or crew requirements;
 5. Activities relating to different categories of Work as distinguished by equipment requirements;
 6. Activities relating to different categories of Work as distinguished by materials;

7. activities relating to distinct and identifiable subdivisions of Work;
8. Activities relating to locations of Work within the Project that necessitates different times or crews to perform;
9. Activities relating to outage schedules for existing utility services that will be interrupted during the performance of the Work;
10. Activities relating to acquisition and installation of equipment, materials and supplies installed by the Owner and/or separate contractors;
11. Activities relating to material to be stored on site;
12. Contract Times consistent with those required in the contract;
13. A legible time scaled network diagram;
14. Activity durations not exceeding twenty-eight (28) calendar days for all activities for which the Contractor will perform actual field work. Material procurement, submittals, concrete curing and other similar activities may exceed twenty-eight (28) calendar days for this draft submission only.

3.04 DETAILED CONSTRUCTION SCHEDULE

- A. Prior to any monthly Application for Payment, the Contractor shall complete the Detailed Construction Schedule to the satisfaction of the Owner or Engineer.
- B. The Detailed Construction Schedule shall represent the Contractor's commitment and intended plan for completion of the Work in compliance with the Contract.
- C. The Owner/Engineer reserves the right to require the Contractor to furnish such manpower, materials facilities and equipment and shall work such hours, including additional shifts and overtime operations as may be necessary, to insure completion of the Work or specified portions thereof within the specific dates as set forth in the Contract Documents. If it becomes apparent to the Owner or Engineer that the work, or any required portion thereof, will not be completed by any such dates, the Contractor shall undertake the following actions, at no additional cost to the Owner, and comply with the requirements as set forth in Section 01320, 3.07 and 3.08, in order to ensure that it complies with all completion requirements:
 1. Increase the quantity of manpower, materials, trades, crafts, and equipment and facilities on the site;
 2. Increase the number of working hours per shift, shifts per working day, or any combination of the foregoing; and
 3. Reschedule activities to achieve maximum activity accomplishment.

3.05 DETAILED CONSTRUCTION SCHEDULE CONTENT

- A. The Detailed Construction Schedule shall consist of a time-scaled graphic representation of all activities, which are part of the Contractor's construction plan and an accompanying listing of each activity's dependencies and interrelationships.
- B. The Contractor shall anticipate and account for, as a minimum, the potential loss of the number of **calendar** days listed below for each calendar month due to weather and shall schedule the work accordingly.

January	12	July	6
February	10	August	6
March	9	September	4
April	6	October	5
May	8	November	6
June	5	December	10

The preceding days were derived from historical data provided by the National Climatic Data Center regarding rainfall at Memphis International Airport. They represent a number less than the actual number of days of measurable rainfall that can be expected to occur during a twenty-four (24) hour period for the months indicated. **The Contractor shall make his own determination as to the likely impact of weather on his operation and shall include as part of the Detailed Construction Schedule submission an accounting of how the impact of anticipated weather was determined and accounted for in the schedule.** These values listed above are the minimum number of weather related days the Contractor shall consider in developing his Detailed Construction Schedule. It is further understood that said calendar day period shall be derived through assuming that work will take place on a calendar day basis.

The Owner or Engineer will continually monitor the effects of weather and when found justified, grant time extensions, if required, at the end of the Contract. In the event less weather days are actually encountered than provided for in this section, those days will accrue to subsequent months of the phase or contract and be balanced against actual weather. In accordance with the Contract Documents weather days occurring during the extension beyond the original completion date will be compensated day for day, if justified. No weather days will be granted beyond the final Contract completion date as computed herein.

- C. All activity durations shall be given in calendar days.
- D. Contractor shall plan his operations and schedule the work to ensure that the critical path runs through on-site construction activities and that off-site procurement activities do not control the critical path of the Detailed Construction Schedule, unless approved in writing by the Owner or Engineer.

3.06 UPDATING OF CONSTRUCTION SCHEDULE/PROGRESS REPORTS

- A. The Detailed Construction Schedule will be reviewed and updated as needed during each project progress meeting.

3.07 RECOVERY SCHEDULE

- A. Should the updated Detailed Construction Schedule, at any time during Contractor's performance, show, in the sole opinion of the Owner or Engineer, that the Contractor is seven (7) or more days behind schedule for any location or category of work, or should Contractor be required to undertake actions under Paragraph 3.04.D hereof, the Contractor shall immediately prepare a Recovery Schedule explaining and displaying how Contractor intends to reschedule his Work in order to regain compliance with the Approved Detailed Construction Schedule during the immediate subsequent pay period.

3.08 SCHEDULE REVISIONS

- A. Should Contractor desire to or be otherwise required under the Contract to make modifications or changes in his method of operation, his sequence of Work or the durations of the activities in his Construction Schedule, he shall do so in accordance with Paragraph 3.04 of this specification. The approved Detailed Construction Schedule may only be revised by the written approval of the Owner or Engineer as provided herein.

END OF SECTION 01320

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DIVISION 1 – SECTION 01321**CONSTRUCTION SURVEYING****PART 1 GENERAL****1.01 SUMMARY**

- A. This section describes the Owner's airport survey grid and surveying requirements.
- B. Related Work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to the General Provisions and other Sections of these Specifications.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTIONS**3.01 EXISTING SURVEY CONTROL MONUMENTS**

- A. The Owner has established an airport-wide survey grid consisting of both first order and second order survey monuments. The monuments are distributed both inside and outside the Air Operations Area fence.
- B. The monuments are tied to the Tennessee State Plane Coordinate System in U.S. Survey feet with the North American Datum, 1983.
- C. Survey control monuments typically, but not always, consist of aluminum disks stamped with identifying codes, set in concrete, and marked by orange witness posts.
- D. The Contractor may obtain the current Survey Control Monument Manual from the Program Manager.

3.02 REQUIREMENTS

- A. Contractor is responsible for all construction surveying.
- B. Any deviations from the existing grades shall be immediately reported to the Program Manager.
- C. Contractor shall tie the project to the survey grid as established by the monuments described in section 3.01.
- D. Contractor shall protect all survey monuments within the vicinity of the project and all survey monuments used for survey while they are occupied.
- E. The Contractor shall, at his expense, have a Tennessee Professional Land Surveyor replace any monument disturbed or destroyed by Contractor's construction activities (using first order techniques); replaced monuments shall be located at least ten feet, but not more than fifty feet, from the location of the disturbed monument. New monuments shall consist of aluminum disks stamped with an identifying code, set in concrete using a procedure approved by Program Manager, and marked by an orange witness post. Replaced-monument survey information shall be provided to Owner in exact format as contained within Owner's Survey Control Monument Manual.

END OF SECTION 01321

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DIVISION 1- SECTION 01322**AERIAL PHOTOGRAPHS****PART 1 GENERAL****1.01 SUMMARY**

- A. Provide photographs taken at specified stages during construction, and in accordance with provisions of this Section.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Provisions and other Sections of these Specifications.

1.02 SUBMITTALS

- A. Except as otherwise directed and paid for, submit one electronic file of each photograph.

1.03 QUALITY ASSURANCE

- A. Secure the services of a professional photographer who is skilled and experienced in construction photography and whose work samples are acceptable to the Engineer.
- B. Do not replace the photographer without the Engineer's written approval.

PART 2 PRODUCTS**2.01 AERIAL PHOTOGRAPHS**

- A. Provide electronic files, at a quality and resolution capable of printing the photographs at a size up to 36" x 24".
- B. Record each electronic file's filename in a manner to show:
 - 1. Job number;
 - 2. Location from which photographed;
 - 3. Date of photograph;
- C. Do not permit photographs to be issued for any other purpose without specific written approval from the Engineer.

PART 3 EXECUTION**3.01 AERIAL PHOTOGRAPHY**

- A. Except as otherwise specifically approved by the Engineer, make the photographs within three calendar days of the date of each Application for Payment.
 - 1. To the maximum extent practicable, make photographs at approximately the same time of day throughout progress of the Work.

2. When inclement weather is anticipated, consult with the Engineer and determine acceptable alternative arrangements.
- B. Except as otherwise specifically approved by the Engineer, take the photographs from four (4) directions. The photographs required shall be oblique aerial photographs. One shall be taken from the north, one from the south, one from the east and one from the west looking at the entire project, or as directed by the Engineer.
1. Select the locations to provide diversified overall views of the Work, from positions, which are expected to remain accessible throughout progress of the Work.
 2. Identify each location by word description, by marked drawing, or by such other means as acceptable to the Engineer, to enable future photographs to be taken from the same position.
 3. When so directed by the Engineer because of the stage of construction, change one or more of the locations as the Engineer directs.
- C. Make each photograph clear, in focus, with high resolution and sharpness, and with minimum distortion.

END OF SECTION 01322

DIVISION 1 – SECTION 01325**DELAYS AND EXTENSIONS OF TIME****1.01 DESCRIPTION**

- A. Work included:
 - 1. Delays and extensions of time.
- B. Related Work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to the General Provisions, and other Sections of these Specifications.

1.02 OBLIGATION OF OWNER AND PROGRAM MANAGER

- A. Neither the Owner nor the Program Manager shall be obligated or liable to the Contractor for any damages, cost or expenses of any type which the Contractor, its subcontractors, sub-subcontractors, or any other person may incur as a result of any disruption or delay from any cause, regardless of the actual source of delay, whether avoidable or unavoidable, it being understood and agreed that the Contractor's sole and exclusive remedy in such event shall be an extension of the Contract Time, but in accordance with provisions of the Contract Documents.
- B. Except for weather delays, any claim for extension of time shall be made in writing to the Program Manager not more than ten (10) days after commencement of such delay, otherwise, such claim will be waived. The Contractor shall provide an estimate of the probable effect of such delay on the progress of the Work.
- C. The time during which the Contractor is delayed in performance of the work caused by the acts or omissions of the Owner, Program Manager or their employees or agents, or by acts of God, fires, floods, epidemics, quarantine restrictions, riots, civil commotions or freight embargoes, or other conditions beyond the Contractor's control which the Contractor could not have reasonably foreseen and provided against shall be added to the Contract Time; however, the Contractor must submit his claim for such delays in accordance with the requirements of this Section and any other applicable provisions of these Contract Documents in order to be considered for an extension of time.
- D. The Contract Time shall be adjusted only for changes in the work pursuant to GP-40, suspensions of the work, excusable delays or emergencies. Whenever the Contractor requests an extension of the Contract Time, the Contractor shall furnish such justification and supporting evidence as required by this section and such other and additional information as the Owner may deem necessary to determine whether the Contractor is entitled to an extension of the Contract Time. All such requests shall conform to all of the requirements of the Contract Documents, shall include evidence that the reasons for the requested Contract Time extension were beyond the control of the Contractor, and the Contractor shall bear the burden of substantiating and proving the necessity of an extension to the Contract Time. The Owner, with the assistance of the Program Manager, shall review all requests for Contract Time extensions and shall advise the Contractor of its decision and finding of fact in writing. If the Owner determines that the Contractor is entitled to an extension of the Contract Time, the length of the extension shall be based upon the currently approved detailed construction schedule and on all other relevant data, which data shall be incorporated into and from the basis for revision to the construction schedule.

The Contractor acknowledges and agrees that the actual delays due to said changes, suspension of the work, or excusable delays in activities which, according to the detailed construction schedule, do not affect the Contract Time, shall not affect the Contract Time, and therefore, cannot form the basis for an extension in the Contract Time or a change in the construction schedule.

- E. The Contractor shall be entitled to an extension of the Contract Time but no increase in the Contract sum, for delays arising from unforeseeable causes beyond the control and without the fault of negligence of the Contractor or its Subcontractors as follows:
 - 1. Acts of God, tornadoes, fires, blizzards, earthquakes, or floods that severely damages completed work or stored materials.
 - 2. Acts of the public enemy; acts of the state, federal or local governments in their sovereign capacities; and acts of a separate contractor in the performance of a separate contract with the Owner relating to this or another project.
- F. The Contractor shall not be entitled to any extension of Contract Time resulting from any condition or cause unless the Contractor strictly complies with the requirements of this Section and the Contractor must submit to the Program Manager within ten (10) days of the first instance of the delay a written request for an extension in the Contract Time which shall include the following information: (a) the nature of the delay; (b) the date of anticipated date of commencement of the delay; (c) activities on the schedule affected by the delay, and/or new activities created by the delay and their relationship with existing activities; (d) identification of persons or organizations or events responsible for the delay; and (e) recommended action to avoid or minimize the delay.
- G. No claim for delay shall be allowed and the Contractor waives any such claim if the Contractor fails to furnish the written request, required by this or other sections, within the period of time specified therein.

END OF SECTION 01325

DIVISION 1 – SECTION 01330**SUBMITTALS****PART 1 GENERAL****1.01 SUMMARY**

- A. This section describes the process for handling Contractor submittals.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, Division 0, Division 1, and other Sections of these Specifications

1.02 SUBMITTALS

- A. Except as otherwise specified below, as soon as practicable after contract award and without causing delay in the work, submit at least 7 bound copies of submittals of all items for which submittals are specified in other sections, and for all major submittal equipment whether specified in other sections or not. Alternatively, all Submittals may be submitted electronically in lieu of hard copies, if possible. Each submittal shall be clearly marked with the project name, dated, and accompanied by a letter of transmittal listing all items included in the submittal and referencing the project specification page and article numbers applicable to each item.
 - 1. Submittals shall include all test results and/or certificate necessary to show that the item conforms to the standards specified. Such standards shall include ASTM, AASHTO, FAA, PCA, Federal Specifications or any other standard listed in these specifications.

1.03 QUALITY ASSURANCE

- A. Before submission to the Engineer or Owner, the Contractor shall check the submittals of all items furnished directly by him, and the applicable Subcontractor shall check the submittals of all items furnished by the Subcontractor involved, as follows: check the submittal drawings for completeness and compliance with the contract documents; check and verify all dimensions, field conditions certifications relating to the submittals and certify in writing that these checks have been made.
 - 1. The Engineer or Owner will return for resubmission, all submittals without the above specified approval and certification, and all submittals which in the Engineer's or Owner's opinion contain numerous discrepancies and/or have not been checked by the Contractor or Subcontractor.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION**3.01 SUBMITTAL REVIEW**

- A. After the Owner or Engineer has reviewed the submittals, except as otherwise specified below, submittals will be dated, and three sets will be returned to the Contractor. If submittals are rejected, four sets will be returned to the Contractor, with indications of the required corrections and changes made on one of the sets. Make such corrections and changes as indicated. Resubmit

submittals as specified above, as often as required by the Engineer or Owner to complete the review. No correction or change indicated on submittals shall be considered as an order for extra work.

- B. Submittals reviewed by the Owner or Engineer will be a general review only, and acceptance will not relieve Contractor or Subcontractor of responsibility for accuracy of submittals, proper fitting, coordination, construction or work, and furnishing materials and work required by Contract but not indicated on submittals. Review of submittals shall not be construed as accepting departures from Contract requirements.
- C. Any material ordered, or work performed prior to obtaining an approved submittal shall be at the Contractor's risk and subject to rejection.

END OF SECTION 01330

DIVISION 1 – SECTION 01351**STORAGE AND PROTECTION****PART 1 GENERAL****1.01 SUMMARY**

- A. Protect products scheduled for use in the Work by all means including, but not necessarily limited to, those described in this Section.
- B. Related Work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, Division 0, and Division 1 of these Specifications.
 - 2. Additional procedures may also be prescribed in other Sections of these Specifications.

1.02 QUALITY ASSURANCE

- A. Include within the Contractor's quality assurance program such procedures as are required to assure full protection of work and materials.

1.03 MANUFACTURERS' RECOMMENDATIONS

- A. Except as otherwise approved by the Owner or Engineer, determine and comply with manufacturers' recommendations on product handling, storage, and protection.

1.04 PACKAGING

- A. Deliver products to the job site in their manufacturer's original container, with labels intact and legible.
 - 1. Maintain packaged materials with seals unbroken and labels intact until time of use.
 - 2. Promptly remove damaged material and unsuitable items from the job site, and promptly replace same with material meeting the specified requirements, at no additional cost to the Owner.
- B. The Owner or Engineer may reject as non-complying such material and products as do not bear identification satisfactory to the Owner or Engineer such as manufacturer, grade, quality, and other pertinent information.

1.05 PROTECTION

- A. Protect finished surfaces, materials, trenches, earthwork, etc. from weather, construction operations, etc.
- B. Maintain finished surfaces clean, unmarred, and suitably protected until accepted by the Owner.

1.06 REPAIRS AND REPLACEMENTS

- A. In event of damage, promptly make replacements and repairs to the approval of the Owner or Engineer and at no additional cost to the Owner.
- B. Additional time required to secure replacements and to make repairs will not be considered by the Owner or Engineer to justify an extension in the Substantial Completion Date.

END OF SECTION 01351

DIVISION 1 – SECTION 01353**RADIO COMMUNICATIONS****1.01 DESCRIPTION****A. Work Included**

1. Provide radio communication with Airport Control Tower.

B. Documents affecting work of this Section include, but are not necessarily limited to General Provisions, and other Sections of these Specifications.**1.02 RADIO COMMUNICATIONS**

- A.** When required by the Contract Documents, and when work under this Contract is in progress within the Air Operations Area (AOA), the Contractor's job superintendent or other authorized representative of the Contractor on the job site shall coordinate such work with the Program Manager and the Program Manager shall maintain approved 2-way radio communication with the Airport Control Tower, for coordination of work with airport operations in progress.

END OF SECTION 01353

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DIVISION 1 – SECTION 01455**QUALITY CONTROL AND QUALITY ASSURANCE TESTING PROGRAMS****PART 1 GENERAL****1.01 SUMMARY**

- A. This Section describes quality control and quality assurance testing and inspections required to be provided by the Contractor and the Owner.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, Division 0, Division 1 and other Sections of these Specifications.
 - 2. Requirements for testing are described in various Sections of these Specifications.

1.02 QUALITY CONTROL and QUALITY ASSURANCE TESTING PROGRAMS

- A. Contractor Quality Control Testing: At his own expense, the Contractor shall make separate arrangements for and be fully responsible for all quality control testing as required by the technical specifications and General Construction Items C-100.
- B. Owner Quality Assurance Testing: At no cost to the Contractor, the Owner will make arrangements for the services of an independent testing laboratory for quality assurance testing of work and materials. This testing is for the Owner's use only and will only be performed after the Contractor's quality control testing program has tested and approved materials and workmanship to be in full compliance with the quality standards of the Specifications. The Owner Quality Assurance testing services shall in no way relieve the Contractor of the responsibility for providing the quality materials, workmanship and testing required for compliance with these specifications.
- C. Determination of Specification Compliance: In all cases of conflicting test results, the Owner's quality assurance test results shall govern. All retesting shall be conducted by Owner's testing laboratory at the Contractor's expense. The amount and location of any retesting shall be as directed by the Owner or Engineer. Unsatisfactory work or materials shall be retested as often as necessary until retests indicate that the failed work or materials have achieved conformity with the Plans and Specifications. The Owner or Engineer shall make the final determination as to whether any work or materials, which do not conform to the Plans and Specifications upon initial testing, are to be removed from the site or reworked. The Owner or Engineer shall also make the final determination as to whether the retesting indicates that work or materials initially rejected have been corrected to meet the requirements of the Plans and Specifications. All removal, replacement, rolling, watering, aeration, reworking, etc. required to bring rejected work or materials into conformance with the Plans and Specifications shall be at the Contractor's expense.
- D. Retesting Expense: The Owner will bear the expense of the initial quality assurance testing of certain items of work or materials as required by the technical specifications. Any retesting of these items of work or materials which upon initial testing fail to meet the standards specified or indicated on the plans shall be at the Contractor's expense.
- E. Laboratory Inspection and Testing: If this contract requires laboratory inspection, testing, and stamping of concrete pipe, concrete fittings, or any other material, the cost of that laboratory inspection, testing, and stamping shall be borne by the Contractor and included in the cost of the work.

- F. Prior to starting concrete operations the Contractor shall name his source of supply for concrete materials and submit representative samples and reports of quality tests for approval.
- G. The Owner shall engage and pay for the services of an independent testing laboratory to perform the following services:
1. Slump test, ASTM C143, shall be taken with every set of cylinders and as often as required to provide the specified consistency of concrete.
 2. Determine air content with every set of cylinders, ASTM C231, or as required.
 3. Cast and test a set of at least 6 cylinders for each day's pour or for each 100 cubic yards or fraction thereof for each class of concrete. Cylinders shall be made and cured, ASTM C31, and tested, ASTM C39, in accordance with ASTM specifications for control tests. Cylinders shall be tested at 7 and 28 days. The Contractor shall provide insulated storage room with heat when necessary to store control cylinders and a protected space for storage of "field" cylinders which approximates the condition of curing of the concrete being sampled. Cylinders designated as "field" cylinders shall be used to determine safe stripping and loading of members. On all pours in excess of 25 cubic yards, continuous laboratory inspection shall be provided at the job site for checking materials, deliveries and concrete consistencies.
- H. The testing laboratory shall observe the materials and the manufacturer of concrete as specified and shall report to the Contractor and Designer the progress thereof. Also, when it appears that the material furnished and the work performed by the Contractor fails to fulfill the specified requirements and Contract, the testing laboratory shall direct the attention of the Contractor and Designer to such failure or infringement. Such observation shall not relieve the Contractor of any obligation to furnish acceptable materials or to provide the concrete quality in the structure that is in strict accordance with plans and specifications. The testing laboratory is not authorized to revoke, alter, relax, enlarge or release the requirements of the specifications, nor to issue instructions contrary to the plans and specifications; nor to approve or accept any portion of the work but in case of any dispute arising between the testing laboratory and the Contractor as to materials furnished or in the manner of performing the work, the testing laboratory shall have the authority to reject materials or suspend the work until the question at issue can be referred to the Designer. The testing laboratory shall not act as foreman or perform other duties for the Contractor. In no case shall any advice or oversight on the part of the testing laboratory relieve the Contractor of responsibility for completing the work in accordance with plans and specifications and the fulfillment of the Contract. The work will be observed as it progresses, but failure to report to the Designer any defective work or materials shall not in any way prevent later rejection when such a defect is discovered or obligate the Owner for final acceptance. Any expense incident to the investigation and determination of actual quality of any questionable material shall be borne by the Contractor.
- I. In the event that concrete tests fail to meet strength requirements of these specifications the designer may require, at no additional cost to the Owner, tests in accordance with the "Standard Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete", ASTM C42, or order load tests in accordance with Chapter 20 of the ACI Building Code 318, to be made on the portions of the structure containing questionable concrete. Suitable appliances and methods of loading the measuring shall be provided by the Contractor under the direction of the testing laboratory. The portions of the structure which are found by the Designer to contain defective concrete shall be removed and reconstructed in a satisfactory manner at the Contractor's expense. Concrete strength tests are to conform to Chapter 5 of the ACI Building Code 318.
- J. The laboratory shall have free access to material stockpiles, batching and mixing plants, and job site. The Contractor shall provide adequate assistance to the laboratory in securing specified samples for tests.

- K. Contractor shall give the Designer and laboratory reasonable notice before beginning any pours (at least 24 hours).
- L. The laboratory shall supply a daily report of concrete and materials testing and inspection to the designer (two copies) and Contractor (one copy).
- M. Concrete batched away from the job and delivered in mixer or agitator trucks shall conform to requirements of ASTM C94.
- N. Sampling and Testing:
 - 1. All materials shall be sampled, tested in accordance with appropriate ASTM Standards, and approved before inclusion in any work on this project.
 - 2. Samples for testing shall be furnished by the Contractor.
 - 3. Rejected material shall be immediately removed from the site.
- O. Standards: Comply with the following applicable standards:
 - 1. ACI 211.1R: "Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete."
 - 2. ACI 211.2 "Standard Practice for Selecting Proportions for Structural Lightweight Concrete."
 - 3. ACI 301R: "Standard Specifications for Structural Concrete for Buildings".
 - 4. ACI 304R: "Guide for Measuring, Mixing, Transporting, and Placing Concrete."
 - 5. ACI 305R: "Hot Weather Concreting."
 - 6. ACI 306R: "Cold Weather Concreting."
 - 7. ACI 308R: "Standard Practice for Curing Concrete."
 - 8. ACI 318: "Building Code Requirements for Structural Concrete and Commentary."
- P. Examine the substrate, formwork, and the conditions under which concrete reinforcement is to be placed, and correct conditions which would prevent proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected.
- Q. Inspection: Before placement of concrete, the Owner's Representative shall observe the placement of all reinforcing and give his approval.

END OF SECTION 01455

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DIVISION 1 – SECTION 01500**CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS****PART 1 GENERAL****1.01 SUMMARY**

- A. This Section describes construction facilities and temporary controls required for the Work.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, Division 0 and Division 1 Specifications,

1.02 REQUIREMENTS

- A. Provide construction facilities and temporary controls needed for the Work including, but not necessarily limited to:
 - 1. Sanitary facilities;
 - 2. Temporary fencing of the construction site, if required.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Maintain temporary facilities and controls in proper and safe condition throughout progress of the Work.

PART 2 PRODUCTS**2.01 UTILITIES**

- A. Water:
 - 1. Provide necessary temporary piping and water supply and, upon completion of the Work, remove such temporary facilities.
 - 2. Provide and pay for water used in construction.
- B. Electricity:
 - 1. Provide necessary temporary wiring and, upon completion of the Work, remove such temporary facility.
 - 2. Provide area distribution boxes located so that the individual trades may furnish and use 100 ft maximum length extension cords to obtain power and lighting at points where needed for work, inspection, and safety.
 - 3. Provide and pay for electricity used in construction.
- C. Heating: Provide, maintain and pay for heat necessary for proper conduct of operations needed in the Work.
- D. Telephone:

1. Make necessary arrangements and pay costs for installation and operation of telephone service to the Contractor's office at the site.
2. Make the telephone available to the Program Manager for use in connection with the Work.

2.02 FIELD OFFICES AND SHEDS

A. Sanitary facilities:

1. Provide temporary sanitary facilities in the quantity required for use by all personnel.
2. Maintain in a sanitary condition at all times.

2.03 ENCLOSURES

- A. Provide and maintain for the duration of construction all scaffolds, tarpaulins, canopies, warning signs, steps, platforms, bridges, and other temporary construction necessary for proper completion of the Work in compliance with pertinent safety and other regulations.

2.04 TEMPORARY FENCING

- A. If indicated provide and maintain for the duration of construction a temporary fence of design and type needed to prevent entry onto the Work by the public.

2.05 REMOVING AND REPLACING FENCES, SOD, ETC.

- A. Where required to install the Work, carefully remove and store all interfering fences, mailboxes, culverts, etc. After installation of work and backfilling, reinstall these items and restore them to at least the conditions, which existed prior to the commencement of work, using materials and workmanship to match those of the original construction and installation.
- B. Carefully remove and store all interfering shrubbery, trees, sod, flowers, and other planting, sufficiently in advance of construction. After installation of work and backfilling, reset and restore these items to at least the conditions that existed prior to the commencement of work.

PART 3 EXECUTION

3.01 MAINTENANCE AND REMOVAL

- A. Maintain temporary facilities and controls as long as needed for safe and proper completion of the Work.
- B. Remove such temporary facilities and controls as rapidly as progress of the Work will permit, or as directed by the Owner or Engineer.

3.02 DUST CONTROL

- A. During construction, haul roads and other disturbed construction areas shall be watered as required to prevent dust from damaging and/or becoming a nuisance to the terminal and other buildings, automobiles, aircraft, and residential and other built-up areas surrounding the project site.

END OF SECTION 01500

DIVISION 1 - SECTION 01600**PRODUCT REQUIREMENTS****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings, Contract, Division 0 and Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements governing Contractor's selection of products for use in Project.
- B. Related Sections: Following Sections contain requirements that relate to this Section:
1. Division 1 Section "Reference Standards and Definitions" specifies the applicability of industry standards to products specified.
 2. Division 1 Section 01320 specifies requirements for submittal of the Contractor's Construction Schedule and the Submittal Schedule.
 3. Division 1 Section "Product Substitution Procedures" specifies administrative procedures for handling requests for substitutions made after award of the Contract.

1.3 DEFINITIONS

- A. Definitions used in this Article are not intended to change meaning of other terms used in Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms. Such terms such are self-explanatory and have well recognized meanings in construction industry.
1. **"Products"** are items purchased for incorporation in Work, whether purchased for Project or taken from previously purchased stock. Term "product" includes terms "material," "equipment," "system," and terms of similar intent.
 - a. "Named Products" are items identified by manufacturer's product name, including make or model designation, indicated in manufacturer's published product literature, that is current as of date of Contract Documents.
 - b. "Foreign Products," as distinguished from "domestic products," are items substantially manufactured (50% or more of value) outside of United States and its possessions; or produced or supplied by entities substantially owned (more than 50%) by persons who are not citizens of nor living within United States and its possessions.
 2. **"Materials"** are products that are substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form part of Work.
 3. **"Equipment"** is a product with operational parts, whether motorized or manually operated, that requires service connections such as wiring or piping.

1.4 SUBMITTALS

- A. Product List: Prepare list showing products specified in tabular form acceptable to Program Manager. Include generic names of products required. Include manufacturer's name and proprietary product names for each item listed.
1. Coordinate product list with Contractor's Construction Schedule and Schedule of Submittals.
 2. Form: Prepare product list with information on each item tabulated under following column headings:
 - a. Related Specification Section number.
 - b. Generic name used in Contract Documents.
 - c. Proprietary name, model number and similar designations.
 - d. Manufacturer's name and address.
 - e. Supplier's name and address.
 - f. Installer's name and address.
 - g. Projected delivery date, or time span of delivery period.
 3. Initial Submittal: Within 30 days after date of commencement of Work, submit 3 copies of an initial product list. Provide written explanation for omissions of data and for known variations from Contract requirements.
 - a. At Contractor's option, initial submittal may be limited to product selections and designations that must be established early in Contract period.
 4. Completed List: Within 60 days after date of commencement of Work, submit 3 copies of completed product list. Provide written explanation for omissions of data and for known variations from Contract requirements.
 5. Engineer's Action: Engineer will review and the Program Manager will respond in writing to Contractor within 2 wks of receipt of completed product list. No response within this period constitutes no objection to listed manufacturers or products but does not constitute a waiver of the requirement that products comply with Contract Documents. Engineer's review will include a list of unacceptable product selections, containing a brief explanation of reasons for this action.
- B. Source Limitations: To fullest extent possible, provide products of same kind, from single source.
1. When specified products are available only from sources that do not or cannot produce quantity adequate to complete project requirements in timely manner, consult with Program Manager for determination by the Engineer of most important product qualities before proceeding. Qualities may include attributes relating to visual appearance, strength, durability, or compatibility. When determination has been made, select products from sources that produce products that possess these qualities, to fullest extent possible.
- C. Compatibility of Options: When Contractor is given option of selecting between 2 or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.
1. Each Contractor is responsible for providing products and construction methods that are compatible with products and construction methods of other separate Contractors.
 2. If dispute arises between Contractors over concurrently selectable, but incompatible products, Engineer will determine which products shall be retained and which are incompatible and must be replaced.
- D. Foreign Product Limitations: Except under 1 or more of following conditions, provide domestic products, not foreign products, for inclusion in the Work:

1. No available domestic product complies with Contract Documents.
 2. Domestic products that comply with Contract Document are only available at prices or terms that are substantially higher than foreign products that also comply with Contract Documents.
- E. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view in occupied spaces or on exterior.
- F. Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface that is not conspicuous.
- G. Equipment Nameplates: Provide permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface which is inconspicuous in occupied spaces. Nameplate shall contain following information and other essential operating data:
1. Name of product and manufacturer.
 2. Model and serial number.
 3. Capacity.
 4. Speed.
 5. Ratings.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and handle products according to manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.
1. Schedule delivery to minimize long-term storage at site and to prevent overcrowding of construction spaces.
 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other losses.
 3. Deliver products to site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installing.
 4. Inspect products upon delivery to ensure compliance with Contract Documents, and to ensure that products are undamaged and properly protected.
 5. Store products at site in manner that will facilitate inspection and measurement of quantity or counting of units.
 6. Store heavy materials away from Project structure in manner that will not endanger supporting construction.
- Store products subject to damage by elements above ground, under cover in weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION

- A. General Product Requirements: Provide products that comply with Contract Documents, that are undamaged and, unless otherwise indicated, new at time of installation.
1. Provide products complete with all accessories, trim, finish, safety guards and other devices and details needed for complete installation and for intended use and effect.
 2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.

- B. Product Selection Procedures: Product selection is governed by Contract Documents and governing regulations, not by previous Project experience. Procedures governing product selection include following:
1. Proprietary Specification Requirements: Where only a single product or manufacturer is named, provide product indicated. No substitutions will be permitted.
 2. Semiproprietary Specification Requirements: Where 2 or more products or manufacturers are named, provide 1 of products indicated. No substitutions will be permitted.
 - a. Where products or manufacturers are specified by name, accompanied by term "or equal," or "or approved equal" comply with Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.
 3. Compliance with Standards, Codes and Regulations: Where Specifications only require compliance with an imposed code, standard or regulation, select product that complies with standards, codes or regulations specified.
 4. Visual Matching: Where Specifications require matching an established Sample, Engineer's decision will be final on whether proposed product matches satisfactorily.
 - a. Where no product available within specified category matches satisfactorily and complies with other specified requirements, comply with provisions of Contract Documents concerning "substitutions" for selection of matching product in another product category.
 5. Visual Selection: Where specified product requirements include phrase "...as selected from manufacturer's standard colors, patterns, textures..." or similar phrase, select product and manufacturer that complies with other specified requirements. Engineer will select color, pattern and texture from product line selected.
 6. Allowances: Refer to individual Specification Sections and "Allowance" provisions in Division 1 for allowances that control product selection, and for procedures required for processing such selections.

2.2 ASBESTOS-FREE REQUIREMENTS

- A. The Contractor shall not use any asbestos containing material (ACM) at any time during the Project. The Contractor shall verify that all materials used on the Project are asbestos-free materials.
- B. During the course of the Project, the Contractor shall routinely check products utilized on-site to ensure only asbestos-free products are utilized.
- C. If the Owner suspects the presence of asbestos, the Owner will sample the suspect material to verify that no ACM was utilized. This testing shall be performed at the expense of the Owner. If ACM is subsequently found during the sampling, the Contractor shall remove and replace the product or material at his/her sole expense. No adjustment of the Contract Schedule will be provided to account for delays associated with removal and/or replacement of ACM. The Contractor shall reimburse Owner for any and all costs associated with the original testing and/or any re-testing that may be necessary.
- D. Upon completion, a notarized certification statement shall be provided by the Contractor to the Owner certifying that all materials associated with this Project are asbestos free. See Specification 01771 Closeout Documents for certification document. If the Contractor does not submit the required asbestos-free certification, the Authority shall have a complete building survey performed by a qualified testing firm within the Project's location. The cost of the survey and any subsequent removal/replacement of any ACM shall be deducted from the Contractor's final payment at the sole discretion of the Owner.

PART 3 - EXECUTION

3.1 INSTALLATION OF PRODUCTS:

- A. Comply with manufacturer's instructions and recommendations for installation of products in applications indicated. Anchor each product securely in place, accurately located and aligned with other Work.
- 1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration until time of Substantial Completion.

END OF SECTION 01600

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DIVISION 1 - SECTION 01630
PRODUCT SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings, Contract, Division 0 and Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling requests for substitutions made after award of Contract.
- B. Contractor's Construction Schedule and Schedule of Submittals are included under Section 01320.
- C. Standards: Refer to Section "Reference Standards and Definitions" for applicability of industry standards to products specified.
- D. Procedural requirements governing Contractor's selection of products and product options are included under Section "Product Requirements."
- E. Program Manager's policy is to reject requests for substitution unless paragraph "Substitutions" under Article "Definitions" applies.

1.3 DEFINITIONS

- A. Definitions used in this Article are not intended to change or modify meaning of other terms used in Contract Documents.
- B. Substitutions: Requests for changes in products, materials, equipment, and methods of construction required by Contract Documents proposed by Contractor after award of Contract are considered requests for "substitutions." Following are not considered substitutions:
 - 1. Revisions to Contract Documents requested by Owner or Program Manager.
 - 2. Specified options of products and construction methods included in Contract Documents.
 - 3. Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

1.4 SUBMITTALS

- A. Substitution Request Submittal: Requests for substitution will be considered if received within 30 days after commencement of Work. Requests received more than 30 days after commencement of Work may be considered or rejected at discretion of Program Manager.
 - 1. Submit 3 copies of each request for substitution for consideration. Submit requests on forms included at end of this Section.

2. Identify product, or fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers. Provide complete documentation showing compliance with requirements for substitutions, and the following information, as appropriate:
 - a. Product Data, including Drawings and descriptions of products, fabrication and installation procedures.
 - b. Samples, where applicable or requested.
 - c. Detailed comparison of significant qualities of proposed substitution with those of Work specified. Significant qualities may include elements such as size, weight, durability, performance and visual effect.
 - d. Coordination information, including list of changes or modifications needed to other parts of Work and to construction performed by Owner and separate Contractors, that will become necessary to accommodate proposed substitution.
 - e. Statement indicating substitution's effect on Contractor's Construction Schedule compared to schedule without approval of substitution. Indicate effect of proposed substitution on the overall Substantial Completion of the project.
 - f. Cost information, including proposal of net change, if any in Contract Sum.
 - g. Certification by Contractor that substitution proposed is equal-to or better in every significant respect to that required by Contract Documents, and that it will perform adequately in application indicated. Include Contractor's waiver of rights to additional payment or additional Contract time, that may subsequently become necessary because of failure of substitution to perform adequately.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Conditions: Contractor's substitution request will be received and considered by Program Manager when one or more of following conditions are satisfied, as determined by Program Manager; otherwise requests will be returned without action except to record noncompliance with these requirements.
 1. Extensive revisions to Contract Documents are not required.
 2. Proposed changes are in keeping with general intent of Contract Documents.
 3. Request is timely, fully documented and properly submitted.
 4. Request is directly related to an "or equal" clause or similar language in Contract Documents.
 5. Specified product or method of construction cannot be provided within Contract Time. Request will not be considered if product or method cannot be provided as result of failure to pursue Work promptly or coordinate activities properly.
 6. Specified product or method of construction cannot receive necessary approval by governing authority, and requested substitution can be approved.
 7. Substantial advantage is offered the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities Owner may be required to bear. Additional responsibilities for Owner may include additional compensation to Program Manager and Engineer for redesign and evaluation services, increased cost of other construction by Owner or separate Contractors, and similar considerations.
 8. Specified product or method of construction cannot be provided in manner that is compatible with other materials, and where Contractor certifies that substitution will overcome incompatibility.
 9. Specified product or method of construction cannot be coordinated with other materials, and where Contractor certifies that proposed substitution can be coordinated.
 10. Specified product or method of construction cannot provide warranty required by Contract Documents and where Contractor certifies that proposed substitution provide required warranty.

- B. Contractor's submittal to the Program Manager and Engineer's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval.
- C. See next page for "Request for Substitution" form.

REQUEST FOR SUBSTITUTION

To:

Attention:

From:

Name of Company_____
Address_____
City, State, Zip Code_____
Phone

Fully answer all information requested below. Failure to answer any item may cause rejection of request for substitution. If requested by Program Manager, submit information about manufacturer and vendor history, financial stability, distribution and support systems. Use one form for each product requested. Only first product listed will be considered on forms with more than one product listed.

Specification Section Number: _____ Drawing Number: _____

Para Number: _____ Detail Number: _____

Specified Product: _____

Proposed Substitution: _____

Answer the following questions. Attach an explanation sheet on your company's letterhead when required.

Does the proposed substitution affect dimensions indicated on Drawings?

No _____ Yes _____ (If yes, explain below).

Does the proposed substitution require changes in Drawings and/or design or installation changes?

No _____ Yes _____

If yes, is the cost of these changes included in the proposed amount? No ____ Yes ____

Does the proposed substitution affect other trades? No _____ Yes _____

(If yes, explain who and how)

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ISSUED FOR BID

If the proposed product does affect the work of other trades, has the cost impact on their work been included in the price of the proposed substitution?

No _____ Yes _____

Does the proposed product's guarantee differ from that of the specified product's?

No _____ Yes _____ (If yes, explain below).

Why is this proposal for substitution being submitted? List reasons below.

Attach a listing of 3 projects using proposed substitution completed within the past 5 yrs in geographic and climatic region of Project. One of applications shall have been in service for at least 3 yrs.

Attach product data/brochures and Vendor Qualification Form for the specified and substitute product.

Undersigned has examined Construction Documents, is familiar with specified product, understands indicated application of product, and understands design intent of Engineer. Undersigned states that proposed substitution complies with Construction Documents and will perform at least equally to specified product within limitations stated above. Undersigned accepts responsibility for coordinating application and installation of proposed substitution and waives all claims for additional costs resulting from incorporation of proposed substitution into Project or its subsequent failure to perform according to specified requirements.

Submitted By: _____

Typed _____ Signature _____

Date: _____

END OF SECTION 01630

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DIVISION 1 – SECTION 01700**FIELD ENGINEERING****PART 1 GENERAL****1.01 SUMMARY**

- A. Provide such field engineering services as are required for proper completion of the Work including, but not necessarily limited to:
1. Establishing and maintaining lines and levels;
 2. Structural design of shores, forms, and similar items provided by the Contractor as part of his means and methods of construction.

All field engineering is incidental to the Item for which it applies. No direct pay will be made for field engineering.

- B. Related work:
1. Documents affecting work of this Section include, but are not necessarily limited to, Division 0, Division 1 and other Sections of these Specifications.
 2. Additional requirements for field engineering may be described in other Sections of these Specifications.

1.02 SUBMITTALS

- A. Upon request of the Owner or Engineer, submit:
1. Data demonstrating qualifications of persons proposed to be engaged for field engineering services.
 2. Documentation verifying accuracy of field engineering work.
 3. Certification, signed by the Contractor's retained field engineer, certifying that elevations and locations of improvements are in conformance or nonconformance with requirements of the Contract Documents.

1.03 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.04 PROCEDURES

- A. In addition to other procedures directed by the Contractor for proper performance of the Contractor's responsibilities:
1. Locate and protect control points before starting work on the site.
 2. Preserve permanent reference points during progress of the Work.
 3. Prior to commencing any work requiring location or grades, the Contractor shall establish

temporary bench marks (TBMs) at an interval not to exceed 1000 feet. TBMs are to be located in areas not anticipated to be disturbed by construction. Provide the Owner or Engineer copies of field notes, including peg test of level, and a listing of the adjusted coordinates and elevations of all TBMs.

4. Do not change or relocate reference points or items of the Work without specific approval from the Owner or Engineer.
5. Promptly advise the Owner or Engineer when a reference point is lost or destroyed, or requires relocation because of other changes in the Work.
 - a. Upon direction of the Owner or Engineer, require the field engineer to replace reference stakes or markers.
 - b. Locate such replacements according to the original survey control.

END OF SECTION 01700

DIVISION 1 – SECTION 01720
PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.01 SUMMARY

- A. Throughout progress of the Work, maintain an accurate record of changes in the Contract Documents, as described in paragraph 3.01 below and, upon completion of the Work, transfer the recorded changes to a set of Record Documents, as described in paragraph 3.02 below. This shall include Record Drawings.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Provisions and the Technical Sections of these Specifications.
 - 2. Other requirements affecting Project Record Documents may appear in pertinent other Sections of these Specifications.

1.02 SUBMITTALS

- A. The Program Manager's review of the current status of Project Record Documents is a prerequisite to the Program Manager's approval of requests for progress payments and request for final payment under the Contract.
- B. Prior to submitting each Application for Payment, secure the Program Manager's review of the current status of the Project Record Documents.
- C. The final project Record Documents must be submitted to the Program Manager and secure approval before final payment for demobilization can occur.

1.03 QUALITY ASSURANCE

- A. Delegate the responsibility for maintenance of Record Documents to one person on the Contractor's staff as approved by the Program Manager.
- B. Accuracy of records:
 - 1. Thoroughly coordinate changes within the Record Documents, making adequate and proper entries on each page of Specifications and each sheet of Drawings and other Documents where such entry is required to show the change properly.
 - 2. Accuracy of records shall be such that future searches for items shown in the Contract Documents may rely reasonably on information obtained from the approved Project Record Documents.
- C. Make entries within 24 hours after receipt of information that the change has occurred.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Maintain the job set of Record Documents completely protected from deterioration and from loss and damage until completion of the Work and transfer of all recorded data to the final Project Record Documents.

- B. In the event of loss of recorded data, use any means necessary to again secure the data needed to comply with this section.
 - 1. Such means shall include, if necessary in the opinion of the Program Manager, removal and replacement of concealing work or materials by Contractor at Contractor's expense.

PART 2 PRODUCTS

2.01 RECORD DOCUMENTS

- A. Job set: Promptly following the Notice to Proceed, secure from the Program Manager at no charge to the Contractor one complete set of all Documents comprising the Contract.

PART 3 EXECUTION

3.01 MAINTENANCE OF JOB SET

- A. Immediately upon receipt of the job set described in Paragraph 2.01-A above, identify each of the Documents with the title, "RECORD DOCUMENTS - JOB SET."
- B. Preservation:
 - 1. Considering the Contract completion time, the probable number of occasions upon which the job set must be taken out for new entries and for examination, and the conditions under which these activities will be performed, devise a suitable method for protecting the job set to the approval of the Program Manager.
 - 2. Do not use the job set for any purpose except entry of new data and for review by the Program Manager, until start of transfer of data to final Project Record Documents.
 - 3. Maintain the job set at the site of Work or at another site as designated by the Program Manager.
- C. Making entries on Drawings:
 - 1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe the change by graphic line and note as required.
 - 2. Date all entries.
 - 3. Call attention to the entry by a "cloud" drawn around the area or areas affected.
 - 4. In the event of overlapping changes, use different colors for the overlapping changes.
- D. Make entries in the pertinent other Documents as approved by the Program Manager.
- E. Drawings shall clearly show actual installed locations, depth, and sizes of:
 - 1. Pipe work of all descriptions below ground outside of building and structures, including locations of culverts, storm & sewer lines, water lines, cleanouts, manholes, inlets, hydrants, and underground valves.
 - 2. Underground electrical conduits, electrical ducts, and directly buried conductors light cables, FAA cables including locations of pull and junction boxes, electric manholes and handholes, pad mounted electrical equipment, utility poles, electrical outlets, and lighting fixtures.

3. All existing underground facilities unearthed by Contractors operations not accurately shown on the drawing.
- F. Conversion of schematic layouts:
1. In some cases on the Drawings, arrangements of conduits, circuits, piping, ducts, and similar items, is shown schematically and is not intended to portray precise physical layout.
 - a. Final physical arrangement is determined by the Contractor, subject to the Program Manager's review.
 - b. However, design of future modifications of the facility may require accurate information as to the final physical layout of items, which are shown only schematically, on the Drawings. This information will be provided by the Contractor.
 2. Show on the job set of Record Drawings, by dimension accurate to within one half foot, the centerline of each run of items such as are described in subparagraph 3.01-E above.
 - a. Clearly identify the item by accurate note such as "24 inch R.C. pipe drain", "4" conduit" and the like.
 - b. Show, by symbol or note, the vertical location of the item ("36 inches deep"), "exposed," and the like.
 - c. Make all descriptive identification so that it may be related reliably to the Specifications.
 3. The Program Manager may waive the requirements for conversion of schematic layouts where, in the Program Manager's judgment, conversion serves no useful purpose. However, do not rely upon waivers being issued except as specifically issued in writing by the Program Manager.

3.02 FINAL PROJECT RECORD DOCUMENTS

- A. The purpose of the final Project Record Documents is to provide factual information regarding all aspects of the Work, both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive site measurement, investigation, and examination.
- B. Approval of recorded data prior to transfer to Program Manager:
 1. Secure the Program Manager's review of all recorded data.
 2. Make required revisions.
- C. Transfer of data to other Documents:
 1. If the Documents other than Drawings have been kept clean during progress of the Work, and if entries thereon have been orderly to the approval of the Program Manager, the job set of those Documents other than Drawings will be accepted as final Record Documents.
 2. If any such Document is not so approved by the Program Manager, secure a new copy of that Document from the Program Manager at the Program Manager's usual charge for reproduction and handling, and carefully transfer the change data to the new copy to the

approval of the Program Manager.

D. Review and submittal:

1. Submit the completed set of Project Record Documents to the Program Manager as described in Paragraph 1.02-C above.
2. Participate in review meetings as required.
3. Make required changes and promptly deliver the final Project Record Documents to the Program Manager.

3.03 CHANGES SUBSEQUENT TO ACCEPTANCE

- A. The Contractor has no responsibility for recording changes in the Work subsequent to Final Completion, except for changes resulting from work performed under Warranty.

END OF SECTION 01720

DIVISION 1 – SECTION 01741**CLEANING****PART 1 GENERAL****1.01 SUMMARY**

- A. Throughout the construction period, maintain the site in a standard of cleanliness including mowing of grass as described in this Section. All demolition or construction debris (FOD) shall be confined within the work site at all times.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, Division 0, Division 1 and other Sections of these Specifications.
 - 2. In addition to the standards described in this Section, comply with requirements for cleaning as described in pertinent other Sections of these Specifications.
 - 3. In addition to the standards described in this Section, comply with pertinent requirements of governmental agencies having jurisdiction.

1.02 QUALITY ASSURANCE

- A. Conduct a daily inspection, and more often if necessary, to verify that cleanliness requirements are being met.
- B. In addition to the standards described in this Section, comply with pertinent requirements of governmental agencies having jurisdiction.

PART 2 PRODUCTS**2.01 CLEANING MATERIALS AND EQUIPMENT**

- A. Provide required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.
- B. In addition to the standards described in this Section, comply with pertinent requirements of governmental agencies having jurisdiction.

2.02 COMPATIBILITY

- A. Use only cleaning materials and equipment compatible with the surface being cleaned and as recommended by the manufacturer of the material.

PART 3 EXECUTION**3.01 PROGRESS CLEANING**

- A. General:
 - 1. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage, and providing required protection of materials.

2. Do not allow accumulation of scrap, debris, waste material, and other items not required for construction of this Work.
 3. Inspect all haul vehicles leaving the site to make sure no debris can fall from the vehicle during transportation.
 4. Provide adequate storage for all items awaiting removal from the job site, observing requirements for fire protection and protection of the ecology.
- B. Site:
1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage. Contractor shall document all daily inspections.
 2. Weekly, and more often if necessary, remove, completely, all accumulated scrap, debris, and waste material from the site.
 3. Maintain the site in a neat and orderly condition at all times.
 4. Mowing of grass within the construction limits is required at a minimum of every two (2) weeks during the active growing season, or as directed by the Engineer or Owner.

3.02 FINAL CLEANING

- A. "Clean," for the purpose of this section, and except as may be specifically provided otherwise, shall be interpreted as meaning the level of cleanliness generally provided by material sweepers and vacuums.
- B. Prior to completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning as described in Article 3.01 above.
- C. Site:
1. Unless otherwise specifically directed by the Owner or Engineer, broom clean paved areas on the site and public paved areas adjacent to the site.
 2. Completely remove resultant debris.
- D. Schedule final cleaning as approved by the Owner or Engineer to enable the Owner to accept a completely clean Work.

3.03 CLEANING DURING OWNER'S OCCUPANCY

- A. Should the Owner occupy the Work or any portion thereof, prior to its completion by the Contractor, and acceptance by the Owner, responsibilities for interim and final cleaning shall be as determined by the Engineer or Owner in accordance with the Division 0 and Division 1 Specifications.

3.04 INTERVENTION OF OWNER

- A. If the Contractor fails to clean up any debris which is deposited as a result of construction/demolition operations, or fails to mow grass as stipulated, the Airport Authority will, after attempting one notification, immediately do so and the cost thereof will be charged to the Contractor at the rate of two hundred and fifty dollars (\$250.00) per hour, per machine and per person additively. The Contractor shall assume full responsibility for failure to perform clean up operations required.

END OF SECTION 01741

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DIVISION 1 - SECTION 01770**CONTRACT CLOSEOUT****PART 1 - GENERAL****1.01 SECTION INCLUDES**

- A. Procedures and requirements for closing out the Work.
 - 1. Closeout submittals.
 - 2. Final cleaning.
 - 3. Record Documents.
 - 4. Substantial completion.
 - 5. Final inspection.
 - 6. Final payment.
 - 7. Warranties.

1.02 RELATED REQUIREMENTS AND SECTIONS

- A. Section 01100 - Summary of Work, Sequence of Construction & Liquidated Damages.

1.03 CLOSEOUT SUBMITTALS

- A. Record documents of the constructed work.
- B. Certificate of Occupancy.
- C. Warranties: This Section and applicable Sections of these Specifications.
- D. Contractors Affidavit of Payment of Debts and Claims and Contractors Affidavit of Release of Liens.
- E. Consent of Surety to Final Payment.
- F. As-built drawings.

1.05 FINAL CLEANING

- A. Clean work and storage areas free of trash. Broom clean and hose wash walks and pavements.

1.06 RECORD DOCUMENTS

- A. Definition:
 - 1. Dimensioned drawings showing in-place components and systems measured as accurately as practicable.
 - 2. Product data and other documents clearly identifying proprietary product and equipment incorporated into the Work.
- B. Maintain at job site one record copy of:
 - 1. Contract Drawings and As-built Drawings.
 - 2. Project Manual.

3. Addenda.
 4. Approved shop drawings.
 5. Contract Modifications.
 6. Field test records.
 7. Meeting minutes (notes).
- C. Make documents available at all times for inspection by Engineer and Owner.
- D. Marking Devices:
1. Use colored felt marking pens for marking prints and product data.
- E. Label each document "PROJECT RECORD" in 1" high printed letters.
- F. Record information concurrent with construction progress. Do not conceal any work until required information has been recorded.
- G. Submittal of Record Documents:
1. At completion of the Work, deliver Record Documents to Owner or Engineer with request for Final Payment.
 2. Accompany submittal with transmittal letter indicating:
 - a. Date
 - b. Project title
 - c. Contractor's name and address
 - d. Title and number of each record document
 3. Submit one reproducible copy and one electronic copy of Record Documents, and provide one copy of other Record Documents.
 4. Provide one AutoCAD Diskette

1.07 SUBSTANTIAL COMPLETION

- A. When Contractor considers the Work to be substantially complete as defined in Conditions of the Contract, Contractor shall prepare and submit a list (punch list) of items to be completed or corrected. Upon receipt of Contractor's list, Owner or Engineer will decide if the Work is substantially complete and, if necessary, will prepare a supplemental list (punch list) of items to be completed or corrected.
- B. Failure to include items on the punch list does not alter responsibility of Contractor to complete work according to Contract Documents.
- C. Before Owner or Engineer issues a Certificate of Substantial Completion, Contractor shall provide certificate of Use and Occupancy and evidence of approval from applicable governing authorities.

1.08 FINAL INSPECTION

- A. When Owner or Engineer receives written notice that the Work is ready for final inspection, and when final application for payment is received, Owner or Engineer shall promptly inspect to determine if the Work complies with the Contract Documents.
- B. Provide Owner or Engineer with written status report of each punch list item before final inspection.

1.09 FINAL PAYMENT

- A. Final payment will be made to contractor by Owner within 45 days after:

1. Completion of the Work.
2. Acceptance by Owner and Engineer of all work performed under the Contract.
3. Receipt of Project Record Documents.
4. Receipt of O & M data, manufacturer's instructions, service manual, parts manual, warranties, and other closeout submittals specified. O & M data must include a list of recommended vendors for any non-standard replacement parts and must include a detailed Preventative Maintenance guide with a schedule of suggested efforts.
5. Preparation by Contractor and approval of Owner of final statement of cost of the completed Work. Final statement shall indicate:
 - a. Original Contract Sum.
 - b. Previous Change Orders.
 - c. Deductions for liquidated damages.
 - d. Other applicable adjustments to Contract Sum.
 - e. Total Contract Sum as adjusted.
 - f. Previous Payments.
 - g. Final payment remaining due.
6. Upon completion by Contractor of work covered by Contract Documents, and before final payment to Contractor for work performed, Contractor shall deliver to Owner an affidavit, indicating that all labor and material used on or for execution of the Work has been paid.

1.10 WARRANTIES

- A. Provide duplicate notarized copies of warranties required by Contract Documents. Accumulate executed documents by subcontractors, suppliers, and manufacturers; provide table of contents and assemble in binder with durable plastic cover properly titled.
- B. Warranties are in addition to and not a limitation of other rights Owner may have against Contractor under the Contract Documents.
- C. Contractor shall bear costs of correcting work not complying with warranty requirements.
- D. Duration of warranties required by individual Sections shall indicate minimum times and shall not relieve Contractor of obligations required under applicable statutes or other Conditions of the Contract.
 1. Warranty period begins on date of Substantial Completion, except where modified by Conditions of the Contract.
 2. Warranties are non-prorated unless stated otherwise in these Specifications.
- E. Manufacturer's warranties shall be backed by assets of manufacturer and not a third party.
- F. Warranties shall be transferable.
- G. Submit warranties to Owner or Engineer for verification and submittal to Owner with Contractor's final Application for Payment.
- H. Re-submit warranties that do not comply with Contract Documents.

PART 2 - PRODUCTS (not applicable)

PART 3 - EXECUTION (not applicable)

END OF SECTION 01770

DIVISION 1 – SECTION 01771
AFFIDAVIT OF CONTRACTOR

STATE OF _____

COUNTY OF _____

_____, being duly sworn according to Law,
(Name of Affiant)

deposes and says that he is the _____ of
(Title)
_____, the Contractor, in a
(Name of Contractor)

Construction contract entered into between the Contractor and Memphis-Shelby County Airport Authority, the Owner, for the construction of Snow Removal Equipment Building - Building Package - Construction, MSCAA Project No. 23-1476-17-02, and that he is authorized to and does make this Affidavit on behalf of said Contractor in order to induce the Owner to make payment to the Contractor, in accordance with the provisions of the said Construction Contract.

Affiant further says that all persons who have furnished materials, labor, and equipment in connection with the construction of the facilities have been paid in full, and that the names of all manufacturers, materialmen, subcontractors and DBE subcontractors that furnished any material and/or services in connection with such construction and the kind of kinds of material and/or services so furnished are as listed hereinafter.

Affiant further certifies that he/she is familiar with the materials used in the construction of and incorporated into, the Project referenced above and attests that no asbestos-containing materials, either friable or otherwise, were used in the process of constructing or incorporated into the construction of the Project.

(Signature of Affiant)

Sworn to and subscribed before me this _____ day of _____ 20____.

(Notary Public)

My commission expires: _____

Name of Entity

Kind of Material and/or Service

[illegible]

END OF SECTION 01771

ISSUED FOR BID

DIVISION 1 – SECTION 01772**FINAL LIEN WAIVER AND RELEASE
PRIME CONTRACTOR****STATE OF TENNESSEE
COUNTY OF SHELBY**

The undersigned _____ (hereinafter “Contractor”) has entered into a Contract with the Memphis-Shelby County Airport Authority (“Owner”) for the construction of improvements known as the:

Snow Removal Equipment Building - Building Package - Construction
Memphis International Airport
MSCAA Project No. 23-1476-17-02 (hereinafter “the Project”).

Upon the receipt of the sum of \$_____, the undersigned forever waives and releases any and all liens or claims of liens it has upon the foregoing described real property on account of labor, materials, equipment or services furnished for said Project. The undersigned certifies that all payments have been made for all work/materials performed to date for all subcontractors and suppliers with the exception of the amount due as a result of the payment amount shown above; and, that all subcontractors and suppliers will be paid all balances due upon receipt of the payment amount shown above. Further, the undersigned does hereby waive, release and relinquish any and all claims or demands against the Owner and Engineer of the above-described Project, the right to assert a mechanic’s and materialmen’s lien and/or any claim for quantum meruit or unjust enrichment, additional work, verbal agreements, increased cost, scheduling damages, including, but not limited to damages for delay, disruption, acceleration and/or interference, whether existing now or arising in the future.

The undersigned certifies and warrants that it has complied with all federal, state and local tax laws, including Social Security laws and Unemployment Compensation laws and workers’ compensation laws insofar as applicable to the performance of the Project. Further, the undersigned certifies and warrants that it has paid all of its subcontractors, vendors, and materialmen for services rendered in connection with the construction and improvement of the Project and that all labor, materials and equipment are free and clear of claims, security interests, indebtedness or encumbrances. The undersigned agrees to indemnify and hold harmless the Owner and the Engineer from and against any and all claims, damages, losses and expenses, including but not limited to, attorney’s fees, arising out of or resulting from any non-payment by the undersigned to any subcontractor, laborer, vendor or materialman for the Project.

As of this date, no mechanics’ or materialmen’s liens have been filed of record arising out of or related to the work performed by the undersigned.

Given under hand and seal this ____ day of _____, 20_____.

CONTRACTOR

By: _____

Title: _____

**STATE OF TENNESSEE
COUNTY OF SHELBY**

Before me, a notary public of the state and county mentioned, personally appeared _____, with whom I am personally acquainted, and who, upon oath, acknowledged such person to be _____, an officer authorized to execute the instrument, of _____, the within named bargainor, a corporation, and that such officer, as such _____, executed the foregoing instrument for the purposes therein contained, by personally signing the name of the corporation as _____.

Witness my hand and seal, at office, this _____ day of _____, 20_____.

Notary Public

My Commission Expires:

END OF SECTION 01772

DIVISION 1 – SECTION 01774
CONTRACTOR WARRANTY FORM

PROJECT: MSCAA Project No. 23-1476-17-02, Snow Removal Equipment Building - Building Package - Construction

LOCATION: Memphis International Airport, Shelby County, Tennessee

OWNER: Memphis-Shelby County Airport Authority

We _____, Contractor
(Company Name)

for the above-reference project, do hereby warrant all labor and materials furnished and work performed are in accordance with the Contract Documents and authorized modifications thereto, and will be free from defects due to defective materials or workmanship for a period of one year.

This warranty commences on _____ and expires on _____.

This warranty covers that portion of the project described below:

ALL MATERIALS, LABOR, AND EQUIPMENT IN CONNECTION WITH THE CONSTRUCTION OF THE FACILITIES OF THE ABOVE REFERENCED CONTRACT.

The Contractor shall promptly correct all defective Work to comply with the Contract Documents whether observed before or after the substantial completion date and whether or not fabricated, installed or completed. The Contractor shall bear all costs of correcting defective Work.

If, within one (1) year after the substantial completion date, or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee or warranty required by the Contract Documents, any of the Work is found to be defective and not in accordance with the Contract Documents, the Contractor shall correct it promptly after receipt of a written notice from the Owner, or the Engineer to do so.

All defective or non-conforming Work shall be removed from the site of the Work if necessary, and the Work shall be corrected to comply with the Contract Documents without cost to the Owner. The Contractor also shall bear the cost of making good all work of other contractors destroyed or damaged by removal or correction of the defective Work of Contractor.

If the Contractor fails to timely and properly correct defective Work, the Owner may correct it and hold the Contractor liable for all costs, expenses and damages, including attorney's fees and litigation costs incurred by Owner in correcting it.

In addition to the foregoing warranty, a warranty period of one (1) year shall apply under the same terms and conditions as the original warranty, to any work, supplied in correction of defective work under warranty pursuant to the provisions of this Section 17.04 and the Contractor shall assign to the Owner any warranties, including extended warranties, which are available in connection with the performance of such correction of defective Work. The warranty period shall commence on the date the Owner accepts the corrective Work of the Contractor.

DATE: _____ FOR: _____
(Company Name)

BY: _____
TITLE: _____

END OF SECTION 01774

ISSUED FOR BID

01774
Page 1

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DIVISION 1 – SECTION 01775**CONSENT OF SURETY COMPANY TO FINAL PAYMENT**

To: Memphis-Shelby County Airport Authority
2491 Winchester Road, Suite 113
Memphis, TN. 38116-3856

Regarding Contract for: Snow Removal Equipment Building - Building Package - Construction

Project: 23-1476-17-02

Dated: _____

CONTRACTOR: _____

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the

(here insert name and address of Surety Company)

_____, SURETY COMPANY,

on bond of _____
(here insert name and address of Contractor)

_____, CONTRACTOR,

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not relieve the Surety Company of any of its obligations to Memphis-Shelby County Airport Authority, OWNER.

IN WITNESS WHEREOF,
the Surety Company has hereunto set its hand this _____ day of _____, 20____

Surety Company

Signature of Authorized Representative

Attest:
(Seal):

Title

END OF SECTION 01775

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DIVION 1 – SECTION 01783**ELECTRICAL CHARACTERISTICS, CAPACITIES AND WIRING DIAGRAMS****PART 1 GENERAL****1.01 SUMMARY**

- A. This section describes the electrical characteristics, sizes, capacities, ratings and wiring diagrams required of electrically operated equipment.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to Division 0, Division 1 and other Sections of these Specifications.

1.02 SUBMITTALS

- A. Furnish with each item of electrically operated equipment a wiring diagram showing all necessary electrical connections required to operate the equipment properly, in accordance with drawing and specification requirements.
- B. Furnish a composite wiring diagram showing all necessary interlock and related wiring between the various items of electrically operated equipment and their controls, as required to operate interlocked equipment as specified in other sections of these specifications and as indicated.

1.03 CAPACITIES, RATINGS, SIZES, AND OTHER REQUIREMENTS NOT SPECIFIED:

- A. For all items of material and/or equipment, the capacities, ratings, sizes, and other requirements thereof not specified shall be as indicated on the Contract drawings.
- B. Where capacities, ratings, sizes, and other requirements for materials and/or equipment is neither specified nor indicated on the Contract drawings, refer each case to the Owner or Engineer before ordering the materials and/or equipment involved, or proceeding with the work involved. The Owner's or Engineer's decision shall govern.

1.04 ELECTRICAL CHARACTERISTICS AND SIZES OF ELECTRICALLY OPERATED EQUIPMENT

- A. Each electrically operated item furnished under this contract shall operate proper on the electrical supply to which it is to be connected, as indicated on the electrical drawings.
- B. All electrically operated equipment shall operate on a 60 hz alternating current supply, unless otherwise indicated. Prior to delivery to the job site, it shall be the joint responsibility of the Contractor under the applicable section and the equipment supplier to determine from the electrical drawings the characteristics of the electrical supply indicated to each individual electrically operated item, and to furnish each electrically operated item accordingly.
 - 1. Where electrical characteristics are specified hereinafter, verify them from the electrical drawings. In the case of discrepancy between the specifications and the electrical drawings, the Electrical drawings shall govern.
 - 2. Where electrical characteristics cannot be determined from the electrical drawings, refer each case to the Owner or Engineer, and the Owner's or Engineer's decision shall govern.

END OF SECTION 01783**ISSUED FOR BID**

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DIVISION 1 – SECTION 01784**MANUFACTURER'S SUPERVISION****1.01 DESCRIPTION****A. Work included:**

1. Furnishing Manufacturer's Supervision

B. Related Work:

1. Documents affecting work of this Section include, but are not necessarily limited to Division 0, Division 1, and other Sections of these Specifications.

1.02 SERVICES

- A. Furnish the services of authorized qualified manufacturer's representatives as required to supervise the installation, testing, initial starting, adjusting, and initial operation of each equipment item or any other item designated by the Contract Documents and included in this Contract.

END OF SECTION 01784

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Item A-100 Specification Reference

DESCRIPTION

100-1.1 This item shall consist of all referenced specifications as shown in the contract documents. All specification references shall be from the most current and accepted Tennessee Department of Transportation (TDOT) Standard Specifications for Road and Bridge Construction, MSCAA Design Guide and Construction Standards, and attached project specifications referenced in Appendix A.

MATERIAL REQUIREMENTS

100-2.1 All material requirements necessary to construct the items within this specification shall be in accordance with the referenced specification they are applicable to.

CONSTRUCTION REQUIREMENTS

100-3.1 All construction requirements necessary to construct the items within this specification shall be in accordance with the referenced specification they are applicable to.

METHOD OF MEASUREMENT

Measurements shall be recorded as items complete, operational, and accepted by the RPR. No separate measurements shall be made for materials, preparation, hauling, placement, labor, equipment, tools, testing, and other incidentals necessary to complete the item(s).

100-4.1 Snow Removal Equipment Building shall be measured per lump sum as a percentage of the individual required items within Appendix A complete, in place, and approved by the Engineer/RPR. Measurement shall correspond to percentage completion as described under the Basis of Payment section.

BASIS OF PAYMENT

Payments shall be full compensation for items complete, operational, and accepted by the RPR. No separate payments shall be made for materials, preparation, hauling, placement, labor, equipment, tools, testing, and other incidentals necessary to complete the item(s).

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 Engineer, of the value of the work performed and materials complete and in place, in accordance with the contract, plans, and specifications

102-5.1 Snow Removal Equipment Building shall be paid per lump sum percentage of the individual required items within Appendix A complete, in place, and approved by the Engineer/RPR.

Payments will be made under:

Item A-100-5.1 Snow Removal Equipment Building – per lump sum

END OF ITEM A-100

Item A-102 Construction Access, Project Safety and Security, and Maintenance of Traffic

DESCRIPTION

102-1.1 General

- A.** Parts of this project takes place within the Air Operations Area (AOA) of an active airfield; therefore, access to the site must be controlled at all times. The access points are shown in the safety and phasing plans.
- B.** All vehicles accessing the project site on behalf of the Contractor shall enter through the access points indicated on the Plans.
- C.** The Contractor shall coordinate access and security within the AOA with the RPR.
- D.** The security gate shall remain closed and locked except when vehicles are entering or exiting.
- E.** Escort personnel, vehicles, and radio equipment shall be trained, badged and subject to approval by MSCAA.
- F.** The Contractor shall insure that all AOA pavements, which are open to traffic, are continuously kept clean and free of debris of any kind. Vehicular haul roads shall also be kept clean. All costs shall be considered incidental to the Project.
- G.** Contractor must have hand brooms, sweepers, water truck, and vacuum sweeper truck on site at all times to immediately remove any debris from active airfield and haul route pavements that results from construction activity.
- H.** The Contractor shall review and make themselves familiar with the Construction Safety and Phasing Plan (CSPP) and shall follow the requirements contained within. The CSPP is incorporated in Attachment 1 in the contract documents.
- I.** The Contractor shall review and make themselves familiar with the AC 150/5370-2G Safety Plan Compliance Document (SPCD) worksheet for airport projects and shall follow the requirements contained within. The Contractor shall fill out the SPCD and submit the document 14 days prior to the pre-construction conference. The notice-to-proceed cannot be issued without approval of the document. The Construction Project Daily Safety Inspection Checklist within must be filled out daily. The SPCD is incorporated in Attachment 2 the contract documents.

102-1.2 Gate Operations. Security gates to the AOA shall be closed and locked at all times that there is not a vehicle passing through them. Security gates will have one gate guard controlling the gate at all times. Use of multiple gates, such as during haul operations, requires the use of multiple gate guards. The Contractor shall be responsible for providing all required gate guards during construction activities. A formal gate guard procedure is in place and shall be adhered to by the Contractor at all times. A copy of that procedure and form is attached hereto.

102-1.3 Security and Escorts. The Contractor will provide badged personnel with non-movement area driving privileges and vehicles to escort Contractor, sub-contractor, vendor and delivery vehicles and equipment from the security gate to the project site. All work shall be coordinated with MSCAA Project Engineer. A minimum of 48 hrs notice shall be provided to the MSCAA Project Engineer for site access.

Contractor's vehicles, including Sub-Contractors vehicles must be inspected and receive an airfield access sticker. This will allow these vehicles unrestricted access only on the Project site. Vendors and delivery vehicles (dump trucks, concrete trucks, and materials deliveries) must be escorted to their specific area on the site. Once at the project site, the Contractor shall be responsible to provide badged personnel to assume control of the escorted vehicle and non-badged personnel. Such vehicles may not transit back to the gate without an escort.

The Contractor shall meet all MSCAA security requirements with regard to training and wearing badges, and/or being escorted by authorized personnel approved by the MSCAA Project Engineer.

102-1.4 Fencing. The Contractor shall maintain the existing AOA security fencing and gates surrounding the Contractor Staging Area if applicable until the completion of the Project.

102-1.5 Airfield Low Profile Barricade. Not used.

102-1.6 Airfield Medium Profile Barricade. Not Used.

102-1.7 Maintenance of Traffic. The Contractor shall maintain public roadways in a clean swept condition at all times. Any debris deposited on the public roads by the Contractor, Sub-Contractors or supplier vehicles shall be removed immediately. A water truck, broom truck, vacuum truck or other equipment as approved by the MSCAA Project Engineer shall be made available for this purpose. All costs associated with maintaining clean public roadways shall be considered incidental to the project.

The Contractor shall install signs and traffic control devices meeting the requirements of the Manual of Uniform Traffic Control Devices, TDOT Standards and FAA Publications about construction on Airports when and whereas directed by the MSCAA Project Engineer or the TDOT.

The Contractor shall furnish and install all construction warning signs, barricades, flexible drum channelizing units, temporary pavement markings, and other traffic control devices as shown on the plans or as directed by the Project Engineer

102-1.8 Access Road and Staging Area. The Contractor shall repair and/or re-construct the access road and the staging area to repair any damage during construction. Repair methods shall be approved by the MSCAA Project Engineer prior to completion. All disturbed areas shall be restored to their original condition prior to the completion of the project.

METHOD OF MEASUREMENT

102-2.1 Construction Access, Project Security, and Staging Area. The method of measurement for Construction Access, Project Security, and Staging Area shall be paid for as a lump sum in accordance with paragraph 102-2.5.

102-2.2 Airfield Low Profile Barricade. Not used.

102-2.3 Airfield Medium Profile Barricade. Not used.

102-2.4 Maintenance of Traffic. The method of measurement for Maintenance of Traffic shall be paid for as a lump sum in accordance with paragraph 102-2.5.

102-2.5 Basis of Measurement and Payment. Based upon the contract lump sum price for the items above, partial payments will be allowed as follows:

- a. With first pay request, 25%.
- 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 40%.

- d. After Final Inspection, Staging area clean-up and delivery of all Project Closeout materials, the final 10%.

BASIS OF PAYMENT

102-3.1 Construction Access, Project Security, and Staging Area. Basis of payment shall be made at the contract lump sum price for Construction Access, Project Security, and Traffic Control. The price shall be full compensation for staffing gates including inspection of vehicles, escorting vehicles onto the site, badging, vehicle stickers & inspection, labor, materials, tools, and incidentals necessary to complete this item.

102-3.2 Maintenance of Traffic. Basis of payment shall be made at the contract lump sum price for Maintenance of Traffic. The price shall be full compensation for providing all equipment, labor, and materials, and incidentals necessary to complete this item.

Payment will be made under:

Item A-102-3.1 Construction Access, Project Security, and Staging Area – per lump sum

Item A-102-3.2 Maintenance of Traffic – per lump sum

END OF ITEM A-102

Item C-100 Contractor Quality Control Program (CQCP)

100-1 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.

100-2 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 10 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:

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.

100-3 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 paragraphs 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 pavement construction with prior QC experience on a project of comparable size and scope as the contract.

Included in the five (5) years of paving/QC 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 airport paving experience.
- (4) An individual with four (4) years of airport paving experience, with a Bachelor of Science Degree in Civil Engineering, Civil Engineering Technology or Construction.

The 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 must be provided. These personnel must 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 CQCPA 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 paragraph 100-6.
- (2) Performance of all QC tests as required by the technical specifications and paragraph 100-8.
- (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.

100-4 Project progress schedule. Critical QC activities must be shown on the project schedule as required by Section 80, paragraph 80-03, *Execution and Progress*.

100-5 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

100-6 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 100-9.

Inspections shall be performed as needed to ensure continuing compliance with contract requirements until completion of the particular feature of work. Inspections 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 QC 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 QC functions will be accomplished and used.

100-7 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

100-8 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 paragraph 100-9.

100-9 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 results are recorded and transmitted electronically, the results must be archived.

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 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 the 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 non-compliance, 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-100-14 Contractor Quality Control Program (CQCP) – 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.

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

Item C-105 Mobilization

105-1 Description. This item of work shall consist of, but is not limited to, work and operations necessary for the movement of personnel, equipment, 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 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. An Engineer/RPR field office is not required.

METHOD OF MEASUREMENT

105-5 Basis of measurement and payment. Based upon the contract lump sum price for “Mobilization” partial payments will be allowed as follows:

- a. With first pay request, 25%.
- 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 40%.
- d. After Final Inspection, Staging area clean-up and delivery of all Project Closeout materials as required by Section 90, paragraph 90-11, *Contractor Final Project Documentation*, the final 10%.

BASIS OF PAYMENT

105-6 Payment will be made under:

Item C-105-6.1 Mobilization – 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.

Office of Federal Contract Compliance Programs (OFCCP)

Executive Order 11246, as amended

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

Memphis International Airport (MEM)
Snow Removal Equipment Building - Design

23-1476-17-02

United States Department of Labor, Wage and Hour Division (WHD)
WH 1321 – Employee Rights under the Davis-Bacon Act Poster

END OF ITEM C-105

Item F-162 Chain-Link Fence

DESCRIPTION

162-1.1 This item shall consist of furnishing and erecting a chain-link fence in accordance with these specifications, the details shown on the plans, and in conformity with the lines and grades shown on the plans or established by the RPR.

MATERIALS

162-2.1 Fabric. The fabric shall be woven with a 9-gauge galvanized steel wire in a 2-inch (50 mm) mesh and shall meet the requirements of ASTM A392, Class 2.

162-2.2 Barbed wire. Barbed wire shall be 2-strand 12-1/2 gauge zinc-coated wire with 4-point barbs and shall conform to the requirements of ASTM A121, Class 3, Chain Link Fence Grade.

162-2.3 Posts, rails, and braces. Line posts, rails, and braces shall conform to the requirements of ASTM F1043 or ASTM F1083 as follows:

- Galvanized tubular steel pipe shall conform to the requirements of Group IA, (Schedule 40) coatings conforming to Type A, or Group IC (High Strength Pipe), External coating Type B, and internal coating Type B or D.
- Posts, rails, and braces furnished for use in conjunction with aluminum alloy fabric shall be aluminum alloy or composite.

Posts, rails, and braces, with the exception of galvanized steel conforming to ASTM F1043 or ASTM F1083, Group 1A, Type A, or aluminum alloy, shall demonstrate the ability to withstand testing in salt spray in accordance with ASTM B117 as follows:

- External: 1,000 hours with a maximum of 5% red rust.
- Internal: 650 hours with a maximum of 5% red rust.

The dimensions of the posts, rails, and braces shall be in accordance with Tables I through VI of Federal Specification RR-F-191/3.

162-2.4 Gates. Gate frames shall consist of galvanized steel pipe and shall conform to the specifications for the same material under paragraph 162-2.3. The fabric shall be of the same type material as used in the fence.

162-2.5 Wire ties and tension wires. Wire ties for use in conjunction with a given type of fabric shall be of the same material and coating weight identified with the fabric type. Tension wire shall be 7-gauge marcelled steel wire with the same coating as the fabric type and shall conform to ASTM A824.

All material shall conform to Federal Specification RR-F-191/4.

162-2.6 Miscellaneous fittings and hardware. Miscellaneous steel fittings and hardware for use with zinc-coated steel fabric shall be of commercial grade steel or better quality, wrought or cast as appropriate to the article, and sufficient in strength to provide a balanced design when used in conjunction with fabric posts, and wires of the quality specified herein. All steel fittings and hardware shall be

protected with a zinc coating applied in conformance with ASTM A153. Barbed wire support arms shall withstand a load of 250 pounds (113 kg) applied vertically to the outermost end of the arm.

162-2.7 Concrete. Concrete shall have a minimum 28-day compressive strength of 3000 psi (2670 kPa).

162-2.8 Marking. Each roll of fabric shall carry a tag showing the kind of base metal (steel, aluminum, or aluminum alloy number), kind of coating, the gauge of the wire, the length of fencing in the roll, and the name of the manufacturer. Posts, wire, and other fittings shall be identified as to manufacturer, kind of base metal (steel, aluminum, or aluminum alloy number), and kind of coating.

CONSTRUCTION METHODS

162-3.1 General. The fence shall be constructed in accordance with the details on the plans and as specified here using new materials. All work shall be performed in a workmanlike manner satisfactory to the RPR. The Contractor shall layout the fence line based on the plans. The Contractor shall span the opening below the fence with barbed wire at all locations where it is not practical to conform the fence to the general contour of the ground surface because of natural or manmade features such as drainage ditches. The new fence shall be permanently tied to the terminals of existing fences as shown on the plans. The Contractor shall stake down the woven wire fence at several points between posts as shown on the plans.

The Contractor shall arrange the work so that construction of the new fence will immediately follow the removal of existing fences. The length of unfenced section at any time shall not exceed 300 feet (90 m). The work shall progress in this manner and at the close of the working day the newly constructed fence shall be tied to the existing fence.

162-3.2 Clearing fence line. Clearing shall consist of the removal of all stumps, brush, rocks, trees, or other obstructions that will interfere with proper construction of the fence. Stumps within the cleared area of the fence shall be grubbed or excavated. The bottom of the fence shall be placed a uniform distance above ground, as specified in the plans. When shown on the plans or as directed by the RPR, the existing fences which interfere with the new fence location shall be removed by the Contractor as a part of the construction work unless such removal is listed as a separate item in the bid schedule. All holes remaining after post and stump removal shall be refilled with suitable soil, gravel, or other suitable material and compacted with tampers.

The cost of removing and disposing of the material shall not constitute a pay item and shall be considered incidental to fence construction.

162-3.3 Installing posts. All posts shall be set in concrete at the required dimension and depth and at the spacing shown on the plans.

The concrete shall be thoroughly compacted around the posts by tamping or vibrating and shall have a smooth finish slightly higher than the ground and sloped to drain away from the posts. All posts shall be set plumb and to the required grade and alignment. No materials shall be installed on the posts, nor shall the posts be disturbed in any manner within seven (7) days after the individual post footing is completed.

Should rock be encountered at a depth less than the planned footing depth, a hole 2 inches (50 mm) larger than the greatest dimension of the posts shall be drilled to a depth of 12 inches (300 mm). After the posts are set, the remainder of the drilled hole shall be filled with grout, composed of one part Portland cement and two parts mortar sand. Any remaining space above the rock shall be filled with concrete in the manner described above.

In lieu of drilling, the rock may be excavated to the required footing depth. No extra compensation shall be made for rock excavation.

162-3.4 Installing top rails. The top rail shall be continuous and shall pass through the post tops. The coupling used to join the top rail lengths shall allow for expansion.

162-3.5 Installing braces. Horizontal brace rails, with diagonal truss rods and turnbuckles, shall be installed at all terminal posts.

162-3.6 Installing fabric. The wire fabric shall be firmly attached to the posts and braced as shown on the plans. All wire shall be stretched taut and shall be installed to the required elevations. The fence shall generally follow the contour of the ground, with the bottom of the fence fabric no less than one inch (25 mm) or more than 4 inches (100 mm) from the ground surface. Grading shall be performed where necessary to provide a neat appearance.

At locations of small natural swales or drainage ditches and where it is not practical to have the fence conform to the general contour of the ground surface, longer posts may be used and multiple strands of barbed wire stretched to span the opening below the fence. The vertical clearance between strands of barbed wire shall be 6 inches (150 mm) or less.

162-3.7 Electrical grounds. Electrical grounds shall be at 500 feet (150 m) intervals. The ground shall be accomplished with a copper clad rod 8 feet (2.4 m) long and a minimum of 5/8 inches (16 mm) in diameter driven vertically until the top is 6 inches (150 mm) below the ground surface. A No. 6 solid copper conductor shall be clamped to the rod and to the fence in such a manner that each element of the fence is grounded. Installation of ground rods shall not constitute a pay item and shall be considered incidental to fence construction. The Contractor shall comply with FAA-STD-019, Lightning and Surge Protection, Grounding, Bonding and Shielding Requirements for Facilities and Electronic Equipment, paragraph 4.2.3.8, Lightning Protection for Fences and Gates, when fencing is adjacent to FAA facilities

162-3.8 Cleaning up. The Contractor shall remove from the vicinity of the completed work all tools, buildings, equipment, etc., used during construction. All disturbed areas shall be seeded per T-901.

METHOD OF MEASUREMENT

Measurements shall be recorded as items complete, operational, and accepted by the RPR. No separate measurements shall be made for materials, preparation, hauling, placement, labor, equipment, tools, testing, and other incidentals necessary to complete the item(s).

162-4.1 Chain-link fence will be measured for payment by the linear foot (meter). Measurement will be along the top of the fence from center to center of end posts, excluding the length occupied by gate openings.

162-4.2 Gates will be measured as complete units.

BASIS OF PAYMENT

162-5.1 Payment for chain-link fence will be made at the contract unit price per linear foot (meter).

162-5.2 Payment for vehicle or pedestrian gates will be made at the contract unit price for each gate.

The price shall be full compensation for furnishing all materials, and for all preparation, erection, and installation of these materials, and for all labor equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item F-162-5.1	Chain Link Fence (Permanent AOA Fence) (10' Tall W/ DBL Arm, 6 Strand Barb Wire & Razor Ribbon Incl Mow Strip) – per linear 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 A121	Standard Specification for Metallic-Coated Carbon Steel Barbed Wire
ASTM A153	Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A392	Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric
ASTM A491	Standard Specification for Aluminum-Coated Steel Chain-Link Fence Fabric
ASTM A824	Standard Specification for Metallic-Coated Steel Marcellled Tension Wire for Use with Chain Link Fence
ASTM B117	Standard Practice for Operating Salt Spray (Fog) Apparatus
ASTM F668	Standard Specification for Polyvinyl Chloride (PVC), Polyolefin and other Organic Polymer Coated Steel Chain-Link Fence Fabric
ASTM F1043	Standard Specification for Strength and Protective Coatings on Steel Industrial Fence Framework
ASTM F1083	Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures
ASTM F1183	Standard Specification for Aluminum Alloy Chain Link Fence Fabric
ASTM F1345	Standard Specification for Zinc 5% Aluminum-Mischmetal Alloy Coated Steel Chain-Link Fence Fabric
ASTM G152	Standard Practice for Operating Open Flame Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials
ASTM G153	Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials
ASTM G154	Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials
ASTM G155	Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials

Federal Specifications (FED SPEC)

FED SPEC RR-F-191/3 Fencing, Wire and Post, Metal (Chain-Link Fence Posts, Top Rails and Braces)

FED SPEC RR-F-191/4 Fencing, Wire and Post, Metal (Chain-Link Fence Accessories)

FAA Standard

FAA-STD-019 Lightning and Surge Protection, Grounding, Bonding and Shielding Requirements for Facilities and Electronic Equipment

FAA Orders

5300.38 AIP Handbook

END OF ITEM F-162

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SECTION 03 1000
CONCRETE FORMWORK

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Formwork for cast-in-place concrete, complete with shoring, bracing, anchorage, form facing material, and form liners.

1.2 RELATED SECTIONS

- A. DIVISION 31 - EARTHWORK.
- B. Section 321313 - CONCRETE PAVING.
- C. Section 321613 - CONCRETE CURBS, GUTTERS, AND SIDEWALKS.
- D. Section 321316 - DECORATIVE CONCRETE PAVING.
- E. Section 032000 - CONCRETE REINFORCEMENT.
- F. Section 033000 - CAST-IN-PLACE CONCRETE.
- G. Section 014580 - CONCRETE TESTS AND INSPECTIONS.

1.3 REFERENCE STANDARDS

- A. Published Specifications, standards, tests, or recommended methods of trade, industry, or governmental organizations that apply to the work of this section were cited by abbreviations noted below.
 - 1. ACI 347 - "Guide to Formwork for Concrete."
 - 2. ACI 301 - "Specifications for Structural Concrete".

1.4 SUBMITTALS

- A. Manufacturer's literature describing the following products:
 - 1. Form-facing material
 - 2. Form Release Agent
 - 3. Pan Forms
 - 4. Form Ties
- B. Samples: Only as requested.
- C. Qualification data for inspection and examination agency.
- D. Field quality-control reports.

1.5 PREINSTALLATION MEETINGS

- A. Review with General Contractor, Construction Manager and subcontractors the following:
 - 1. Delegated design items and responsibility of roles.
 - 2. Shoring and reshoring procedures.
 - 3. Forms, facings, and form-removal limitations.
 - 4. Anchor rod and embedded item installation tolerances.
 - 5. Special inspection and testing procedures for field quality control.
 - 6. Inspecting agency plan for schedule and procedures for field quality control.
 - 7. Construction, movement, contraction, and isolation joints.

1.6 QUALITY ASSURANCE

- A. Testing and Inspection Agency: An independent agency, qualified with ASTM C1077 and ASTM E329 for testing specified.
- B. Formwork Delegated Design: Delegated design of formwork shall be completed by a qualified licensed professional engineer in the project state. A set of formwork calculations shall be submitted, sealed by the qualified professional engineer licensed in the project state responsible for the design. The formwork delegated design engineer shall submit a copy of their Certificate of Insurance (COI), indicating coverage of \$1,000,000 each occurrence and \$1,000,000 aggregate for the length of project, until the substantial completion certificate for the entire project is issued to the owner.
- C. Mockups: Build layouts to show joints, surface finish, texture, tolerances, and workmanship.
 - 1. Build panel approximately [100 sq. ft. (9.3 sq. m)] the location will be indicated by the Architect.
 - 2. Mockup may become part of completed work if approved by Architect.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Form Design and Shoring: The design and engineering of the formwork and shoring, as well as its construction and installation, shall be the responsibility of the Contractor as a delegated design. Formwork shall be designed for loads and lateral pressures outlined in ACI 347-14(21) and wind loads as required by the ASCE 37-14R2019. Design considerations, capacities, and other applicable requirements shall conform to ACI 347-14(21) and the controlling local building code. Design wood panel forms in accordance with APA's "Concrete Forming Design/ Construction Guide."
- B. Allowable Tolerances: Formwork shall produce concrete within the following tolerance limits unless otherwise noted.
 - 1. Tolerances for exposed formed surfaces for buildings shall conform to ACI 117 Class A.
 - 2. Tolerances for concealed formed surfaces shall conform to ACI Class B.
 - 3. Tolerances for formed surfaces for all other concrete structures shall conform to those outlined in ACI 347-14(21), unless otherwise noted.
- C. Coordination: Fully coordinate with other trades and other sections for the installation of embedded items. Provide suitable templates, inserts, and sleeves for setting items not placed in the forms.

2.2 MATERIALS

- A. Forms shall be plywood, metal, fiber glass, and/or lumber, as specified below, to achieve surface finish specified in Section 033000. Form materials furnished shall be new, except that metal and fiber glass forms previously used elsewhere will be permitted, provided that they are free of objectionable holes, dents, distortions, and other defects. After initial use on this project, form materials may be reused thereon provided they will produce acceptable concrete surfaces. Furnish in sizes to minimize number of joints.
 - 1. Pan type forms shall be glass-fiber-reinforced plastic or formed steel with straight [or tapered] ends, stiffened to resist concrete pressures without deformations that exceed required tolerances.
 - 2. Framing, backing, bracing, shoring, and other formwork shall be No. 2 Common or better lumber.
 - 3. Smooth surface forms shall be used for all exterior and interior exposed concrete surfaces including, but not limited to, walls, columns, ceilings, beams, steps, tank and basin interiors, and slab edges and be moisture resistant commercial standard exterior-grade plywood panels complying with DOC PS 1, at least 15/32", mill-oiled and edge sealed,

- bearing APA grade trademark, Plyform, Class I B-B or better, unless otherwise approved.
 - 4. Unfinished surface forms may be used for all exterior and interior concealed concrete, except tank and basin interiors, and may be No. 2 Common or better lumber, plywood, metal, plastic or other type of form material. Wood forms shall be used for all surfaces that are to be plastered. Lumber forms to be dressed on at least two edges and one side for tight fit.
 - 5. Metal forms shall not be rust-stained.
 - 6. Earth forms may be used as side forms of footings where soil conditions are suitable and approved by the Architect/Engineer.
- B. Form Ties shall be factory-fabricated, removable or snap-off type, fabricated from glass-fiber reinforced plastic or metal.
- 1. Provide ties designed to resist lateral pressure of plastic concrete.
 - 2. Provide ties with integral water stops for all structures which are intended to contain water or other liquids, surfaces indicated to receive waterproofing or dampproofing, and/or to prevent intrusion of ground or other water.
 - 3. Provide ties that, when removed, leave holes no larger than the tie rod diameter, without cones or spalling of the concrete surface.
 - 4. Provide ties that leave no corrodible metal closer than 1 1/2 inch to exposed concrete surface.
- C. Form-Release Agent shall be commercially available coating that does not stain, bond with, or otherwise adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.
- 1. Form release agent shall be acceptable to form liner manufacturer where form liners are used.
 - 2. Formulate form-release agent with rust inhibitor for steel form-facing materials.
 - 3. Form release agent for surfaces intended to receive an applied coating or finish must be compatible with the applied coating or finish.
 - 4. Form coating for potable water containing structures shall be non-toxic after 30 days and not introduce objectionable taste or odor into the water.
- D. Chamfer Strips shall be wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- E. Fabricate reglets not less than 0.022-inch-thick, galvanized-steel sheet. Fill or cover face opening of reglet during concrete placement to prevent intrusion of concrete or debris.
- F. Rustication Strips shall be wood, metal, PVC, or rubber strips, with beveled edges for ease of form removal.
- B. Dovetail Anchor Slots shall be hot-dip galvanized-steel sheet, not less than 0.034-inch-thick, with bent tab anchors. Fill or cover face opening of slots during concrete placement to prevent intrusion of concrete or debris.

PART 3 - EXECUTION

3.1 CONSTRUCTION

- A. Construct and erect forms in accordance with ACI 301 to types, shapes, lines, and grades shown on the drawings with as few joints as practical to ensure straight, plumb, level, and smooth concrete surfaces with all angles sharp and true to line and to facilitate safe form removal without damage to concrete. Forms shall have sufficient strength to safely support all construction loads, with no appreciable bulging, sagging, movement, or leakage of mortar, and be clean of all debris at time of concreting. Camber forms where necessary to maintain specified tolerances.
- B. Align joints symmetrically in forms for exposed concrete.

- C. Provide top forms for inclined surfaces that exceed 1.5 horizontal to 1 vertical slope.
 - D. Provide 3/4 by 3/4 inch chamfer strips in formwork at exposed external corners, including but not limited to those on columns, beams, walls, slab edges, and equipment bases, but not including those on steps.
 - E. Bevel, marker and rustication strips shall be applied in straight lines and secured to prevent displacement.
 - F. Provide wrecking plates as required to prevent damage to concrete surfaces during stripping.
 - G. Provide temporary cleanouts and openings in bottom of wall and column forms as required for effective removal of loose dirt, debris, and waste material; for inspection of reinforcement; for introduction of vibrators; and where necessary to limit the free fall of the concrete to less than four feet. Close temporary ports with tight-fitting panels, flush with inside of form so joints will not be apparent in finished concrete surfaces.
 - H. All embedded items shall be placed in tied to the reinforcing prior to placing and consolidating cast in place concrete.
 - I. Establish slab edge forms level and set screeds. Depress slabs where indicated and where required for special floor finishes. Slope slab to drain where indicated.
 - J. Earth forms for footings shall be cut to sizes and elevations indicated. If dry, all earth or rock surfaces shall be moistened prior to concrete placement.
 - 1. Provide forms for footings wherever concrete cannot be placed against solid earth excavation.
 - K. Re-tighten formwork and bracing prior to concrete placement to maintain proper alignment and prevent mortar leakage.
 - L. Clean forms from chips, sawdust, dirt, and other debris prior to concrete placement.
 - M. Contact face of forms shall be coated with form-release agent according to manufacturer's written instructions. Remove excess oil coating before placing reinforcement.
 - N. Space vertical joints as indicated, but no further than 50 feet. Located joints adjacent to pier and in concealed locations where possible.
 - O. Locate horizontal joints in walls and columns at underside of slabs, beams, at the top of footings, and as indicated in Drawings.
 - P. Place construction joint perpendicular to surface of concrete and main reinforcement, at locations indicated or as approved by Architect/Engineer. Locate joints for beams and slabs within the middle third of spans.
 - Q. Overlap forms at construction joints with previously placed concrete 12 inches minimum.
- 3.2 OPENINGS IN CONCRETE CONSTRUCTION
- A. Provide formed openings where required for mechanical, electrical, and other work. Obtain written approval from Architect/Engineer prior to forming openings not indicated in Drawings.
 - B. Cutting Openings: Where openings are required in new in-place or existing concrete construction, cut these only at locations approved by Architect/Engineer, as follows:
 - 1. Small opening for pipes, conduits, etc.: Cut with suitable rotary core type drills, without spalling the concrete. Do not use star drills, chisels, or similar impact type tools, unless otherwise approved.
 - 2. Large holes for ducts, equipment, doorways, windows, etc.: Chip through the concrete one-half way through each side, to prevent unnecessary spalling and damage to the concrete.

3.3 INSTALLATION OF EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete.
 - 1. Use templates, setting drawings, and diagrams furnished with items to be embedded.
 - 2. Install reglets to receive waterproofing and through-wall flashings in outer face of concrete at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
 - 3. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303 "Code of Standard Practice".
 - 4. Install dovetail anchor slots in concrete structures, as indicated on Drawings and according to manufacturer's instructions.
 - 5. Clean all embedded items immediately prior to concrete placement.

3.1 REMOVAL AND REUSE OF FORMS

- A. Formwork for sides of beams, walls, and columns that do not support weight of concrete may be removed after curing at a temperature not less than 50 deg F for 24 hours. Concrete must be hard enough to not be damaged by form-removal operations and curing and protection operations must be maintained.
 - 1. Remove forms only if shores are positioned to allow for removal of forms without loosening or disturbing adjacent shores.
 - 2. Use every precaution to avoid spalling or otherwise damaging concrete by form removal.
 - 3. Retain formwork for slabs, and other structural elements that support weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
- B. Clean and repair surfaces of forms to be reused. Remove fins and laitance, and tighten to close joints
 - 1. Apply new form-release agent.
 - 2. Split, frayed, delaminated, or otherwise damaged form-facing material are unacceptable for exposed surfaces.
 - 3. Do not use patched forms for exposed concrete surfaces unless approved by Architect.
 - 4. Align and secure joints to avoid offsets.

3.2 SHORING AND RESHORING INSTALLATION

- A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring systems. Do not remove shoring or reshoring until measurement of slab tolerances is complete.
- B. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.3 FIELD QUALITY CONTROL

- A. Required special inspections:
 - 1. Inspect formwork for shape, location, and dimensions of the concrete member being formed.
- B. Owner will engage a special inspector to perform field tests and inspections and prepare test reports.
- C. Owner will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

END OF SECTION

SECTION 03 2000

CONCRETE REINFORCEMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Reinforcing steel bars, welded steel wire fabric for cast-in-place concrete, complete with tie wire, bar supports, splices and other reinforcing devices.

1.2 RELATED SECTIONS

- A. Section 031000 – CONCRETE FORMWORK.
- B. Section 033000 – CAST-IN-PLACE CONCRETE.
- C. DIVISION 31 – SITEWORK.
- D. Section 321313 – CONCRETE PAVING.
- E. Section 321316 – DECORATIVE CONCRETE PAVING
- F. Section 321613 – CONCRETE CURBS, GUTTERS, AND SIDEWALKS.

1.3 REFERENCE STANDARDS

- A. Published Specifications, standards, tests, or recommended methods of trade, industry, or governmental organizations apply to work in this section where cited below. Materials and work shall conform to the requirements of standards, codes, and recommended practices required in this section.
 - 1. ASTM - American Society for Testing and Materials
 - a. A615 – Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement
 - b. A706 – “Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement”
 - 2. ACI - American Concrete Institute
 - a. ACI 315R-18 - "Guide to Presenting Reinforcement Steel Design Details."
 - b. ACI 318 - "Building Code Requirements for Reinforced Concrete."
 - c. MNL-66 - "ACI Detailing Manual"
 - 3. CRSI - Concrete Reinforcing Steel Institute
 - a. "Manual of Standard Practice."
 - b. "Reinforcing Bar Splices."
 - c. "Placing Reinforcing Bars."
 - d. "Epoxy-Coated Reinforcement"

1.4 SUBMITTALS

- A. Manufacturer's literature describing the following products:
 - 1. Each type of steel reinforcement.
 - 2. Epoxy Repair Materials.
 - 3. Mechanical Splice Connectors.
 - 4. Bar supports.
- B. Shop Drawings: Placing drawings complying with ACI MNL-66 showing bar sizes, grades, lengths, bending diagrams, bar arrangements, placing details, and locations of reinforcing steel. Include diagrammatic wall elevations at scale to clearly show the position and erection marks of bars including marginal bars around openings with dowels, splices, and laps. Include location and lengths of lap splices, details for mechanical splices, spacings of stirrups and ties,

and details for bar supports.

- C. Certified Mill Test Reports.
- D. Qualification Data for testing and inspection agency.
- E. Samples if required by Architect/Engineer.
- F. Special Inspections reports.
- G. Preinstallation Meeting Minutes.

1.5 PREINSTALLATION MEETING

- A. Review with General Contractor, Construction Manager, and subcontractors the following:
 - 1. Steel reinforcement placement.
 - 2. Construction joints.
 - 3. Isolation joints.
 - 4. Special inspections and testing requirements
- B. Submit minutes of preinstallation meeting for Engineer's record.

1.6 QUALITY ASSURANCE

- A. Special Inspector Qualifications: An independent inspector, qualified according to ASTM E329, for inspections indicated.
- B. Testing Agency Qualifications: An independent agency, qualified according to ASTM C1077 and ASTM E329, for testing indicated.

1.7 STORAGE AND HANDLING

- A. Store reinforcing and accessories in manner to prevent bending and excessive rusting and fouling with grease, dirt, or other bond-weakening coatings.
- B. Store epoxy-coated reinforcement under opaque covering. Handle epoxy-coated reinforcement with padded contact areas and multiple lift points to avoid damaging the coating.
- C. Take precautions to maintain identification after bundles are broken.

PART 2 PRODUCTS

2.1 REINFORCING STEEL

- A. All reinforcement shall be detailed and fabricated in accordance with ACI 315 and CRSI "Manual of Standard Practice."
- B. Reinforcing bars shall be deformed bars conforming to ASTM A615 "Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement," Grade 60, as indicated on the drawings.
- C. Epoxy-Coated Reinforcing Bars:
 - 1. Epoxy coating shall conform to ASTM A775 or ASTM A934 with less than 2 percent damaged coating per linear foot of bar.
 - 2. Steel reinforcing bars shall be deformed bars conforming to ASTM A615, Grade 60.

- D. Steel bar mats shall conform to ASTM A184 "Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement" and shall use deformed bars conforming to ASTM A615, Grade 60.

2.2 REINFORCEMENT ACCESSORIES

- A. Bar supports shall be provided as recommended in Chapter 3 of CRSI "Manual of Standard Practice."
All bar supports in contact with formwork for surfaces which will be exposed to view or be exposed to weather; receive acoustical plaster or paint; and interior surfaces of structures which will normally contain water: CRSI Class 1, plastic-protected, or CRSI Class 2, stainless steel protected, as approved.
 - 1. For other areas, unless otherwise indicated: CRSI Class 3, bright basic.
 - 2. On ground: concrete blocks, or if required, wire bars Class 3 with sand plates.
 - 3. Epoxy-coated reinforcement: CRSI Class 1A epoxy-coated or other dielectric-polymer-coated wire bar supports.
- B. Tie wire shall be black annealed wire, 16-1/2 gauge minimum conforming to ASTM A1064.
- C. Joint dowel bars shall conform to ASTM A615, Grade 60, epoxy-coated steel bars, cut to length. Ends shall be square and free of burrs.
- D. Mechanical splice couplers shall conform to ACI 318 Type 1 mechanical-lap type and material shall match reinforcing bar being spliced.
- E. Epoxy repair coating shall be two-part liquid repair coating conforming with ASTM A775 "Standard Specification for Epoxy-Coated Steel Reinforcing Bars" and compatible with epoxy coating on reinforcement.

PART 3 - EXECUTION

3.1 PLACEMENT

- A. General:
 - 1. Place reinforcing steel in accordance with the recommended practices in "Placing Reinforcing Bars" by CRSI, as indicated on the drawings and outlined herein.
 - 2. Do not bend or straighten any reinforcing steel in a manner which will weaken or damage the material, nor heat reinforcing steel for bending or straightening. Submit request and proposed procedure to field bend or straighten reinforcing bars to the Engineer for approval.
 - 3. All splices of reinforcement, minimum concrete cover, placing tolerances and bar spacings shall conform to ACI 318 and to recommended practices in "Reinforcement Anchorages and Splices" by CRSI.
 - 4. Take care not to puncture vapor retarder. Repair and reseal any punctures in vapor barrier prior to placing concrete.
 - 5. Maintain a minimum clearance between bars not less than 1 inch, one bar diameter, or 1-1/3 times the maximum nominal aggregate size, whichever is greater.
- B. Supports:
 - 1. Reinforcing steel shall be accurately placed in the forms and adequately supported and secured against displacement within the tolerances outlined in ACI 318.
 - 2. Provide spaces, chains, bolsters, and other metal accessories to support all reinforcing steel and secure it in proper position with minimum cover specified before and during concrete placement.
 - 3. Ends of tie wires to be directed into concrete, not toward exposed surfaces.
- C. Splices:
 - 1. Splices shall be as indicated on the drawings for all bars indicated to be continuous. Generally, splice bottom bars at points of support and top bars at mid-span of slabs,

beams, and girders. Avoid splices at points of maximum tensile stress. Stagger horizontal and vertical splices in accordance with ACI 318.

2. Install mechanical splice couplers according to manufacturer's instructions.
- D. Reinforcing steel shall not be welded.
- E. Protection Against Rust:
1. Where there is danger of rust staining adjacent surfaces, wrap reinforcement with impervious tape or otherwise prevent rust staining.
 2. Remove protective materials and clean reinforcement of loose rust and mill scale, earth, ice, and other materials that adversely affect bond to concrete as required before proceeding with concrete placement.
- F. Joints:
1. Install dowel bars and support assemblies at dowelled joint where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.
 2. Install construction joints such that strength and appearance of concrete are not impaired, at locations indicated in Drawings. If construction joints are not indicated in Drawings, locations to be approved by Engineer and Architect. Reinforcement shall continue through construction joints, unless otherwise indicated. Construction joints to be perpendicular to main reinforcement.
- G. Repair cut and damaged epoxy coatings with epoxy repair coating in accordance with ASTM D3963 "Standard Specification for Fabrication and Jobsite Handling of Epoxy-Coated Steel Reinforcing Bars".
- H. Prior to concrete placement, verify reinforcement has been properly bent, positioned, and secured in accordance with drawings; and remove ice, oil, grease, dirt, rust, mill scale or other bond-weakening coatings.
- I. Installation tolerances shall conform to ACI 117 "Specification for Concrete Construction and Materials."
- 3.2 QUALITY CONTROL
- A. Owner will engage a special inspector to perform required field tests and inspections and prepare reports.
- B. Engage a qualified testing agency to perform required tests and inspections and to submit reports.
- C. Required special inspections:
1. Steel reinforcement placement.
 2. Steel reinforcement mechanical splice couplers.

END OF SECTION

SECTION 03 3000

CAST-IN-PLACE CONCRETE

PART 1- GENERAL

1.1 SECTION INCLUDES

- A. Cast-in-place concrete complete with vapor retarder under slabs on grade, expansion joint fillers, and anchorage items including slots, inserts, anchors, bolts, mixture design, placement procedures, concrete materials, and finishes.

1.2 RELATED SECTIONS

- A. Section 031000 - CONCRETE FORMWORK.
- B. Section 032000 - CONCRETE REINFORCEMENT.
- C. DIVISION 05 - METALS
- D. DIVISION 23 - MECHANICAL
- E. DIVISION 26 - ELECTRICAL.
- F. DIVISION 31- EARTHWORK.
- G. Section 316213 - CONCRETE PILES
- H. Section 321313 - CONCRETE PAVING
- I. Section 321316 - DECORATIVE CONCRETE PAVING
- J. Section 321613 - CONCRETE CURBS, GUTTERS, AND SIDEWALKS.

1.3 REFERENCE STANDARDS AND CODES

- A. Published Specifications, standards, tests, or recommended methods of trade, industry or governmental organizations apply to work in this section where cited below. Materials and work shall conform to the requirements of standards, codes, and recommended practices required in this section.
 - 1. ASTM - American Society for Testing and Materials.
 - a. ASTM C94 - "Standard Specification for Ready-Mixed Concrete."
 - 2. ACI - American Concrete Institute.
 - a. ACI 301 - "Specifications for Structural Concrete for Buildings."
 - b. ACI 318 - "Building Code Requirement for Reinforced Concrete."

1.4 SUBMITTALS

- A. Manufacturer's literature and material test reports for the following products:
 - 1. Aggregates.
 - a. Include test reports indicating absence of deleterious expansion due to alkali aggregate reactivity.
 - 2. Portland cement.
 - 3. Fly ash.
 - 4. Silica fume.
 - 5. Slag cement.
 - 6. Blended hydraulic cement.
 - 7. Performance hydraulic cement.
 - 8. Admixtures:

- a. Include manufacturer's instructions and limitations of use. Include manufacturer's certification that admixture is compatible with mix design. Submit applicable research reports in accordance with ICC AC198.
 - 9. Color pigments.
 - 10. Concrete curing materials.
 - a. Required VOC Content
 - 11. Slab treatments.
 - a. Required VOC Content
 - 12. Vapor retarders.
 - 13. Joint fillers.
 - 14. Repair materials.
 - 15. Adhesives.
 - 16. Bonding Agents.
- B. Contractor shall prepare and submit for approval mix design for each class of concrete specified as well as a minimum of 15 compressive strength test records for each mix design. Include information on air content, placement method, nominal maximum aggregate size, unit weight, slump, water-cement ratio, and dosages for admixtures. Identify locations where each mixture is intended to be used. Test records to include admixtures and their dosage rates, slump, air content, 7-day compressive strength, and 28-day compressive strength. Indicate permissible amount of mixing water to be withheld to be added at Project site.
- C. Contractor shall name his source of supply for concrete materials and submit representative samples of aggregates and cement and reports of quality tests for approval.
- D. Other samples only as requested.
- E. Qualification certificates for the following:
- 1. Installer
 - 2. Testing agency
 - 3. Ready-Mix Concrete Manufacturer
 - 4. Post-Installed Anchor Installer
- 1.5 PREINSTALLATION MEETING
- A. Review with General Contractor, Construction Manager, and subcontractors the following:
- 1. Vapor Retarder Installation.
 - 2. Shoring and Reshoring Procedures.
 - 3. Hot and Cold Weather Concrete Placement Procedures.
 - 4. Concrete Finishing Procedures.
 - 5. Concrete Curing Procedures.
 - 6. Construction Joints, Isolation Joints, and Joint Filler.
 - 7. Floor Flatness and Levelness Measurements.
 - 8. Anchor Installation Procedures and Tolerances.
 - 9. Form Installation and Form Removal Procedures.
 - 10. Concrete Repair Procedures.
 - 11. Special inspections and testing requirements.
- B. Submit minutes of preinstallation meeting for Engineer's record.
- 1.6 QUALITY ASSURANCE
- A. Concrete work shall conform to all requirements of ACI 301 "Specifications for Structural Concrete for Buildings", except as modified and supplemented herein.
- B. Mockup
- 1. Mockup panel to be approximately 100 sq. ft. (9.3 sq. m) for formed surface. Mockup panel to be approximately 15 feet by 15 feet for slab on grade. Mockup panels to match in place construction and demonstrate joint construction, surface finish, floor

treatments, and tolerances.

2. Mockup may become part of the completed construction if approved by Architect.
 - C. Testing Agency Qualifications: An independent agency, qualified according to ASTM C1077 and ASTM E329, for testing indicated in Drawings. Laboratory supervisor shall be an ACI Concrete Laboratory Testing Technician, Grade II. Field testing shall be performed by ACI Concrete Field Testing Technician Grade I and laboratory testing shall be performed by ACI Concrete Laboratory Testing Technician, Grade I.
 - D. Installer Qualifications: Installer shall be qualified as an ACI Flatwork Technician or Finisher.
 - E. Post-Installed Anchor Installer Qualifications: Installer shall be qualified as an ACI Adhesive Anchor Installer.
 - F. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94 requirements for production facilities and equipment. Contractor shall submit NRMCA quality certificates and quality control plan for Engineer's record.
 - G. Contractor shall submit field quality control reports within 7 days of test.
 - H. Contractor shall submit floor surface flatness and levelness measurements report, indicating compliance with specified tolerances, or proposed methods to achieve required tolerances.
- 1.7 STORAGE OF MATERIALS
- A. Store concrete materials in a manner which will effectively segregate each type of material from each other, prevent contamination of materials, and protect the materials from damage by weather and other causes. Comply with ASTM C94 and ACI 301.

PART 2— PRODUCTS

2.1 MATERIALS

- A. Cement: ASTM C150, Type I or Type II, unless otherwise approved. Use only one brand of cement throughout the project unless otherwise approved by the Architect/Engineer.
- B. Fly Ash: ASTM C618, Class C or F, unless otherwise approved. Use only one manufacturer's plant throughout the project unless otherwise approved by the Architect/Engineer.
- C. Slag Cement: ASTM C989/C989M, Grade 100 or 120. Use only one manufacturer's plant throughout the project unless otherwise approved by the Architect/Engineer.
- D. Silica Fume: ASTM C1240 amorphous silica. Use only one manufacturer's plant throughout the project unless otherwise approved by the Architect/Engineer.
- E. Performance-Based Hydraulic Cement: ASTM C1157/C1157M: Type GU, general use, Type HE, high early strength, Type MS, moderate sulfate resistance, Type HS, high sulfate resistance, Type MH, moderate heat of hydration, or Type LH, low heat of hydration. Use only one manufacturer's plant throughout the project unless otherwise approved by the Architect/Engineer.
- F. Blended Hydraulic Cement: ASTM C595/C595M, Type IL, portland-limestone cement. Use only one manufacturer's plant throughout the project unless otherwise approved by the Architect/Engineer.
- G. Aggregates for normal weight concrete shall conform to ASTM C33 Class 3M. Provide aggregates from single source.

1. Coarse aggregate: crushed limestone, nominal maximum aggregate size as indicated on contract documents, uniformly graded, free of materials with deleterious reactivity to alkali.
 2. Fine aggregate: clean sand, free of materials with deleterious reactivity to alkali.
 3. Limit Alkali-Silica Reaction through one of the following methods:
 - a. Expansion Result of Aggregate: Not more than 0.04 percent at one-year when tested in accordance with ASTM C1293.
 - b. Expansion Results of Aggregate and Cementitious Materials in Combination: Not more than 0.10 percent at an age of 16 days when tested in accordance with ASTM C1567.
 - c. Alkali Content in Concrete: Not more than 4 lb./cu. yd. for moderately reactive aggregate or 3 lb./cu. yd. for highly reactive aggregate, when tested in accordance with ASTM C1293 and categorized in accordance with ASTM C1778, based on alkali content being calculated in accordance with ACI 301.
- H. Admixtures: Use only when conditions of use are approved, or as specified elsewhere in Drawings or specifications. Admixtures to be compatible with other admixtures. Obtain admixtures from single manufacturer.
1. Water reducing admixture: The admixture shall conform to ASTM C494, Type A, and not contain more chloride ions than are present in municipal drinking water. Eucon WR-75 by the Euclid Chemical Company, MasterPozzolith 200 by Master Builders, Plastocrete 161 by Sika Chemical Corporation, , or approved equal.
 2. Water reducing, retarding admixture: The admixture shall conform to ASTM C494, Type D, and not contain more chloride ions than are present in municipal drinking water. Eucon Retarder-75 by the Euclid Chemical Company, Pozzolith 100 XR by Master Builders, Plastiment by Sika Chemical Corporation, , or approved equal.
 3. High range water reducing admixture (superplasticizer): The admixture shall conform to ASTM C494, Type F or G, and not contain more chloride ions than are present in municipal drinking water. Eucon 37 by the Euclid Chemical Company, Sikament by Sika Chemical Corporation, or approved equal.
 4. Non-Corrosive, Non-Chloride Accelerator: The admixture shall conform to ASTM C494, Type C or E, and not contain more chloride ions than are present in municipal drinking water. The admixture manufacturer must have long term non-corrosive test data from an independent testing laboratory for (at least a year's duration) using an acceptable accelerated corrosion test method such as that using electrical potential measures. Accelguard 80 by The Euclid Chemical Company, Darset 400 by W.R. Grace, or approved equal.
 - a. Air Entraining Admixture: The admixture shall conform to ASTM C260. Calcium chloride or admixtures containing more than 0.05 percent chloride ions are not permitted.
 5. Permeability-Reducing Admixture: The admixture shall conform to ASTM C494, Type S. Admixtures shall be tested in accordance with U.S. Army Corps of Engineers CRC C48 at a hydraulic pressure of 200 psi for 14 days. WT-240 P by Sika Corporation or Admix C-500 by Xypex, or approved equal.
 6. Corrosion-Inhibiting Admixture: The admixture shall conform to ASTM C494, Type C. MasterLife CI 222 by Master Builders or Sika BNI by Sika Corporation or Eucon BCN by Euclid Chemical Company.
 7. Certification: Written conformance to above mentioned requirements and the chloride ion content of the admixture will be required from the admixture manufacturer prior to mix design review by the Engineer.
- I. Color Pigment: Use when specified elsewhere in Drawings or specifications. Conform to ASTM C979/C979M, synthetic mineral-oxide pigments, color stable, nonfading, and resistant to lime and other alkalis.
1. Color: To be selected by Architect from manufacturer's full range.
 2. Add color pigment to concrete mix design in accordance with manufacturer's written instructions. Color shall be consistent with approved mockup.]
- J. Water: Clean and potable, free from impurities detrimental to concrete. Conform to ASTM C1602.

- K. Bonding Agent: The compound shall be a [polyvinyl acetate, rewettable type, conforming to ASTM C1059 Type I. Tammsweld by the Euclid Chemical Company, Weldcrete by the Larsen Company, or approved equal.][nonredispersible acrylic emulsion, nonrewettable type, conforming to ASTM C1059 Type II. Flex-Con by the Euclid Chemical Company, Strong Bond by the Larsen Company, or approved equal.]
- L. Epoxy Adhesive: The compound shall be a two component, 100 percent solids, 100 percent reactive compound suitable for use on dry or damp surfaces. Conform to ASTM C881. Euco Epoxy #452 or #352 by the Euclid Chemical Company or Sikadur Hi-Mod by Sika Chemical Corporation.
- M. Non-Shrink Grout: Factory premixed grout containing metallic aggregates or mineral aggregates and requiring only addition of water at the site. "Euco NS" (non-metallic) by The Euclid Chemical Company, "Masterflow 713" (non-metallic) by Master Builders. The grout shall conform to CRD-621, "Corps of Engineers Specifications for Non-Shrink Grout" and ASTM C1107.
- N. Curing Materials:
 - 1. Wet Coverings: Burlap, AASHTO M-182 Class II
 - 2. Curing Paper: ASTM C171, Type 1, regular. Fortifiber Corporation's Orange Label Sisalkraft, or approved equal.
 - 3. Sheet Plastic: ASTM C171, Polyethylene, 4 mils thick, fungus resistant.
 - a. For ambient temperature above 85 degrees F, use white.
 - b. For ambient temperature below 50 degrees F, use black.
 - c. Any color may be used for ambient temperature between 50 degrees F and 85 degrees F.
 - 4. Dissipating Resin Curing Compound: The compound shall be a dissipating resin type compound, conforming to ASTM C309, Type I, Kurez DR VOX by the Euclid Chemical Company or approved equal. The film must chemically break down in a two to four week period after application.
 - a. Curing compounds shall not be used on any surface against which additional concrete or other cementitious materials are to be bonded.
 - 5. Curing and Sealing Compound: The compound shall conform to ASTM C1315, Type 1, Class A, clear, solvent-based, membrane-forming, 30 percent solids content minimum, and have test data from an independent laboratory indicating a maximum moisture loss of 0.030 grams per square cm when applied at a coverage rate of 300 square feet per gallon. Curing compound shall be certified by curing compound manufacturer to not interfere with bonding floor covering. Super Rez Seal or Super Diamond Clear by the Euclid Chemical Company, Seal Cure 30 by W.R. Meadows, or approved equivalent.
- O. Expansion Joint Filler:
 - 1. Asphalt-saturated cellulosic fiber strips conforming to ASTM D1751 - "Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)."
 - 2. Self-expanding cork strips conforming to ASTM D1752 - "Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction."
 - 3. Verify compatibility of joint filler with sealant specified.
- P. Anchorage Items: Cast-in-place slots, bolts, and inserts for anchoring masonry finish and mechanical items to concrete shall be of the types indicated and/or required to accommodate the subsequently installed fastening devices.
- Q. Vapor Retarder: 10 mil (0.25 mm thick) clear polyethylene film, type recommended for below grade application. Conform to ASTM E1745, Class A.
- R. Semi-Rigid Joint Filler: Two-part, semirigid, 100% solids, [epoxy resin with a Shore A durometer hardness of 80] [polyurea with a Shore A Hardness of 90 to 95] per ASTM D2240.

- S. Repair Overlayment: Self-leveling, cement-based, polymer-modified topping that can be applied in thicknesses from 1/4 inch, or for full-depth repairs over a scarified surface to match adjacent floor elevation.
 - 1. Use manufacturer's recommended primer for application.
 - 2. Cement Binder: Portland cement conforming to ASTM C150.
 - 3. Aggregate: well-graded gravel, 1/4 inch maximum nominal diameter, or coarse sand
 - 4. Minimum compressive strength: 5,000 psi at 28 days.
 - 5. Follow manufacturer's printed instructions for surface preparation, mixing, placement, and curing.
- T. Repair Underlayment: Self-leveling, cement-based, polymer-modified, underlayment product that can be applied in thicknesses from 1/8 inch, and can be feathered at edges to match adjacent floor elevation.
 - 1. Use manufacturer's recommended primer for application.
 - 2. Cement Binder: Portland cement conforming to ASTM C150.
 - 3. Aggregate: well-graded gravel, 1/4 inch maximum nominal diameter, or coarse sand
 - 4. Minimum Compressive Strength: 4100 psi at 28 days when tested according to ASTM C109.
 - 5. Follow manufacturer's printed instructions for surface preparation, mixing, placement, and curing.

2.13 PROPORTIONING

- A. Proportioning of ingredients for each class of concrete required shall be in accordance with ACI 301 Method 1, laboratory trial batches, or Method 2, past field experience using materials to be employed on the project to produce placability, durability, specified strengths and properties specified.
- B. Percentage of cementitious materials, by weight, other than Portland cement shall be limited in concrete mix designs as follows:
 - 1. Fly Ash/Pozzolan: 25%
 - 2. Silica Fume: 10%
 - 3. Slag Cement: 50%
 - 4. Combination of Fly Ash and Slag Cement: 50% (Fly Ash not to exceed 25%)
 - 5. Combination of Fly Ash and Silica Fume: 35% (Silica Fume not to exceed 10%)
 - 6. Combination of Fly Ash, Slag Cement, and Silica Fume: 50% (Silica Fume not to exceed 10%)
- C. Admixtures shall be used according to manufacturer's printed instructions for the following conditions:
 - 1. Water-reducing and set-retarding admixtures when required in hot temperatures and/or low humidity.
 - 2. High-range water reducing admixtures or plasticizing admixtures where required for workability.
 - 3. [Permeability-reducing admixtures where indicated in Drawings.]
 - 4. [Corrosion-inhibiting admixtures where indicated in Drawings.]

2.14 CONCRETE QUALITIES REQUIRED

- A. Class I: Normal-weight concrete for footings.
 - 1. Minimum compressive strength: 4000 psi at 28 days
 - 2. Maximum water-cement ratio: 0.55
 - 3. Nominal maximum aggregate size: 1 inch.
 - 4. Slump: 4 ± 1 inches
 - 5. Air content: Not to exceed 3 percent.
 - 6. Limit water-soluble, chloride-ion content to 0.3 percent weight of cement
 - 7. Exposure Class: ACI 318 F0S0W0C1
- B. Class II: Normal-weight concrete for column piers.
 - 1. Minimum compressive strength: 5000 psi at 28 days

2. Maximum water-cement ratio: 0.40
 3. Nominal maximum aggregate size: 3/4 inch.
 4. Slump: 4 ± 1 inches
 5. Air content: 6 percent, plus or minus 1.0 percent at point of delivery, as determined by ASTM C173, for 3/4-inch nominal maximum aggregate size.
 6. Limit water-soluble, chloride-ion content to 0.3 percent weight of cement
 7. Exposure Class: ACI 318 F3S0W0C2
- C. Class III: Normal-weight concrete for interior slabs on ground and tie beams.
1. Minimum compressive strength: 5000 psi at 28 days
 2. Maximum water-cement ratio: 0.40
 3. Nominal maximum aggregate size: 1 inch.
 4. Slump: 4 ± 1 inches
 5. Air content: 6 percent, plus or minus 1.0 percent at point of delivery, as determined by ASTM C173, for 1-inch nominal maximum aggregate size.
 6. Minimum Cement Content: 520 lb/yd³ for 1-inch nominal maximum aggregate size.
 7. Limit water-soluble, chloride-ion content to 1.0 percent weight of cement
 8. Exposure Class: ACI 318 F3S0W0C2

PART 3 - EXECUTION

3.1 PREPARATION

- A. Approval: Prior to placing concrete, give the Architect/Engineer sufficient advance notice of each proposed placing. Do not place any concrete on any subgrade or in any formwork until the subgrade, formwork, accessories, reinforcing steel, anchor bolts, and other embedded items for the placement involved have been inspected and approved by the geotechnical engineer and/or special inspector. Do not place concrete until unsatisfactory conditions have been corrected.
- B. Bonding and Grouting: Before depositing new concrete on or against concrete which has set, treat existing concrete surfaces which will receive additional concrete, as follows: thoroughly roughen existing concrete surfaces and remove laitance, foreign matter, and loose particles; retighten forms at junction of existing and new concrete; dampen (but do not saturate) existing concrete surfaces; and slush existing concrete surface with cement-sand grout of proportions similar to those of the concrete. Grout coat shall be as thick as practicable on vertical surfaces, and at least 1/2 inch thick on horizontal surfaces. Place new concrete before grout has attained its initial set.
- C. Install construction joints at locations indicated on drawings. Except where indicated, no construction joints will be permitted without prior specific approval. Vertical construction joints in wall footings shall be reduced to a minimum. Construction joints in slabs and walls, where permitted, shall be located and made so that the strength and usefulness of the structure will not be impaired.
1. Unless otherwise indicated, the unit of operation shall not exceed the following in any horizontal direction: suspended slabs, 50 feet; slabs on grade intended to retain water or other liquid, 50 feet; other slabs on grade, 20 feet; walls intended to retain water or other liquid, 20 feet; other walls, 40 feet.
- D. Expansion joints shall be provided at locations indicated on drawings. Joint filler shall be as specified. Do not permit reinforcement or other embedded metal items bonded to concrete (except dowels bonded on only one side of joint) to extend through any expansion joint.
- E. Contraction joints shall be provided at locations indicated on the drawings and as directed by the Architect/Engineer.
1. Contraction joints may be formed, tooled or sawed approximately equal to 1/4 the thickness of slab.
- F. Install reglets and through-wall flashing in outer face of concrete frame or exterior walls, at

locations indicated in Drawings.

- G. Placing Embedded Items: Expansion joint material, waterstops, anchors and other embedded items shall be positioned accurately and securely against displacement. Voids in sleeves, inserts, and anchor slots shall be filled temporarily with readily removable material to prevent entry of concrete into voids.
- H. Anchor rods shall be set with templates according to approved shop drawings. Comply with tolerances in Section 7.5 of ANSI/AISC 303.
- I. Slabs on ground shall be placed on properly leveled and thoroughly compacted sub-grades or granular fill, as indicated. All sub-soils for slabs shall be approved before placing concrete. At locations indicated, provide one layer of vapor retarder material, lapped at joints a minimum of 6 inches and sealed with manufacturer's recommended adhesive tape. Place, protect and repair vapor retarder in accordance with ASTM E1643 and manufacturer's printed instructions. Terminate vapor retarder at foundations, grade beams, or pile caps by lapping vapor retarder not less than 6 inches and sealing vapor retarder to concrete to form continuous perimeter.
- J. Concrete Foundations for Mechanical Equipment: Provide concrete pads required under all mechanical equipment. Set bolts, anchors, piping, etc., in concrete as required by manufacturer of equipment used. See mechanical drawings and details for size, design, and location of equipment requiring concrete pads. Pads shall be steel trowel finished on all top exposed surfaces
 - 1. Pads shall be 5,000 psi normalweight concrete when located on structural slabs.

3.2 PRODUCTION OF CONCRETE

- A. Concrete shall be ready-mixed, batched, mixed, and transported in accordance with ASTM C94, "Standard Specification for Ready-Mixed Concrete."
 - 1. Plant equipment and facilities shall conform to "Certification of Ready Mixed Concrete Production Facilities (Checklist with Instructions)" of the National Ready Mixed Concrete Association
- B. Site Mixing: Batch and mix materials in accordance with ASTM C94. Mix materials in drum-type batch mixer.
 - 1. For mixer capacity of 1 cu. yd. or smaller, mix for at least 1-1/2 minutes, but not more than five minutes after materials are in mixer.
 - 2. Increase mixing time by 15 seconds for each additional 1 cu. yd. for mixer capacity larger than 1 cu. yd.
 - 3. Provide batch ticket for each batch used, indicating project name, date, time, concrete mix design ID, batch quantity, placement location, admixtures used, design strength, design slump, and amount of water added.
- C. Ready-Mixed: Batch, mix, and deliver concrete in accordance with ASTM C94. Mix materials in appropriate drum-type batch mixer.
 - 1. Provide batch ticket for each batch used, indicating project name, date, time, concrete mix design ID, batch quantity, placement location, admixtures used, design strength, design slump, design air content and amount of water permitted to be added at site.

3.5 PLACEMENT

- A. Conveying: Convey concrete from mixer to forms as rapidly as practicable without segregation or loss of ingredients, continuously and at such a rate that no unfinished area will be left exposed or unworked before the concrete takes its initial set. Do not deposit concrete initially set. Place concrete within 90 minutes after mixing unless otherwise noted. Retempering of concrete which has partially set will not be permitted. Comply with limits in ACI 301 for adding water to concrete at project site. Do not exceed amount of water

permitted to be added on delivery ticket. Do not add water after high-range water-reducing admixture.

- B. Take precautions to avoid damage to under-slab waterproofing and displacement of reinforcement and formwork.
- C. Chute Placement: When concrete is conveyed by chute, maintain a continuous flow of concrete. Chute shall be of metal or metal-lined wood, with sections set at approximately the same slope, which shall not be less than one vertical to three horizontal, and not more than one vertical to two horizontal. Discharge end of chute shall be provided with a drop chute to prevent segregation. If height of discharge end of chute is more than three times the thickness of the layer being deposited, but not more than four feet above surface of concrete in forms, use a spout with its lower end maintained as near surface of deposit as practicable. When pouring is intermittent, chute shall discharge into a hopper. Clean chutes thoroughly before and after each run. Discharge waste materials and flushing water outside forms. Raised runways for wheeling concrete to place shall be provided when necessary.
- D. Deposit concrete in approximately horizontal layers of 12 to 18 inches as near as possible to its final position. Do not allow concrete to drop vertically more than 3 feet, nor through a cage of reinforcing steel except when an elephant trunk or tremie is used.
 - 1. Elephant trunks or tremies shall be used in deep walls and columns to prevent free fall of concrete and to allow placement through cage of reinforcement.
- E. Keep forms and reinforcement clean above pour line by removing clinging concrete with wire brush before casting next lift. Also remove leakage or laitance through forms.
- F. Interruption in casting longer than 45 minutes shall be cause for discontinuing casting for remainder of day. In this event, cut back concrete and provide construction joints as the Architect/Engineer directs; clean forms and reinforcement as necessary to receive concrete at later time.
- G. Continuously place concrete in units between construction joints so that each unit will be monolithic in construction. Concrete placement rate shall be such that surface of concrete not carried to construction joints will not have attained initial set before additional concrete is placed in the construction unit involved. Beams, girders, brackets, column capitals, haunches, and drop panels shall be placed at same time as slabs. In walls of structures having door, window, or other openings, lifts of individual pours shall terminate at the tops or bottoms of the openings. Other lifts shall terminate at levels indicated, or to conform to structural requirements or architectural details, or both, as approved. Special provisions shall be made for joining successive pours as detailed or as approved. At least 48 hours shall elapse before placing concrete in the adjoining unit at each construction joint.
- H. Compaction: During and immediately after depositing concrete compact each layer by mechanical internal vibrating equipment supplemented by hand spading, rodding, and tamping, as required, to ensure concrete is thoroughly vibrated around reinforcement and into corners. Do not use vibrators to transport concrete inside of forms. Form vibrators shall not be used. Internal vibrators shall maintain not less than 5,000 impulses per minute when submerged in the concrete; maintain at least one vibrator as a stand-by. Limit vibrator duration to the time necessary to produce satisfactory consolidation without causing objectionable segregation. Do not insert vibrator into lower courses which have begun to set. Apply vibrators at uniformly spaced points not farther than the visible effectiveness of the machine.
- I. Do not disturb concrete slab surfaces before finishing. After concrete has been placed, begin initial floating to obtain level plane and uniform texture before excess bleedwater appears. Screed surfaces and strike to correct elevations.
- J. Hot Weather Concreting: Conform to ACI 305R and ACI 301 and follow requirements when mean daily temperature rises above 85 degrees Fahrenheit.

1. Forms, steel reinforcement, and subgrade may be fog-sprayed before placing concrete. Subgrade shall not have areas of standing water or softness.
 2. Temperature of concrete as placed shall be lowest temperature practicable but not higher than 90 degrees Fahrenheit.
 3. Crushed ice in lieu of water will be approved to maintain concrete below maximum temperature.
 4. Addition of water-reducing retarders will be permitted only if the Architect/Engineer approves, and mix is redesigned.
 5. Concrete shall be discharged within 75 minutes after mixing when air temperature is between 85 and 90 degrees and 60 minutes when air temperature is above 90 degrees.
- K. Cold Weather Concreting: Conform to ACI 306R and ACI 301 and follow requirements when mean daily temperature falls below 40 degrees Fahrenheit for three consecutive days.
1. Reinforcement, forms, or ground to receive concrete shall be completely free from frost.
 2. Concrete shall not be placed in contact with surfaces less than 35 degrees Fahrenheit.
 3. Minimum temperature of concrete as placed shall be 50 degrees Fahrenheit. Test concrete temperature hourly in accordance with ASTM C1064.
 4. Only the specified non-corrosive, non-chloride accelerator may be used. Calcium chloride, thiocyanates, or admixtures containing more than 0.05 percent chloride ions are not permitted.
 5. Concrete shall be maintained at temperature no lower than 50 degrees Fahrenheit for minimum seven day period after placement.

3.6 JOINTS

- A. Control Joints in Slabs-on-Ground: Form weakened plane control joints, at locations indicated in Drawings. Construct control joints at depth at least one-fourth of concrete thickness as follows:
1. Sawed Joints: Form control joints with power saws with shatterproof abrasive or diamond-rimmed blades. Cut 1/8 inch wide joints into concrete. Ensure cutting does not tear or damage surface. Saw cut control joints as soon as practicable, on same day as concrete placement.
 2. Install semirigid joint filler full depth in saw-cut joints. Install joint filler in accordance with manufacturer's written instructions.
- B. Doweled Joints: Install dowel bars with grease or asphalt applied to one-half of dowel bar to prevent concrete bonding on one side of joint. Install dowel bars supports at joints at spacing indicated on Drawings.
- C. Isolation Joints in Slabs-on-Ground: After removing formwork, install joint-filler strips at slab interfaces with vertical elements, such as walls, columns, pedestals, and other locations, as indicated in Drawings.
1. Extend joint filler for the full depth and width of isolation joint.
 2. Terminate joint filler flush with finished concrete surface unless otherwise indicated on Drawings.
 3. Furnish joint filler in lengths as long as practicable. Splice sections by clipping or lacing where more than one length is required.
- D. Construction joints:
1. Locate construction joints so strength and appearance are not impaired, at locations indicated or approved by Architect/Engineer.
 2. Locate construction joints for beams and slabs within the middle third of spans. Reinforcement shall continue through construction joints, unless otherwise indicated. Construction joints to be perpendicular to main reinforcement.
 3. Provide keyed joints at locations indicated. Embed keys at least 1 1/2 inch into concrete.
 4. Apply bonding agent at locations or roughen surface to 1/4 inch amplitude where new

- concrete is placed against hardened concrete.
- 5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders.
- 6. Locate vertical joints in walls at piers, near corners, and in otherwise concealed locations, at a maximum spacing of 25 feet.

3.7 FINISHING OF FORMED SURFACES

- A. Immediately after forms have been removed and concrete surfaces have been repaired as specified under "Repair of Surface Defects" concrete surfaces shall be given one or more of the following finished in locations indicated or specified hereinafter. When completed the finished exposed concrete surfaces shall be free of defects, with corners, jambs, and angles straight, plumb, true to line, and level, as applicable.
- B. As-Cast Finish SF-3.0: Retain texture imparted by form-facing material. Comply with ACI 117 Class A for tolerances. Patch voids larger than $\frac{3}{4}$ inch wide or $\frac{1}{2}$ inch deep and all tie holes. Remove projections larger than $\frac{1}{8}$ inch. Finish applies to concrete exposed to public view and to receive rubbed or floated finish.
- C. Cork-Floated Finish: Immediately after removal of formwork, wet concrete surface and apply slurry of 1 part Portland cement and 1 part sand with water. Finish surface with cork float.
- D. Waterproof Coating and Finish: Remove all form release products and membrane curing compounds and apply a waterproof coating. Coating shall be as recommended by the manufacturer for this application, strictly waterproof and shall bond securely to the concrete surfaces
 - 1. Waterproof coating shall be Standard Dry Wall Products "Thoroseal" mixed with Acryl 60 bonding agent, or an equal waterproof coating, applied in two coats in strict accordance with the manufacturer's printed instructions to produce a sand textured finish.
- E. Related Unformed Surfaces: Tops of walls or buttresses, horizontal offsets and similar unformed surfaces occurring adjacent to formed surfaces shall be struck smooth after concrete is placed and be floated to a texture reasonably consistent with that of the formed surfaces. Continue final finish on formed surfaces uniformly across the unformed surfaces.

3.8 CONCRETE SLAB FINISHES

- A. General: Finish concrete slabs as specified below. Dusting of wearing surfaces with dry materials will not be permitted. In preparation for finishing, strike slabs off true to the required elevations and grades of the finished slabs. Slabs shall be level with a tolerance of $\frac{3}{8}$ inch in 10 feet, except where drains occur or slopes are indicated, in which case the slabs shall be pitched to the drains or sloped, as applicable. Do not add water to concrete surfaces. Comply with ACI 302 for finishing concrete surfaces.
- B. Medium Broom Finish: Drag horsehair broom, or similar, over wet concrete surface.
- C. Required Flatness and Levelness measurements:

Usage	Overall Floor Flatness (FF)	Overall Floor Levelness (FL)	Minimum Local Value of Flatness	Minimum Local Value of Levelness
Non-critical spaces, mechanical rooms, floors to receive thick-set tiles, parking structure slabs	20	15	15	12
General office, light office or industrial, carpeted spaces	25	20	25	15
General warehouse floors with moderate or heavy traffic, areas to receive thin set tiles	35	20	24	15
Warehouses with air-pallet use, ice rinks	45	35	30	24

1. Slabs on Ground:
 - a. Overall Values: FF = 25, FL = 20
 - b. Minimum Local Values: FF = 17, FL = 15

3.9 PROTECTION

- A. Protect concrete surfaces from stains from petroleum and acids, and damage from equipment, vehicles, and machinery.
- B. Protect concrete surfaces to receive liquid floor treatment, surface hardener or polished concrete finish from damage, as recommended by floor treatment installer.

3.10 CURING

- A. General: Take curing measures immediately after casting and extend period according to the manufacturer's recommendation based upon prevailing temperature, wind, and relative humidity. Comply with ACI 308.1.
 1. Keep concrete continuously moist for minimum 14 days after casting.
 2. Maintain concrete temperature at minimum 50 degrees Fahrenheit for seven days after casting
 3. Avoid alternate wetting and drying and fluctuations of concrete temperature
 4. Protect fresh concrete from direct rays of sun, rain, drying winds, soiling, and damage.
 5. Do not permit curing method to affect adversely finishes or treatments applied to finished concrete.
- B. Curing Methods for Slabs: Cure all concrete surfaces with one or a combination of the following methods. Where a specific curing procedure is not specified, at the Contractor's selection, one or more of the following methods shall be used.
 1. Water curing: keep concrete surfaces continuously wet with clean water during the curing period by immersion, maintaining a continuous flow of water over the surface, continuous spraying, continuous sprinkling or a combination of these. For all curing methods, the difference in temperature between the water used for curing and the concrete shall not exceed 20 degrees Fahrenheit.
 2. Wet coverings: cover the concrete surfaces with burlap, cotton mats, sand, earth, or other suitable moisture retaining materials and keep these materials saturated during the curing period. Lap all fabrics at least 12 inches at all joints. On exposed concrete, do not use any type covering which will discolor the concrete surface.
 3. Waterproof coverings: as soon as possible after finishing, thoroughly wet the concrete surfaces and cover the concrete surfaces with waterproof paper or plastic film immediately after wetting. For a period of at least 8 hours after the concrete has taken its initial set, maintain a continuous flow of clean water over the concrete surface under the covering. Lap all joints in the covering at least 12 inches and provide weights and other means and methods to keep the waterproof covering in direct contact with the concrete during

the curing period. Seal film with waterproof tape or adhesive and immediately repair tears.

4. Membrane forming curing compounds: an approved liquid membrane forming curing compound may be used after one of the curing methods specified above has been used for at least 24 hours after the concrete has taken its initial set. The membrane forming curing compound shall be applied in strict accordance with the manufacturer's printed instructions. Apply in two coats at right angles to each other at a rate of 200 square feet coverage per gallon per coat unless otherwise recommended by the manufacturer. Apply coats uniformly and free of pinholes, gaps, puddles, and runs. Recoat areas subject to rain within three hours of application. After curing period, curing compound should be removed using manufacturer's recommended removal procedures, unless manufacturer certifies that curing compound does not interfere with floor covering or adhesive.
 - a. Membrane forming curing compound used on potable water containing structures shall be nontoxic and taste and odor free.

3.11 REPAIR OF SURFACE DEFECTS

- A. Fin and Protrusion Removal: Immediately after form removal, remove fins and other unnecessary protrusions, flush with concrete surfaces.
- B. Filling and Patching: Surface defects including tie holes, shall be repaired immediately after form removal using one of the following appropriate methods
 1. For concrete surfaces to receive rubbed finish: as soon as practicable after form removal, fill and patch tie holes, honeycombs, voids, cracks greater than 0.01 inch wide and other unnecessary holes 1 inch or more in diameter, as follows:
 - a. Remove all loose material.
 - b. Wet concrete for 8 hours before patching.
 - c. Apply bonding agent to affected area.
 - d. Mop surface to receive patch, with slurry of cement and water.
 - e. Fill with "dry" grout of sand and cement in the same proportions as those of the concrete, except with only enough water added to provide a mix that will "ball" in the hand. Force grout into cavities with the greatest practicable pressure.
 - f. Finish surface to match adjacent area.
 - g. Cure fill as specified under curing.
 2. For concrete surfaces to receive waterproof coating and finish: as soon as practicable after form removal, fill and patch tie holes, honeycombs, voids, and other unnecessary holes with commercially prepared patching material. Standard Dry Wall Products "Thorite" or as approved, which has high bonding characteristics; 5,000 psi minimum 28 day strength; recommended by the manufacturer for use in contact with potable water without emitting objectionable tastes or odors to the water; and compatible with the Waterproof Coating and Finish specified above. Apply patching material in strict accordance with the manufacturer's printed instructions.
 3. For unformed surfaces: Grind high areas and fill low areas with repair topping and/or underlayment for slab to meet specified tolerances. Follow manufacturer's printed instructions for repair topping installation and minimum topping thicknesses.

3.12 INSPECTION AND TESTING

- A. See TESTING LABORATORY SERVICES in DIVISION 1.
- B. Owner will engage a special inspector to perform required field tests and inspections and prepare reports.
- C. Engage a qualified testing agency to perform required tests and inspections and to submit reports.
- D. The Architect/Engineer and testing laboratory shall have free access to all points where concrete materials are stored, proportioned or mixed, and all materials, equipment and methods used shall

be subject to their inspection, tests, and approval.

- E. Contractor shall notify Architect/Engineer and testing and inspection agencies at least 24 hours prior to placement of concrete.
- F. An independent special inspector shall perform the following inspections:
 - 1. Verify the use of the correct concrete mix design.
 - 2. Inspect formwork for shape, location and dimensions of the concrete member being formed.
 - 3. Inspect concrete placement for proper placement techniques.
 - 4. Verify curing procedure and maintenance of curing temperature.
 - 5. Verify the concrete strength before removal of shores and forms from beams and slabs.
 - 6. Inspect anchors cast in concrete or post-installed in hardened concrete.
 - 7. If requested by Architect/Engineer, Special Inspector may inspect Batch Plant.
- G. An independent testing laboratory shall perform following services:
 - 1. Obtain samples of fresh concrete in accordance with ASTM C172.
 - 2. Test Portland Cement, one test for each separate truckload, in accordance with ASTM C150, or provide certified mill test reports of cement.
 - 3. Test coarse and fine aggregates in accordance with ASTM C33.
 - 4. Design and test all mixtures (with admixtures included) to be used on project.
 - 5. If concrete materials are batched away from the project site and mixed on the project or transported to project in mixer or agitator trucks, laboratory inspection shall be provided at job site for checking materials deliveries and concrete consistencies on all pours in excess of 24 cubic yards.
 - 6. Cast, cure, and test cylinders of each concrete mix placed on the job, in accordance with ASTM C31 and ASTM C39, and as follows:
 - a. Quantity of test cylinders required: At least twelve cylinders of each day's concrete placing and for each concrete mix used, but not less than twelve cylinders for each 100 cubic yards of concrete placed, and not less than twelve cylinders for each 5,000 square feet of surface area of concrete placed. Test cylinders to be 6 inches by 12 inches.
 - b. Testing requirements: Test one set of two laboratory cured cylinders and one set of two field cured cylinders at seven days; test one set of two laboratory cured cylinders and one set of two field cured cylinders at 28 days; and hold one set of two field cured and one set of two laboratory cured cylinders in reserve for 56 day or later testing, as required.
 - c. Compressive strength of concrete is deemed satisfactory if the average of three consecutive strength tests equals or exceeds the design compressive strength, and no compressive strength test value is less than 500 psi less than design compressive strength for design compressive strength 5000 psi or less, or 0.1f'c for design compressive strength greater than 5000 psi.
 - 7. Slump tests, using ASTM C143, once for each composite sample, but not less than one test for each day's pour of each mix design, and whenever in the consistency of concrete appears to vary.
 - 8. Test for air content of normal weight concrete sample once for each composite sample in accordance with ASTM C231.
 - 9. Test for air content and unit weight of lightweight once for each composite sample in accordance with ASTM C173 and ASTM C567.
 - 10. Determine temperature once for each composite sample in accordance with ASTM C1064. When ambient temperature is below 40-degree F or above 80 degrees F, concrete shall be tested each hour to ensure that concrete is between 50 degrees and 90 degrees.
 - 11. Test reports shall be promptly delivered within 48 hours of testing by the laboratory to the Contractor and the Architect/Engineer in accordance with ASTM C31. Test reports shall include project name, date sample was obtained, compressive strength at 7 days and 28 days, type of fracture observed, names and certification numbers for field and laboratory technicians, batch ticket numbers, curing method, and maximum and minimum curing temperatures.

12. Daily reports shall be furnished, giving the date, location, and yardage of concrete placement, specifying materials, proportions, consistencies, and class of concrete used, the test cylinder number representing pour, and the weather conditions prevailing.
 13. If compressive strength tests show that compressive strength is less than design compressive strength, cylinders may be cored in locations directed by the Architect/Engineer, in accordance with ASTM C42.
 14. If compressive strength of field-cured cylinders is less than 85 percent of laboratory-cured cylinders of the same mix design, evaluate curing procedures and protection of concrete and make corrections as required.
 15. Impact hammer, sonoscope or other non-destructive testing is permitted, but will not be used as the sole basis for approval of concrete.
 16. Correct deficiencies where test reports or inspections indicate Work does not comply with the Contract Documents. Additional testing, at Contractor's expense, may be required to determine compliance with specified requirements.
- H. An independent testing agency shall measure the floor flatness and levelness in accordance with ASTM E1155 within 72 hours of finishing.

END OF SECTION

SECTION 05 5000
METAL FABRICATIONS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Steel framing and supports for overhead doors.
- B. Steel framing and supports for mechanical and electrical equipment.
- C. Steel framing and supports for applications where framing and supports are not specified in other Sections.
- D. Slotted channel framing.
- E. Prefabricated building columns.
- F. Shelf angles.
- G. Metal ladders.
- H. Miscellaneous steel trim including steel angle corner guards and steel edgings.
- I. Metal bollards.
- J. Loose bearing and leveling plates for applications where they are not specified in other Sections.
- K. Products furnished, but not installed, under this Section include the following:
 - 1. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete.
 - 2. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

1.2 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of metal fabrications that are anchored to or that receive other work. 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.

1.3 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Fasteners.
 - 2. Shop primers.
 - 3. Shrinkage-resisting grout.
 - 4. Prefabricated building columns.
 - 5. Slotted channel framing.
 - 6. Manufactured metal ladders.
 - 7. Metal bollards.

8. Metal downspout boots.

- B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:
1. Steel framing and supports for overhead doors.
 2. Steel framing and supports for mechanical and electrical equipment.
 3. Steel framing and supports for applications where framing and supports are not specified in other Sections.
 4. Prefabricated building columns.
 5. Shelf angles.
 6. Metal ladders.
 7. Miscellaneous steel trim including steel angle corner guards and steel edgings.
 8. Metal bollards.
- C. Delegated Design Submittal: For ladders, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer's experience with providing delegated-design engineering services of the kind indicated, including documentation that engineer is licensed in the jurisdiction in which Project is located.
- B. Mill Certificates: Signed by stainless steel manufacturers, certifying that products furnished comply with requirements.
- C. Welding certificates.
- D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- E. Research Reports: For post-installed anchors.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with the following:
1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
 3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

1.6 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls, floor slabs, decks, and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design ladders.
- B. Structural Performance of Aluminum Ladders: Ladders, including landings, are to withstand the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.

- C. Structural Performance of Alternating Tread Devices: Alternating tread devices are to withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Uniform Load: 100 lbf/sq. ft. (4.79 kN/sq. m).
 - 2. Concentrated Load: 300 lbf (1.33 kN) applied on an area of 4 sq. in. (2580 sq. mm).
 - 3. Uniform and concentrated loads need not be assumed to act concurrently.
 - 4. Alternating Tread Device Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.
 - 5. Comply with applicable railing loadings in Section 055213 "Pipe and Tube Railings."
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
 - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 METALS

- 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. Steel Plates, Shapes, and Bars: ASTM A36/A36M, ASTM A572/A572M Gr 50. where noted otherwise on drawings.
- C. Stainless Steel Sheet, Strip, and Plate: ASTM A240/A240M or ASTM A666, Type 304.
- D. Stainless Steel Bars and Shapes: ASTM A276/A276M, Type 304.
- E. Rolled-Steel Floor Plate: ASTM A786/A786M, rolled from plate complying with ASTM A36/A36M or ASTM A283/A283M, Grade C or D.
- F. Rolled-Stainless Steel Floor Plate: ASTM A793.
- G. Steel Tubing: ASTM A500/A500M, cold-formed steel tubing.
- H. Steel Pipe: ASTM A53/A53M, Standard Weight (Schedule 40) unless otherwise indicated.
- I. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.
 - 1. Size of Channels: 1-5/8 by 1-5/8 inches (41 by 41 mm).
 - 2. Galvanized Steel: ASTM A653/A653M, commercial steel, Type B or structural steel, Grade 33 (Grade 230), with G90 (Z275) coating; 0.108-inch (2.8-mm) nominal thickness.
 - 3. Cold-Rolled Steel: ASTM A1008/A1008M, commercial steel, Type B or structural steel, Grade 33 (Grade 230); 0.0966-inch (2.5-mm) minimum thickness; hot-dip galvanized after fabrication.
- J. Aluminum Plate and Sheet: ASTM B209 (ASTM B209M), Alloy 6061-T6.
- K. Aluminum Extrusions: ASTM B221 (ASTM B221M), Alloy 6063-T6.
- L. Aluminum-Alloy Rolled Tread Plate: ASTM B632/B632M, Alloy 6061-T6.
- M. Aluminum Castings: ASTM B26/B26M, Alloy 443.0-F.

2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
 - 1. Provide stainless steel fasteners for fastening aluminum or stainless steel.
 - 2. Provide bronze fasteners for fastening bronze.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A (ASTM F568M, Property Class 4.6); with hex nuts, ASTM A563 (ASTM A563M); and, where indicated, flat washers.
- C. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325 (Grade A325M), Type 3, heavy-hex steel structural bolts; ASTM A563, Grade DH3, (ASTM A563M, Class 10S3) heavy-hex carbon-steel nuts; and where indicated, flat washers.
- D. Stainless Steel Bolts and Nuts: Regular hexagon-head annealed stainless steel bolts, ASTM F593 (ASTM F738M); with hex nuts, ASTM F594 (ASTM F836M); and, where indicated, flat washers; Alloy Group 1 (A1).
- E. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563 (ASTM A563M); and, where indicated, flat washers.
 - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- F. Anchors, General: Capable of sustaining, 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 in accordance with ASTM E488/E488M, conducted by a qualified independent testing agency.
- G. Cast-in-Place Anchors in Concrete: Either threaded or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A47/A47M malleable iron or ASTM A27/A27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F2329/F2329M.
- H. Post-Installed Anchors: Torque-controlled expansion anchors.
 - 1. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) stainless steel bolts, ASTM F593 (ASTM F738M), and nuts, ASTM F594 (ASTM F836M).

2.4 MISCELLANEOUS MATERIALS

- A. Shop Primers: Provide primers that comply with Section 099600 "High-Performance Coatings."
- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
 - 1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- C. Water-Based Primer: Emulsion type, anticorrosive primer for mildly corrosive environments that is resistant to flash rusting when applied to cleaned steel, complying with MPI#107 and compatible with topcoat.
- D. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.

- E. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.
- F. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- G. Concrete: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained concrete with a minimum 28-day compressive strength of 4000 psi (20 MPa).

2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
 - 1. Fabricate units from slotted channel framing where indicated.

2. Furnish inserts for units installed after concrete is placed.
 - C. Galvanize miscellaneous framing and supports where indicated.
 - D. Prime miscellaneous framing and supports with zinc-rich primer or primer specified in Section 099600 "High-Performance Coatings" where indicated.
- 2.7 PREFABRICATED BUILDING COLUMNS
- A. Source Limitations: Obtain prefabricated building column from single source from single manufacturer.
 - B. General: Provide prefabricated building columns consisting of load-bearing structural-steel members protected by concrete fireproofing encased in an outer non-load-bearing steel shell. Fabricate connections to comply with details shown or as needed to suit type of structure indicated.
 - C. Fire-Resistance Ratings: Provide prefabricated building columns listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for ratings indicated, based on testing in accordance with ASTM E119.
 1. Fire-Resistance Rating: As indicated.
- 2.8 SHELF ANGLES
- A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch (19-mm) bolts, spaced not more than 6 inches (150 mm) from ends and 24 inches (600 mm) o.c., unless otherwise indicated.
 1. Provide mitered and welded units at corners.
 2. Provide open joints in shelf angles at expansion and control joints. Make open joint approximately 2 inches (50 mm) larger than expansion or control joint.
 - B. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete.
 - C. Galvanize and prime shelf angles located in exterior walls.
 - D. Prime shelf angles located in exterior walls with primer specified in Section 099600 "High-Performance Coatings."
 - E. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.
- 2.9 METAL LADDERS
- A. General:
 1. Comply with ANSI A14.3.
 - B. Steel Ladders:
 1. Siderails: Continuous, 3/8-by-3-inch (9.5-by-76.2-mm) steel flat bars, with eased edges.
 2. Rungs: 3/4-inch- (19-mm-) diameter, steel bars.
 3. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
 4. Provide nonslip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.
 5. Galvanize and prime ladders, including brackets.
 6. Prime ladders, including brackets and fasteners, with zinc-rich primer.

2.10 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
 - 1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.
- C. Galvanize and prime miscellaneous steel trim.
- D. Prime miscellaneous steel trim with primer specified in Section 099600 "High-Performance Coatings."

2.11 METAL BOLLARDS

- A. Fabricate metal bollards from Schedule 80 steel pipe.
- B. Prime steel bollards with primer specified in Section 099600 "High-Performance Coatings."

2.12 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Galvanize bearing and leveling plates.
- C. Prime plates with primer specified in Section 099600 "High-Performance Coatings."

2.13 STEEL WELD PLATES AND ANGLES

- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.14 GENERAL FINISH REQUIREMENTS

- A. Finish metal fabrications after assembly.
- B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.15 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.
 - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean galvanized surfaces of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.
- C. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.

1. Shop prime with universal shop primer unless primers specified in Section 099600 "High-Performance Coatings" are indicated.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:
 1. Cast Aluminum: Heavy coat of bituminous paint.
 2. Extruded Aluminum: Two coats of clear lacquer.

3.2 INSTALLATION OF MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports for overhead doors securely to, and rigidly brace from, building structure.
- C. Anchor shelf angles securely to existing construction with expansion anchors, anchor bolts, or through bolts.
- D. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.
 1. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in "Installing Bearing and Leveling Plates" Article.
- E. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in "Installation of Bearing and Leveling Plates" Article.

1. Grout baseplates of columns supporting steel girders after girders are installed and leveled.

3.3 INSTALLATION OF PREFABRICATED BUILDING COLUMNS

- A. Install prefabricated building columns to comply with ANSI/AISC 360, "Specifications for Structural Steel Buildings," and with requirements applicable to listing and labeling for fire-resistance rating indicated.

3.4 INSTALLATION OF METAL BOLLARDS

- A. Fill metal-capped bollards solidly with concrete and allow concrete to cure seven days before installing.
 1. Do not fill removable bollards with concrete.
- B. Fill bollards solidly with concrete, mounding top surface to shed water.
 1. Do not fill removable bollards with concrete.

3.5 REPAIRS

- A. Touchup Painting:
 1. Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - a. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION

SECTION 05 5300

GRATING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Formed metal grating.
- B. Formed openings.
- C. Perimeter closures.

1.2 RELATED SECTIONS

- A. Section 055000 - METAL FABRICATIONS.
- B. Section 091230 – INTERIOR PAINTING.

1.3 SHOP DRAWINGS

- A. Submit shop drawings for final approval.
- B. Clearly detail shapes, general construction, supports, span and deflection table, perimeter construction details, tolerance, and installation details.

1.4 SUBMITTALS

- A. Submit manufacturer's installation instructions.
- B. Submit samples of the following for final approval:
 - 1. One sample of each material using on project of adequate size to adequately judge construction and finish.

1.5 REFERENCES

- A. ANSI/NAAMM A202.1 - Metal Bar Grating Manual.
- B. ANSI/ASTM A123 - Zinc (Hot Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip.
- C. ASTM A36 - Structural Steel.
- D. ASTM A525 - General Requirements for Steel Sheet, Zinc-coated (Galvanized) by the Hot-Dip Process.
- E. ASTM A569 - Steel, Carbon, Hot-rolled Sheet and Strip, Commercial Quality.

1.6 QUALITY ASSURANCE

- A. Design grates and plates under direct supervision of professional engineer experienced in design of building structures, registered in the State of this work.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Sheet Steel: ASTM A569; A36; carbon steel with raised lug pattern.
- B. Formed Steel: ASTM A36, of shapes indicated or required.

2.2 FASTENERS

- A. Fasteners: Galvanized steel.
- B. Type manufacturer's standard for the application involved.

2.3 FABRICATION

- A. Fabricate grates and plates to achieve design loads and the sizes indicated or required.
- B. Weld, Mechanically clinch or rivet joints of intersecting grating sections.
- C. Provide support framing for openings.
- D. Each individual grating section shall be banded all around with bars similar to the bearing bars, welded at all corners, and welded or otherwise securely attached to the ends of all bearing bars.

2.4 FINISHES

- A. Galvanizing: ASTM A525, to G90.
- B. Non-slip Surfacing: Aluminum oxide.
- C. Grating Frames: Fabricate these of steel as detailed, and hot dip galvanize them after fabrication.
- D. Step Treads for Metal Stairs: These shall be factory fabricated assemblies, of the same materials and pattern as those of the gratings. All aluminum surfaces which will contact steel shall be factory treated to prevent electrolytic action.
 - 1. Secure step treads to steel stair stringers with stainless steel or galvanized steel bolts, nuts, and washers.

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify that opening sizes and dimensional variations are acceptable to suit grating and plating tolerances.
- B. Verify that supports and anchors are correctly positioned.
- C. Beginning of installation means acceptance of existing conditions.

3.2 INSTALLATION

- A. Install grates in accordance with manufacturer's instructions and approved shop drawing.
- B. Mechanically cut galvanized finished surfaces. Do not use flame cutting tools.
- C. Secure grating with mechanical fasteners to prevent movement.

3.3 TOLERANCES

- A. Conform to ANSI/NAAMM A202.1
- B. Maximum Space Between Adjoining or Abutting Sections: 1 inch.
- C. Maximum Variation From Top Surface Plane of Adjoining or Abutting Sections: 1/16 inch.

END OF SECTION

SECTION 06 1050

MISCELLANEOUS CARPENTRY

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Wood blocking, cants, and nailers.
- B. Wood sleepers.
- C. Utility shelving.
- D. Plywood backing panels.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.3 DEFINITIONS

- A. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) or greater but less than 5 inches nominal (114 mm actual) in least dimension.
- B. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. NeLMA: Northeastern Lumber Manufacturers' Association.
 - 2. NHLA: National Hardwood Lumber Association.
 - 3. NLGA: National Lumber Grades Authority.
 - 4. SPIB: The Southern Pine Inspection Bureau.
 - 5. WCLIB: West Coast Lumber Inspection Bureau.
 - 6. WWPA: Western Wood Products Association.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
 - 2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
 - 3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.5 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For the following, from ICC-ES:
 - 1. Preservative-treated wood.
 - 2. Power-driven fasteners.
 - 3. Powder-actuated fasteners.
 - 4. Expansion anchors.
 - 5. Metal framing anchors.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 1. Factory mark each piece of lumber with grade stamp of grading agency.
 2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
 3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
 4. Provide dressed lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber: 15 percent unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWPAC U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.
 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
 2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat all miscellaneous carpentry unless otherwise indicated.
 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 2. Wood sills, sleepers, blocking, and similar concealed members in contact with masonry or concrete.
 3. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 - 1. Blocking.
 - 2. Nailers.
 - 3. Cants.
 - 4. Utility shelving.
- B. For items of dimension lumber size, provide Construction or No. 2 grade lumber of any species.
- C. For utility shelving, provide lumber with 15 percent maximum moisture content and[any of] the following species and grades:
 - 1. Eastern white pine, Idaho white, lodgepole, ponderosa, or sugar pine; Premium or No. 2 Common (Sterling) grade; NeLMA, NLGA, WCLIB, or WWPA.
 - 2. Mixed southern pine, No. 1 grade; SPIB.
- D. For concealed boards, provide lumber with 15 percent maximum moisture content and any of the following species and grades:
 - 1. Mixed southern pine, No. 2.
 - 2. Hem-fir or hem-fir (north), Construction or No. 2 Common.
 - 3. Spruce-pine-fir (south) or spruce-pine-fir, Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
- E. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- F. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- G. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.4 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: DOC PS 1, Exterior, AC thickness indicated or, if not indicated, not less than 3/4-inch (19-mm) nominal thickness.
 - 1. Plywood shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers.

2.5 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: NES NER-272.
- D. Wood Screws: ASME B18.6.1.

- E. Screws for Fastening to Metal Framing: ASTM C 1002, length as recommended by screw manufacturer for material being fastened.
 - F. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).
 - G. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.
 - H. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
 - 1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
 - 2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Grade A1 or A4).
- 2.6 METAL FRAMING ANCHORS
- A. Basis-of-Design Product: Subject to compliance with requirements, provide or comparable product by one of the following:
 - 1. Cleveland Steel Specialty Co.
 - 2. KC Metals Products, Inc.
 - 3. Phoenix Metal Products, Inc.
 - 4. Simpson Strong-Tie Co., Inc.
 - 5. USP Structural Connectors.
 - B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.
 - 1. Use for interior locations unless otherwise indicated.
 - C. Hot-Dip Heavy-Galvanized Steel Sheet: ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 (Z550) coating designation; and not less than 0.036 inch (0.9 mm) thick.
 - 1. Use for wood-preservative-treated lumber and where indicated.
 - D. Stainless-Steel Sheet: ASTM A 666, Type 304.
 - 1. Use for exterior locations and where indicated.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- B. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- C. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

- D. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels.
 - E. Metal Framing Anchors: Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
 - F. Do not splice structural members between supports unless otherwise indicated.
 - G. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
 - 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches (406 mm) o.c.
 - H. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
 - I. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
 - 1. Use inorganic boron for items that are continuously protected from liquid water.
 - 2. Use copper naphthenate for items not continuously protected from liquid water.
 - J. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. NES NER-272 for power-driven fasteners.
 - 2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
 - 3. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.
 - K. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.
- 3.2 WOOD GROUND, BLOCKING, AND NAILER INSTALLATION
- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
 - B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.
 - C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches (38 mm) wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.
- 3.3 PROTECTION
- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

- B. Protect miscellaneous rough carpentry from weather. If, despite protection, miscellaneous rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION

SECTION 07 2100
BUILDING INSULATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Glass-fiber blanket insulation.
- B. Polyisocyanurate foam-plastic board insulation.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.3 ACTION SUBMITTALS

- A. Product Data Sheets: For each type of product indicated. Roof & wall installation instructions.
- B. Shop Drawings: Provide shop drawings that indicate the following:
 - 1. 1. Liner fabric layout
 - 2. 2. Insulation Layout and cut list.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.

1.5 QUALITY ASSURANCE

- A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 - PRODUCTS

2.1 GLASS-FIBER BLANKET INSULATION

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. CertainTeed Corporation.
 - 2. Guardian Building Products, Inc.
 - 3. Johns Manville.
 - 4. Knauf Insulation.
 - 5. Owens Corning.

- B. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
- C. R-values of the insulation listed per the documents.
- D. Foil-Faced, Glass-Fiber Blanket Insulation: ASTM C 665, Type III (reflective faced), Class B (faced surface with a flame-propagation resistance of 0.12 W/sq. cm); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.
- E. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide cross ventilation between insulated attic spaces and vented eaves.
- F. OptiLiner System (Basis of Design)
 - 1. Fabric liner facing/vapor barrier composed of woven high-density polyethylene coated on both sides with polyethylene. Complies with the following:
 - a. ASTM C1136, Types I through Type VI 1) Type I-IV exception for dimensional stability (value is < 2.0%.)
 - b. Perm rating: d 0.02 when tested in accordance with ASTM E 96 Procedure A.
 - c. Flame Spread Index < 25 and Smoke Developed Index < 50 when tested in accordance with ASTM E 84.
 - d. Color: 1) White
 - 2. Vapor barrier adhesive. Complies with the following:
 - a. Application temperature 10°F to 110° F
 - 3. Double sided vapor barrier tape. Complies with the following:
 - a. Width 0.75" b. Rubber based and free film
 - 4. Patch tape. Complies with the following:
 - a. Adhesive added to one side
 - b. b. Installation temperature from 10°F to 110°F
 - c. 3" width
 - 5. Metal Banding/Straps. Complies with the following:
 - a. Coated steel
 - b. 1.0" wide
 - c. Structural Steel Grade 50 per ASTM C 653
 - d. Exposed color to match vapor barrier
 - 1) White
 - e. Backing – gray
 - 6. Thermal breaks
 - a. Closed cell polyethylene foam tape for wall applications. Complies with the following:
 - 1) 0.125" thick to 0.375" thick
 - 2) 3.0" wide
 - b. Thermal spacer blocks. Complies with the following:
 - 1) Extruded or expanded polystyrene
 - 2) Minimum width 3.0"
 - 3) Thickness 0.5" – 1.0"
 - 7. Light gage steel fasteners
 - a. Zinc plated cold forged steel
 - b. Head color to match vapor barrier
 - 1) White
 - c. Contain rubber sealing washer.
 - 8. Heavy gage steel fasteners
 - a. Zinc plated cold forged steel
 - b. Head color to match vapor barrier
 - 1) White
 - c. Contain rubber sealing washer
 - 10. Insulation Hangars
 - a. Insul-hold insulation hangars.

- G. Sustainability Requirements: Provide glass-fiber blanket insulation as follows:
 1. Free of Formaldehyde: Insulation manufactured with 100 percent acrylic binders and no formaldehyde.
 2. Low Emitting: Insulation tested according to ASTM D 5116 and shown to emit less than 0.05-ppm formaldehyde.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrates of substances that are harmful to insulation or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.
- B. Purlin and girt attachment surfaces should be clean and dry prior to attaching two-faced tape or sealing adhesive.
- C. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- D. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- E. 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.
- F. Banding has sharp edges and cut proof gloves should be worn when handling.

3.3 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION

- 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. Glass-Fiber Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 3. Maintain 3-inch (76-mm) clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
 4. Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
 5. For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
- C. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
 1. Loose-Fill Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).

2. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

3.4 PROTECTION

- A. Protect installed insulation 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

SECTION 07 4210

FORMED METAL WALL PANELS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Concealed-fastener, lap-seam metal wall panels.
- B. Soffit panels

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Meet with Owner, Architect, Owner's insurer if applicable, metal panel Installer, metal panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal panels, including installers of doors, windows, and louvers.
 - 2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 3. Review methods and procedures related to metal panel installation, including manufacturer's written instructions.
 - 4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
 - 5. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that affect metal panels.
 - 6. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
 - 7. Review temporary protection requirements for metal panel assembly during and after installation.
 - 8. Review of procedures for repair of metal panels damaged after installation.
 - 9. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
- B. Shop Drawings:
 - 1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
 - 2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches (1:10).
- C. Samples for Initial Selection: For each type of metal panel indicated with factory-applied finishes.
 - 1. Include Samples of trim and accessories involving color selection.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- C. Field quality-control reports.
- D. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For metal panels to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. UL-Certified, Portable Roll-Forming Equipment: UL-certified, portable roll-forming equipment capable of producing metal panels warranted by manufacturer to be the same as factory-formed products. Maintain UL certification of portable roll-forming equipment for duration of work.
- C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 - 1. Build mockup of typical metal panel assembly including corner, soffits, supports, attachments, and accessories.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
- B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Retain strippable protective covering on metal panels during installation.

1.9 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.10 COORDINATION

- A. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.11 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including rupturing, cracking, or puncturing.
 - b. Deterioration of metals and other materials beyond normal weathering.
 - 2. Warranty Period: Two years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:
 - 1. Wind Loads: As indicated on Drawings.
 - 2. Other Design Loads: As indicated on Drawings.
 - 3. Deflection Limits: For wind loads, no greater than 1/240 of the span.
- B. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) when tested according to ASTM E 283 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).
- C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- E. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 CONCEALED-FASTENER, LAP-SEAM METAL WALL PANELS

- A. General: Provide factory-formed metal panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to

supports using concealed fasteners and factory-applied sealant in side laps. Include accessories required for weathertight installation.

- B. Concealed-Fastener Metal Wall Panels Types 1, 2 and 3
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CENTRIA Architectural Systems.
 - b. Morin - A Kingspan Group Company.
 - c. CECO- Metal Panels – PBR & Shadowrib; Roof = Battenlok

2. Basis of Design: Morin

Type 1: Morin - Concealed Fastener Matrix Series MX-1

22 gage G90 galvanizes Steel, Smooth Finish
 Panel Depth: 1 ½"
 Panel Width: 12"
 Exterior Finish: Two Coat Fluoropolymer
 Color: Standard Colors

Type 2: Morin - Concealed Fastener Matrix Series MX-4

22 gage G90 galvanizes Steel, Smooth Finish
 Panel Depth: 1 ½"
 Panel Width: 12"
 Exterior Finish: Two Coat Fluoropolymer
 Color: Standard Colors

Type 3: Morin - Concealed Fastener Matrix Series SWL-12-S (Roof Panels)

22 gage G90 galvanizes Steel, Smooth Finish
 Panel Depth: 1 ¾"
 Panel Width: 12"
 Exterior Finish: Two Coat Fluoropolymer
 Color: Standard Colors

2.3 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, G90 (Z275 hot-dip galvanized) coating designation or ASTM A 792/A 792M, Class AZ50 (Class AZM150) aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.
- B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
1. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal panels.
 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

- C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- D. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
 - 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
 - 2. Joint Sealant: ASTM C 920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
 - 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.4 FABRICATION

- A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.
- C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- D. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
- E. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
 - 1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
 - 2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
 - 3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
 - 4. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
 - 5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
 - 6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
 - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

2.5 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Steel and Aluminum Panels and Accessories:
 - 1. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
 - 1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.
 - 2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.
 - a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

3.3 METAL PANEL INSTALLATION

- A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 1. Shim or otherwise plumb substrates receiving metal panels.
 - 2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
 - 3. Install screw fasteners in predrilled holes.

4. Locate and space fastenings in uniform vertical and horizontal alignment.
 5. Install flashing and trim as metal panel work proceeds.
 6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
 7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
 8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- B. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.
- C. Watertight Installation:
1. Apply a continuous ribbon of sealant or tape to seal lapped joints of metal panels, using sealant or tape as recommend by manufacturer on side laps of nesting-type panels; and elsewhere as needed to make panels watertight.
 2. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
 3. At panel splices, nest panels with minimum 6-inch (152-mm) end lap, sealed with sealant and fastened together by interlocking clamping plates.
- D. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal wall panel manufacturer; or, if not indicated, provide types recommended by metal panel manufacturer.
- E. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.
1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof performance.
 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (610 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).
- ### 3.4 FIELD QUALITY CONTROL
- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect completed metal wall panel installation, including accessories.
- B. Remove and replace metal wall panels where tests and inspections indicate that they do not comply with specified requirements.
- C. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.
- D. Prepare test and inspection reports.

3.5 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
- B. After metal panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
- C. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 6200

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Formed Products:
 1. Formed roof drainage sheet metal fabrications.
 2. Formed low-slope roof sheet metal fabrications.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section 06 1050 "Miscellaneous Carpentry" for wood nailers, curbs, and blocking.
- C. Section 07 7100 "Roof Accessories" for set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies as indicated shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Fabricate and install roof edge flashing copings capable of resisting the following forces according to recommendations in FMG Loss Prevention Data Sheet 1-49:
 1. Wind Zone 1: For velocity pressures of 21 to 30 lbf/sq. ft. (1.00 to 1.44 kPa): 60-lbf/sq. ft. (2.87-kPa) perimeter uplift force, 90-lbf/sq. ft. (4.31-kPa) corner uplift force, and 30-lbf/sq. ft. (1.44-kPa) outward force.
- C. Thermal Movements: Provide sheet metal flashing and trim that allows for thermal movements from ambient and surface temperature changes.
 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C) material surfaces.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.
- B. Shop Drawings: Show fabrication and installation layouts of sheet metal flashing and trim, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work. Include the following:
 1. Identification of material, thickness, weight, and finish for each item and location in Project.
 2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
 3. Details for joining, supporting, and securing sheet metal flashing and trim, including layout of fasteners, cleats, clips, and other attachments. Include pattern of seams.
 4. Details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction.

5. Details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For sheet metal flashing, trim, and accessories to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
- B. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

1.8 WARRANTY

- A. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 1. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 2. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 3. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.
- B. Metallic-Coated Steel Sheet: Restricted flatness steel sheet, metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
 1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation; structural quality.
 2. Surface: Smooth, flat and with manufacturer's standard clear acrylic coating on both sides.
 3. Exposed Coil-Coated Finish:
 1. Metallic Fluoropolymer: AAMA 621. Three-coat fluoropolymer finish with suspended metallic flakes containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 4. Color: Custom to match wall panel

5. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).

2.2 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal[or manufactured item] unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal[or manufactured item].
 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 1. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating.
 2. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
 3. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
 2. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329 or Series 300 stainless steel.
- C. Solder:
 1. For Zinc-Coated (Galvanized) Steel: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead or Grade Sn60, 60 percent tin and 40 percent lead.
- D. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
- E. Elastomeric Sealant: ASTM C 920, elastomeric [polyurethane] [polysulfide] [silicone] polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.
- H. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.
- I. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.3 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.
 1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
 2. Obtain field measurements for accurate fit before shop fabrication.

3. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
 4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.
 - C. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant.
 - D. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.
 - E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
 - F. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
 - G. Do not use graphite pencils to mark metal surfaces.
- 2.4 LOW-SLOPE ROOF SHEET METAL FABRICATIONS
- A. Roof-Edge Flashing (Gravel Stop) and Fascia Cap: Fabricate in minimum 96-inch- (2400-mm-) long, but not exceeding 10-foot- (3-m-) long, sections. Furnish with 6-inch- (150-mm-) wide, joint cover plates.
 1. Joint Style: Lap, 4 inches (100 mm) wide
 2. Fabricate from the following materials:
 1. Galvanized Steel: 0.028 inch (0.71 mm) thick.
- 2.5 MISCELLANEOUS SHEET METAL FABRICATIONS
- A. Equipment Support Flashing: Fabricate from the following materials:
 1. Galvanized Steel: 0.028 inch (0.71 mm) thick.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of the Work.
 1. Verify compliance with requirements for installation tolerances of substrates.
 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 3. Space cleats not more than 12 inches (300 mm) apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
 4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
 5. Install sealant tape where indicated.
 6. Torch cutting of sheet metal flashing and trim is not permitted.
 7. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.
- C. Fastener Sizes: Use fasteners of sizes that will penetrate metal decking not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- D. Seal joints as shown and as required for watertight construction.
1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).
 2. Prepare joints and apply sealants to comply with requirements in Section 07920 "Joint Sealants."
- 3.3 MISCELLANEOUS FLASHING INSTALLATION
- A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.
- 3.4 ERECTION TOLERANCES
- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.
- 3.5 CLEANING AND PROTECTION
- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean off excess sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturers written installation instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.

END OF SECTION

SECTION 07 9200

JOINT SEALANTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. This Section includes sealants for the following applications, including those specified by reference to this Section:
- B. This Section includes sealants for the following applications:
 - 1. Exterior joints in the following vertical surfaces and nontraffic horizontal surfaces:
 - a. Joints between masonry units and aluminum framing.
 - b. Joints between different materials listed above.
 - c. Perimeter joints between materials listed above and frames of doors and windows.
 - d. Control and expansion joints in ceiling and overhead surfaces.
 - e. Other joints as indicated.
 - 2. Exterior joints in the following horizontal traffic surfaces:
 - 3. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints of exterior openings where indicated.
 - c. Tile control and expansion joints.
 - d. Perimeter joints between interior wall surfaces and frames of interior doors, windows, and elevator entrances.
 - e. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - f. Other joints as indicated.
 - 4. Interior joints in the following horizontal traffic surfaces:
 - a. Other joints as indicated.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Construction Agreement and Division 1 Specification Sections, apply to this Section.
- B. Division 2 Section "Pavement Joint Sealants" for sealing joints in pavements, walkways, and curbing.
- C. Division 7 Section "Firestopping" for fire-resistant building joint-sealant systems.
- D. Division 8 Section "Glazing" for glazing sealants.
- E. Division 9 Section "Gypsum Board Assemblies" for sealing perimeter joints of gypsum board partitions to reduce sound transmission.
- F. Division 9 Section "Acoustical Panel Ceilings" for sealing edge moldings at perimeters of acoustical ceilings.

1.3 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.
- B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.4 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Product Certificates: Signed by manufacturers of joint sealants certifying that products furnished comply with requirements and are suitable for the use indicated.
- D. SWRI Validation Certificate: For each elastomeric sealant specified to be validated by SWRI's Sealant Validation Program.
- E. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of Contracting Officer and Government, and other information specified.
- F. Preconstruction Field Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on preconstruction testing specified in "Quality Assurance" Article.
- G. Field Test Report Log: For each elastomeric sealant application. Include information specified in "Field Quality Control" Article.
- H. Compatibility and Adhesion Test Reports: From sealant manufacturer indicating the following:
 - 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 - 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- I. Product Test Reports: From a qualified testing agency indicating sealants comply with requirements, based on comprehensive testing of current product formulations.
- J. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.
- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
- C. Preconstruction Compatibility and Adhesion Testing: Submit to joint sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
 - 1. Use manufacturers standard test methods to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
 - a. Perform tests under environmental conditions replicating those that will exist during installation.
 - 2. Submit not fewer than nine pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
 - 3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 - 4. For materials failing tests, obtain joint sealant manufacturer's written instructions for corrective measures, including the use of specially formulated primers.

5. Testing will not be required if joint sealant manufacturers submit joint preparation data that are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials in compliance with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not proceed with installation of joint sealants under the following conditions:
 1. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer.
 2. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 40 deg F (4.4 deg C).
 3. When joint substrates are wet.
- B. Joint-Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
- C. Joint-Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.8 WARRANTY

- A. General Warranty: Special warranties specified in this Article shall not deprive Government of other rights Government may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Special Installer's Warranty: Written warranty, signed by Installer agreeing to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 1. Warranty Period: Two years from date of Substantial Completion.
- C. Special Manufacturer's Warranty: Written warranty, signed by elastomeric sealant manufacturer agreeing to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
 1. Warranty Period: 20 years from date of Substantial Completion.
- D. Special warranties specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:
 1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
 2. Disintegration of joint substrates from natural causes exceeding design specifications.
 3. Mechanical damage caused by individuals, tools, or other outside agents.
 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified in the sealant schedules at the end of Part 3.
- B. Products: Subject to compliance with requirements, provide one of the products indicated for each type in the sealant schedules at the end of Part 3.

2.2 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Contracting Officer from manufacturer's full range for this characteristic.

2.3 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealant Standard: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant in the Elastomeric Joint-Sealant Schedule at the end of Part 3, including those referencing ASTM C 920 classifications for type, grade, class, and uses.
- B. Additional Movement Capability: Where additional movement capability is specified in the Elastomeric Joint-Sealant Schedule, provide products with the capability, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, to withstand the specified percentage change in the joint width existing at the time of installation and remain in compliance with other requirements of ASTM C 920 for uses indicated.
- C. Stain-Test-Response Characteristics: Where elastomeric sealants are specified in the Elastomeric Joint-Sealant Schedule to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

2.4 SOLVENT-RELEASE JOINT SEALANTS

- A. Acrylic-Based Solvent-Release Joint-Sealant Standard: Comply with ASTM C 1311 for each product of this description indicated in the Solvent-Release Joint-Sealant Schedule at the end of Part 3.

2.5 LATEX JOINT SEALANTS

- A. Latex Sealant Standard: Comply with ASTM C 834 for each product of this description indicated in the Latex Joint-Sealant Schedule at the end of Part 3.

2.6 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Sealant for Exposed and Concealed Joints: For each product of this description indicated in the Acoustical Joint-Sealant Schedule at the end of Part 3, provide manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834 and the following:
 - 1. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

- B. Acoustical Sealant for Concealed Joints: For each product of this description indicated in the Acoustical Joint-Sealant Schedule at the end of Part 3, provide manufacturer's standard, nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission.

2.7 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, of type indicated below and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
 1. Type C: Closed-cell material with a surface skin.
 2. Type O: Open-cell material.
 3. Type B: Bicellular material with a surface skin.
 4. Type: Any material indicated above.
- C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F (minus 32 deg C). Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and otherwise contribute to optimum sealant performance.
- D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.8 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants with joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. **Surface Cleaning of Joints:** Clean out joints immediately before installing joint sealants to comply with joint sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air. Porous joint surfaces include the following:
 - a. Concrete.
 - b. Masonry.
 - c. Unglazed surfaces of ceramic tile.
 - 3. Remove laitance and form-release agents from concrete.
 - 4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
 - a. Metal.
 - b. Glass.
 - c. Glazed surfaces of ceramic tile.
- B. **Joint Priming:** Prime joint substrates where recommended in writing by joint sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. **Masking Tape:** Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. **General:** Comply with joint sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. **Sealant Installation Standard:** Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. **Acoustical Sealant Application Standard:** Comply with recommendations of ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.
- D. **Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.**
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- E. **Install bond-breaker tape behind sealants where sealant backings are not used between sealants and back of joints.**

- F. Install sealants by proven techniques to comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses provided for each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- G. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealants from surfaces adjacent to joint.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
 - 4. Provide flush joint configuration, per Figure 5B in ASTM C 1193, where indicated.
 - 5. Provide recessed joint configuration, per Figure 5C in ASTM C 1193, of recess depth and at locations indicated.
 - a. Use masking tape to protect adjacent surfaces of recessed tooled joints.

3.4 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field-test joint-sealant adhesion to joint substrates as follows:
 - 1. Extent of Testing: Test completed elastomeric sealant joints as follows:
 - a. Perform 10 tests for the first 1000 feet (300 m) of joint length for each type of elastomeric sealant and joint substrate.
 - b. Perform one test for each 1000 feet (300 m) of joint length thereafter or one test per each floor per elevation.
 - 2. Test Method: Test joint sealants by hand-pull method described below:
 - a. Make knife cuts from one side of joint to the other, followed by two cuts approximately 2 inches (50 mm) long at sides of joint and meeting cross cut at one end. Place a mark 1 inch (25 mm) from cross-cut end of 2-inch (50-mm) piece.
 - b. Use fingers to grasp 2-inch (50-mm) piece of sealant between cross-cut end and 1-inch (25-mm) mark; pull firmly at a 90-degree angle or more in direction of side cuts while holding a ruler alongside of sealant. Pull sealant out of joint to the distance recommended by sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension; hold this position for 10 seconds.
 - c. For joints with dissimilar substrates, check adhesion to each substrate separately. Do this by extending cut along one side, checking adhesion to opposite side, and then repeating this procedure for opposite side.
 - 3. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field adhesion test log.
 - 4. Inspect tested joints and report on the following:
 - a. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field- adhesion hand-pull test criteria.
 - b. Whether sealants filled joint cavities and are free from voids.
 - c. Whether sealant dimensions and configurations comply with specified requirements.
 - 5. Record test results in a field adhesion test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.

6. Repair sealants pulled from test area by applying new sealants following same procedures used to originally seal joints. Ensure that original sealant surfaces are clean and new sealant contacts original sealant.

- B. Evaluation of Field-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements, will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

- A. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from the original work.

3.7 ELASTOMERIC JOINT-SEALANT SCHEDULE

- A. Multicomponent Nonsag Polysulfide Sealant: Where joint sealants of this type are indicated, provide products complying with the following:
- B. Low-Modulus Nonacid-Curing Silicone Sealant: Where joint sealants of this type are indicated, provide products complying with the following:

1. Products:

- a. 790; Dow Corning.
- b. Silpruf; GE Silicones.
- c. UltraPruf SCS2300; GE Silicones.

2. Type and Grade: S (single component) and NS (nonsag).

3. Class: 25.

4. Below are examples of Use O substrates. Retain only those that apply or insert others.

Use O Joint Substrates: Anodic aluminum, galvanized steel, EIFS and other adjacent surfaces and ceramic tile.

5. Stain-Test-Response Characteristics: Nonstaining to porous substrates per ASTM C 1248. Applications: Curtain wall/window wall system and Architectural precast concrete panels.

6. Color: To be selected by the Contracting Officer.

- C. Medium-Modulus Neutral-Curing Silicone Sealant: Where joint sealants of this type are indicated, provide products complying with the following:

1. Products: Provide the following:

- a. 795; Dow Corning.

2. Type and Grade: S (single component) and NS (nonsag).

3. Class: 25.

4. Uses "B" joint substrates: Below are examples of Use O substrates. Retain only those that apply or insert others.

5. Stain-Test-Response Characteristics: Nonstaining to porous substrates per ASTM C 1248.

6. Applications: Butt glazing of insulated glass units: structural and nonstructural applications.

7. Color: To be selected by the Contracting Officer.

D. Mildew-Resistant Silicone Sealant: Where joint sealants of this type are indicated, provide products formulated with fungicide that are intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and temperature extremes, and that comply with the following:

1. Products: Provide one of the following:
 - a. 786 Mildew Resistant; Dow Corning.
 - b. Sanitary 1700; GE Silicones.
 - c. NuFlex 302; NUCO Industries, Inc.
 - d. 898 Silicone Sanitary Sealant; Pecora Corporation.
 - e. PSI-611; Polymeric Systems, Inc.
 - f. Tremsil 600 White; Tremco.
2. Type and Grade: S (single component) and NS (nonsag).
3. Class: 25.
4. Applications: Solid polymer sheet and wall surfaces and sanitary fixtures and ceramic tile

3.8 ACOUSTICAL JOINT-SEALANT SCHEDULE

A. Acoustical Sealant for Exposed and Concealed Joints: Where joint sealants of this type are indicated, provide products complying with the following:

1. Products: Provide one of the following:
 - a. AC-20 FTR Acoustical and Insulation Sealant; Pecora Corporation.
 - b. SHEETROCK Acoustical Sealant; USG Corp., United States Gypsum Co.
2. Applications: Penetration of vertical wall surfaces in the studio area.

3.9 NONELASTOMERIC LATEX JOINT SEALANTS (ACRYLIC EMULSION SEALANTS)

A. For interior non-moving joints and paintable if indicated on the room finish schedule.

1. Sealants of this type shall meet ASTM C 834.
2. See sub-section 1.2.B.3. & 4. for locations.

END OF SECTION

SECTION 08 1100

STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Section includes hollow-metal work.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section 08710 "Door Hardware" for door hardware for hollow-metal doors.

1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.4 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, temperature-rise ratings, and finishes.
- B. Shop Drawings: Include the following:
 - 1. Elevations of each door type.
 - 2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
 - 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - 4. Locations of reinforcement and preparations for hardware.
 - 5. Details of each different wall opening condition.
 - 6. Details of anchorages, joints, field splices, and connections.
 - 7. Details of accessories.
 - 8. Details of moldings, removable stops, and glazing.
 - 9. Details of conduit and preparations for power, signal, and control systems.
- C. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

1.6 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.

- B. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
 - 1. Provide additional protection to prevent damage to factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch- (102-mm-) high wood blocking. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Amweld International, LLC.
 - 2. Apex Industries, Inc.
 - 3. Ceco Door Products; an Assa Abloy Group company.
 - 4. Commercial Door & Hardware Inc.
 - 5. Concept Frames, Inc.
 - 6. Curries Company; an Assa Abloy Group company.
 - 7. Custom Metal Products.
 - 8. Daybar.
 - 9. Deansteel.
 - 10. de La Fontaine Industries.
 - 11. DKS Steel Door & Frame Sys. Inc.
 - 12. Door Components, Inc.
 - 13. Fleming-Baron Door Products.
 - 14. Gensteel Doors Inc.
 - 15. Greensteel Industries, Ltd.
 - 16. HMF Express.
 - 17. Hollow Metal Inc.
 - 18. Hollow Metal Xpress.
 - 19. J/R Metal Frames Manufacturing, Inc.
 - 20. Karpen Steel Custom Doors & Frames.
 - 21. L.I.F. Industries, Inc.
 - 22. LaForce, Inc.
 - 23. Megamet Industries, Inc.
 - 24. Mesker Door Inc.
 - 25. Michbi Doors Inc.
 - 26. MPI Group, LLC (The).
 - 27. National Custom Hollow Metal.
 - 28. North American Door Corp.
 - 29. Philipp Manufacturing Co (The).
 - 30. Pioneer Industries, Inc.
 - 31. Premier Products, Inc.
 - 32. Republic Doors and Frames.
 - 33. Rocky Mountain Metals, Inc.
 - 34. Security Metal Products Corp.
 - 35. Shanahans Manufacturing Ltd.
 - 36. Steelcraft; an Ingersoll-Rand company.

- 37. Steward Steel; Door Division.
- 38. Stiles Custom Metal, Inc.
- 39. Titan Metal Products, Inc.
- 40. Trillium Steel Doors Limited.
- 41. West Central Mfg. Inc.

- B. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.

2.2 REGULATORY REQUIREMENTS

- A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
 - 1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.

2.3 EXTERIOR HOLLOW-METAL DOORS AND FRAMES

- A. Construct exterior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3.
 - 1. Physical Performance: Level A according to SDI A250.4.
 - 2. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches (44.5 mm.)
 - c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm), with minimum A40 (ZF120) coating.
 - d. Edge Construction: Model 2, Seamless.
 - e. Core: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core at manufacturer's discretion.
 - f. Doors to be insulated. Thermally enhanced Core doors. U-value = .32.
 - 3. Frames:
 - a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm), with minimum A40 (ZF120) coating.
 - b. Construction Full profile welded.

2.4 HOLLOW-METAL PANELS

- A. Provide hollow-metal panels of same materials, construction, and finish as adjacent door assemblies.

2.5 FRAME ANCHORS

- A. Jamb Anchors:
 - 1. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (1.0 mm) thick.
 - 2. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
- B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch (1.0 mm), and as follows:
 - 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch (51-mm) height adjustment. Terminate bottom of frames at finish floor surface.

2.6 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.
- D. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.
 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- F. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- G. Grout: ASTM C 476, except with a maximum slump of 4 inches (102 mm), as measured according to ASTM C 143/C 143M.
- H. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- I. Glazing: Comply with requirements in Section 08800 "Glazing."
- J. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.7 FABRICATION

- A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Hollow-Metal Doors:
 1. Steel-Stiffened Door Cores: Provide minimum thickness 0.026 inch (0.66 mm), steel vertical stiffeners of same material as face sheets extending full-door height, with vertical webs spaced not more than 6 inches (152 mm) apart. Spot weld to face sheets no more than 5 inches (127 mm) o.c. Fill spaces between stiffeners with glass- or mineral-fiber insulation.
 2. Fire Door Cores: As required to provide fire-protection and temperature-rise ratings indicated.
 3. Vertical Edges for Single-Acting Doors: Bevel edges 1/8 inch in 2 inches (3.2 mm in 51 mm).

4. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets.
 5. Bottom Edge Closures: Close bottom edges of doors with end closures or channels of same material as face sheets.
 6. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
 7. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch (19 mm) beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.
- C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
1. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
 4. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
 5. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Stud-Wall Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
 - (1) Three anchors per jamb up to 60 inches (1524 mm) high.
 - (2) Four anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
 - (3) Five anchors per jamb from 90 to 96 inches (2286 to 2438 mm) high.
 - (4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 96 inches (2438 mm) high.
 6. Head Anchors: Two anchors per head for frames more than 42 inches (1067 mm) wide and mounted in metal-stud partitions.
 7. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.
- E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
 2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.
- F. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with mitered hairline joints.
1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
 4. Provide loose stops and moldings on inside of hollow-metal work.

5. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

2.8 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

2.9 ACCESSORIES

- A. Louvers: Provide louvers for interior doors, where indicated, which comply with SDI 111C, with blades or baffles formed of 0.020-inch- (0.5-mm-) thick, cold-rolled steel sheet set into 0.032-inch- (0.8-mm-) thick steel frame.
 1. Sightproof Louver: Stationary louvers constructed with inverted-V or inverted-Y blades.
 2. Fire-Rated Automatic Louvers: Louvers constructed with movable blades closed by actuating fusible link, and listed and labeled for use in fire-rated door assemblies of type and fire-resistance rating indicated by same qualified testing and inspecting agency that established fire-resistance rating of door assembly.
- B. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

- A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.
- B. Hollow-Metal Frames: Install hollow-metal frames of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.

1. Set frames accurately in position; plumb, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. At fire-rated openings, install frames according to NFPA 80.
 - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - c. Install frames with removable stops located on secure side of opening.
 - d. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - e. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
 4. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.
- C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire-Rated Steel Doors:
 - a. Between Door and Frame Jambs and Head: 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).
 - b. Between Edges of Pairs of Doors: 1/8 inch (3.2 mm) to 1/4 inch (6.3 mm) plus or minus 1/32 inch (0.8 mm).
 - c. At Bottom of Door: 3/4 inch (19.1 mm) plus or minus 1/32 inch (0.8 mm).
 - d. Between Door Face and Stop: 1/16 inch (1.6 mm) to 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).
 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 3. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.
- D. Glazing: Comply with installation requirements in Section 08800 "Glazing" and with hollow-metal manufacturer's written instructions.
1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (51 mm) o.c. from each corner.
- 3.4 ADJUSTING AND CLEANING
- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.
 - B. Remove grout and other bonding material from hollow-metal work immediately after installation.
 - C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

- D. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.
- E. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION

SECTION 08 7100

DOOR HARDWARE

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Door hardware for the following:
 - a. Swinging doors.
- B. Cylinders for door hardware specified in other Sections.
- C. Provide hardware list.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Section 081100 "Steel Doors and Frames" for door silencers provided as part of hollow-metal frames.
- C. Section 082110 "Flush Wood Doors.
- D. Section 084110 "Aluminum-Framed Entrances and Storefronts" for installation of entrance door hardware, including cylinders.
- E. Products furnished, but not installed, under this Section include the products listed below. Coordinating and scheduling the purchase and delivery of these products remain requirements of this Section.

1.3 ALLOWANCES

- A. Cash Allowance: Include under provision of Section SC-30 and Bid Proposal form.
- B. Allowance includes purchase and delivery of all hardware. Installation is included in this section and is part of the Contract Price.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Details of electrified door hardware, indicating the following:
 - 1. Shop drawings that including the following:
 - a. Elevations for doors.
 - b. Elevations for Frames
 - c. Head, jamb and other associated details.
 - 2. Operation Narrative: Describe the operation of doors controlled by electrified door hardware.
- C. Other Action Submittals:
 - 1. Door Hardware Schedule: Prepared by or under the supervision of Installer, detailing fabrication and assembly of door hardware, as well as installation procedures and

diagrams. Coordinate final door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

- a. Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.
- b. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.
- c. Content: Include the following information:
 - 1) Identification number, location, hand, fire rating, size, and material of each door and frame.
 - 2) Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
 - 3) Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
 - 4) Fastenings and other pertinent information.
 - 5) Explanation of abbreviations, symbols, and codes contained in schedule.
 - 6) Mounting locations for door hardware.
 - 7) List of related door devices specified in other Sections for each door and frame.
2. Keying Schedule: Prepared by or under the supervision of Installer, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.

1.5 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For electrified door hardware, from the manufacturer.
 1. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
- B. Product Test Reports: For compliance with accessibility requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on doors located in accessible routes.
- C. Warranty: Special warranty specified in this Section.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of door hardware to include in maintenance manuals. Include final hardware and keying schedule.

1.7 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of door hardware from a single manufacturer.
 1. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.
- B. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated, provide door hardware rated for use in assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C, unless otherwise indicated.
- C. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.

- D. Means of Egress Doors: Latches do not require more than 15 lbf (67 N) to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
 - E. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines ICC/ANSI A117.1.
 - 1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22.2 N).
 - 2. Comply with the following maximum opening-force requirements:
 - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
 - b. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
 - 3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than [1/2 inch (13 mm) high] [and] [3/4 inch (19 mm) high for exterior sliding doors].
 - 4. Adjust door closer sweep periods so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches (75 mm) from the latch, measured to the leading edge of the door.
- 1.8 DELIVERY, STORAGE, AND HANDLING
- A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.
 - B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.
 - C. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.
 - D. Deliver keys and permanent cores to Owner by registered mail or overnight package service.
- 1.9 COORDINATION
- A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.
 - B. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
 - C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
 - D. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.
- 1.10 WARRANTY
- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including excessive deflection, cracking, or breakage.
 - b. Faulty operation of doors and door hardware.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

2. Warranty Period: Three years from date of Substantial Completion, unless otherwise indicated.
 - a. Electromagnetic and Delayed-Egress Locks: Five years from date of Substantial Completion.
 - b. Exit Devices: Two years from date of Substantial Completion.
 - c. Manual Closers: 10 years from date of Substantial Completion.
 - d. Concealed Floor Closers: 25 years from date of Substantial Completion.

1.11 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.
- B. Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door and door hardware operation. Provide parts and supplies that are the same as those used in the manufacture and installation of original products.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. Provide door hardware for each door as scheduled on drawings to comply with requirements in this Section.
 1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products.
 2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
- B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Schedule" Article. Products are identified by using door hardware designations, as follows:
 1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements.
 2. References to BHMA Designations: Provide products complying with these designations and requirements for description, quality, and function.

2.2 HINGES

- A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Baldwin Hardware Corporation.
 - b. Bommer Industries, Inc.
 - c. Cal-Royal Products, Inc.
 - d. Hager Companies.
 - e. IVES Hardware; an Ingersoll-Rand company.
 - f. Lawrence Hardware Inc.
 - g. McKinney Products Company; an ASSA ABLOY Group company.
 - h. PBB, Inc.
 - i. Stanley Commercial Hardware; Div. of The Stanley Works.

2.3 SELF-CLOSING HINGES AND PIVOTS

- A. Self-Closing Hinges and Pivots: BHMA A156.17.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Baldwin Hardware Corporation.
 - b. Bommer Industries, Inc.
 - c. Cal-Royal Products, Inc.
 - d. Hager Companies.
 - e. Lawrence Hardware Inc.
 - f. McKinney Products Company; an ASSA ABLOY Group company.
 - g. PBB, Inc.
 - h. Stanley Commercial Hardware; Div. of The Stanley Works.

2.4 MECHANICAL LOCKS AND LATCHES

- A. Lock Functions: As indicated in door hardware schedule.
- B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:
 - 1. Bored Locks: Minimum 1/2-inch (13-mm) latchbolt throw.
 - 2. Mortise Locks: Minimum 3/4-inch (19-mm) latchbolt throw.
 - 3. Deadbolts: Minimum 1-inch (25-mm) bolt throw.
- C. Lock Backset: 2-3/4 inches (70 mm), unless otherwise indicated.
- D. Lock Trim:
 - 1. Description:
 - 2. Levers: Wrought.
 - 3. Escutcheons (Roses): Wrought.
 - 4. Dummy Trim: Match lever lock trim and escutcheons.
 - 5. Operating Device: Lever with escutcheons (roses).
- E. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.
 - 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 - 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
 - 3. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.
 - 4. Rabbet Front and Strike: Provide on locksets for rabbeted meeting stiles.
- F. Bored Locks: BHMA A156.2; Grade 1; Series 4000.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Arrow USA; an ASSA ABLOY Group company.
 - b. Best Access Systems; Div. of Stanley Security Solutions, Inc.
 - c. Cal-Royal Products, Inc.
 - d. Corbin Russwin Architectural Hardware; n ASSA ABLOY Group Company.
 - e. Falcon Lock; An Ingersoll-Rand Company.
 - f. K2 Commercial Hardware; a Black & Decker Corp. company.
 - g. Marks USA.
 - h. Medeco Security Locks, Inc.; an ASSA ABLOY Group company.
 - i. PDQ Manufacturing.
 - j. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
 - k. Schlage Commercial Lock Division; an Ingersoll-Rand company.
 - l. Weiser Lock Corp.; a Black & Decker Corp. company.

- m. Yale Security Inc.; an ASSA ABLOY Group company.
 - G. Mortise Locks: BHMA A156.13; Security Grade 1; stamped steel case with steel or brass parts; Series 1000.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Accurate Lock & Hardware Co.
 - b. Adams Rite Manufacturing Co.; an ASSA ABLOY Group company.
 - c. Arrow USA; an ASSA ABLOY Group company.
 - d. Best Access Systems; Div. of Stanley Security Solutions, Inc.
 - e. Cal-Royal Products, Inc.
 - f. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
 - g. Falcon Lock; an Ingersoll-Rand company.
 - h. Marks USA.
 - i. PDQ Manufacturing.
 - j. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
 - k. Schlage Commercial Lock Division; an Ingersoll-Rand company.
 - l. Yale Security Inc.; an ASSA ABLOY Group company.
 - H. Interconnected Locks: BHMA A156.12; Grade [1] [2]; Series 5000.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Arrow USA; an ASSA ABLOY Group company.
 - b. Falcon Lock; an Ingersoll-Rand company.
 - c. Schlage Commercial Lock Division; an Ingersoll-Rand company.
- 2.5 AUXILIARY LOCKS
- A. Bored Auxiliary Locks: BHMA A156.5: Grade 1; with strike that suits frame.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following
 - a. Arrow USA; an ASSA ABLOY Group company.
 - b. Best Access Systems; Div. of Stanley Security Solutions, Inc.
 - c. Cal-Royal Products, Inc.
 - d. Falcon Lock; an Ingersoll-Rand company.
 - e. Hager Companies.
 - f. K2 Commercial Hardware; a Black & Decker Corp. company.
 - g. Marks USA.
 - h. Medeco Security Locks, Inc.; an ASSA ABLOY Group company.
 - i. PDQ Manufacturing.
 - j. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
 - k. Schlage Commercial Lock Division; an Ingersoll-Rand company.
 - l. Weiser Lock Corp.; a Black & Decker Corp. company.
 - m. Yale Security Inc.; an ASSA ABLOY Group company.
 - B. Mortise Auxiliary Locks: BHMA A156.5; Grade [1] [2]; with strike that suits frame.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Accurate Lock & Hardware Co.
 - b. Adams Rite Manufacturing Co.; an ASSA ABLOY Group company.
 - c. Arrow USA; an ASSA ABLOY Group company.
 - d. Best Access Systems; Div. of Stanley Security Solutions, Inc.
 - e. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
 - f. Schlage Commercial Lock Division; an Ingersoll-Rand company.
 - g. Yale Security Inc.; an ASSA ABLOY Group company.

- C. Push-Button Combination Locks: BHMA A156.5; cylindrical; Grade 1; lock opens by entering a one- to five-digit code by pushing correct buttons in correct sequence; automatically relocks when door is closed; with strike that suits frame.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following.

2.6 ELECTRIC STRIKES

- A. Electric Strikes: BHMA A156.31; Grade 1; with faceplate to suit lock and frame.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Adams Rite Manufacturing Co.; an ASSA ABLOY Group company.
 - b. Dortronics Systems, Inc.
 - c. DynaLock Corp.
 - d. Folger Adam Electric Door Controls; an ASSA ABLOY Group company.
 - e. HES, Inc.; an ASSA ABLOY Group company.
 - f. Rutherford Controls Int'l. Corp.
 - g. Security Door Controls.
 - h. Trine Access Technology.
 - i. Von Duprin; an Ingersoll-Rand company.

2.7 ELECTROMAGNETIC LOCKS

- A. Electromagnetic Locks: BHMA A156.23; electrically powered; with electromagnet attached to frame and armature plate attached to door; full-exterior or full-interior type, as required by application indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Door Controls International, Inc.
 - b. Dortronics Systems, Inc.
 - c. DynaLock Corp.
 - d. Rutherford Controls Int'l. Corp.
 - e. Schlage Commercial Lock Division; an Ingersoll-Rand company.
 - f. Securitron Magnalock Corporation; an ASSA ABLOY Group company.
 - g. Security Door Controls.
- B. Delayed-Egress Electromagnetic Locks: BHMA A156.24, electrically powered, with electromagnet attached to frame and armature plate attached to door; depressing push bar for more than 3 seconds initiates irreversible alarm and 15-second delay for egress. When integrated with fire alarm, fire alarm voids 15-second delay.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Door Controls International, Inc.
 - b. Doorguard Systems, Inc.
 - c. DynaLock Corp.
 - d. Rutherford Controls Int'l. Corp.
 - e. Schlage Commercial Lock Division; an Ingersoll-Rand company.
 - f. Securitron Magnalock Corporation; an ASSA ABLOY Group company.

2.8 ELECTROMECHANICAL LOCKS

- A. Electromechanical Locks: BHMA A156.25; Grade 1; motor or solenoid driven; bored; with strike that suits frame.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Best Access Systems; Div. of Stanley Security Solutions, Inc.
 - b. Brink, R. R., Locking Systems, Inc.
 - c. DynaLock Corp.
 - d. Marks USA.

- e. Rutherford Controls Int'l. Corp.
- f. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
- g. Schlage Commercial Lock Division; an Ingersoll-Rand company.
- h. Security Door Controls.
- i. Yale Security Inc.; an ASSA ABLOY Group company.

2.9 SELF-CONTAINED ELECTRONIC LOCKS

- A. Self-Contained Electronic Locks: BHMA A156.25, bored; with internal, battery-powered, self-contained electronic locks; consisting of complete lockset, motor-driven lock mechanism, and actuating device; enclosed in zinc-dichromate-plated, wrought-steel case, and strike that suits frame. Provide key override, low-battery detection and warning, LED status indicators, and ability to program at the lock.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of:
 - a. Best Access Systems; Div. of Stanley Security Solutions, Inc.
 - b. Kaba Ilco Corp.; a Kaba Group company.
 - c. Marks USA.
 - d. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
 - e. Schlage Commercial Lock Division; an Ingersoll-Rand company.
 - f. Yale Security Inc.; an ASSA ABLOY Group company.

2.10 EXIT LOCKS AND EXIT ALARMS

- A. Exit Locks and Alarms: BHMA A156.29, Grade 1.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Arrow USA; an ASSA ABLOY Group company.
 - b. Detex Corporation.
 - c. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

2.11 SURFACE BOLTS

- A. Surface Bolts: BHMA A156.16.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Burns Manufacturing Incorporated.
 - b. Don-Jo Mfg., Inc.
 - c. Door Controls International, Inc.
 - d. IVES Hardware; an Ingersoll-Rand company.
 - e. Trimco.

2.12 MANUAL FLUSH BOLTS

- A. Manual Flush Bolts: BHMA A156.16; minimum 3/4-inch (19-mm) throw; designed for mortising into door edge.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Adams Rite Manufacturing Co.; an ASSA ABLOY Group company.
 - b. Burns Manufacturing Incorporated.
 - c. Don-Jo Mfg., Inc.
 - d. Door Controls International, Inc.
 - e. Hiawatha, Inc.
 - f. IVES Hardware; an Ingersoll-Rand company.
 - g. Trimco.

2.13 AUTOMATIC AND SELF-LATCHING FLUSH BOLTS

- A. Automatic and Self-Latching Flush Bolts: BHMA A156.16; minimum 3/4-inch (19-mm) throw; designed for mortising into door edge.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cal-Royal Products, Inc.
 - b. Door Controls International, Inc.
 - c. IVES Hardware; an Ingersoll-Rand company.
 - d. Trimco.

2.14 EXIT DEVICES AND AUXILIARY ITEMS

- A. Exit Devices and Auxiliary Items: BHMA A156.3.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Adams Rite Manufacturing Co.; an ASSA ABLOY Group company.
 - b. Arrow USA; an ASSA ABLOY Group company.
 - c. Cal-Royal Products, Inc.
 - d. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
 - e. Detex Corporation.
 - f. Door Controls International, Inc.
 - g. DORMA Architectural Hardware; Member of The DORMA Group North America.
 - h. Dor-O-Matic; an Ingersoll-Rand company.
 - i. K2 Commercial Hardware; a Black & Decker Corp. company.
 - j. Monarch Exit Devices & Panic Hardware; an Ingersoll-Rand company.
 - k. Precision Hardware, Inc.; Division of Stanley Security Solutions, Inc.
 - l. Rutherford Controls Int'l. Corp.
 - m. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
 - n. Von Duprin; an Ingersoll-Rand company.
 - o. Yale Security Inc.; an ASSA ABLOY Group company.

2.15 LOCK CYLINDERS

- A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.
 1. Manufacturer: Same manufacturer as for locking devices..
- B. Standard Lock Cylinders: BHMA A156.5; Grade 1; permanent cores that are interchangeable; face finished to match lockset.
- C. High-Security Lock Cylinders: BHMA A156.30; Grade 1; Type M, mechanical; permanent cores that are removable; face finished to match lockset.
- D. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.
- E. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

2.16 KEYING

- A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference.
 1. Existing System:
 - a. Master key or grand master key locks to Owner's existing system.
 2. Keyed Alike: Key all cylinders to same change key.
- B. Keys: Nickel silver.
 1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
 - a. Notation: "DO NOT DUPLICATE."

2. Quantity: In addition to one extra key blank for each lock, provide the following:
 - a. Cylinder Change Keys: Three.
 - b. Master Keys: Five.
 - c. Grand Master Keys: Five.
 - d. Great-Grand Master Keys: Five.

2.17 KEY CONTROL SYSTEM

- A. Key Control Cabinet: BHMA A156.5; metal cabinet with baked-enamel finish; containing key-holding hooks, labels, 2 sets of key tags with self-locking key holders, key-gathering envelopes, and temporary and permanent markers; with key capacity of 150 percent of the number of locks.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Key Boxes and Cabinets.
 - b. GE Security, Inc.
 - c. HPC, Inc.
 - d. Lund Equipment Co., Inc.
 - e. MMF Industries.
 - f. Tri Palm International.
 2. Multiple-Drawer Cabinet: Cabinet with drawers equipped with key-holding panels and key envelope storage, and progressive-type ball-bearing suspension slides. Include single cylinder lock to lock all drawers.
- B. Key Lock Boxes: Designed for storage of two keys, with tamper switches to connect to intrusion detection system.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. GE Security, Inc.
 - b. HPC, Inc.
 - c. Knox Company.
- C. Key Control System Software: BHMA A156.5, Grade 1; multiple-index system for recording and reporting key-holder listings, tracking keys and lock and key history, and printing receipts for transactions. Include instruction manual.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Best Access Systems; Div. of Stanley Security Solutions, Inc.
 - b. GE Security, Inc.
 - c. HPC, Inc.

2.18 OPERATING TRIM

- A. Operating Trim: BHMA A156.6; aluminum, unless otherwise indicated.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Burns Manufacturing Incorporated.
 - b. Don-Jo Mfg., Inc.
 - c. Forms + Surfaces.
 - d. Hager Companies.
 - e. Hiawatha, Inc.
 - f. IVES Hardware; an Ingersoll-Rand company.
 - g. Rockwood Manufacturing Company.
 - h. Trimco.

2.19 ACCESSORIES FOR PAIRS OF DOORS

- A. Coordinators: BHMA A156.3; consisting of active-leaf, hold-open lever and inactive-leaf release trigger; fabricated from steel with nylon-coated strike plates; with built-in, adjustable safety release.
- B. Carry-Open Bars: BHMA A156.3; prevent the inactive leaf from opening before the active leaf; provide polished brass or bronze carry-open bars with strike plate for inactive leaves of pairs of doors unless automatic or self-latching bolts are used.
- C. Astragals: BHMA A156.22.

2.20 SURFACE CLOSERS

- A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Arrow USA; an ASSA ABLOY Group company.
 - b. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
 - c. DORMA Architectural Hardware; Member of The DORMA Group North America.
 - d. Dor-O-Matic; an Ingersoll-Rand company.
 - e. K2 Commercial Hardware; a Black & Decker Corp. company.
 - f. LCN Closers; an Ingersoll-Rand company.
 - g. Norton Door Controls; an ASSA ABLOY Group company.
 - h. Rixson Specialty Door Controls; an ASSA ABLOY Group company.
 - i. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
 - j. Yale Security Inc.; an ASSA ABLOY Group company.

2.21 CONCEALED CLOSERS

- A. Concealed Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. DORMA Architectural Hardware; Member of The DORMA Group North America.
 - b. LCN Closers; an Ingersoll-Rand company.
 - c. Norton Door Controls; an ASSA ABLOY Group company.
 - d. Rixson Specialty Door Controls; an ASSA ABLOY Group company.
 - e. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

2.22 CLOSER HOLDER RELEASE DEVICES

- A. Closer Holder Release Devices: BHMA A156.15; Grade 1; closer connected with separate or integral releasing and fire- or smoke-detecting devices. Door shall become self-closing on interruption of signal to release device. Automatic release is activated by smoke detection system loss of power.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.

- b. DORMA Architectural Hardware; Member of The DORMA Group North America.
- c. LCN Closers; an Ingersoll-Rand company.
- d. Norton Door Controls; an ASSA ABLOY Group company.
- e. Rixson Specialty Door Controls; an ASSA ABLOY Group company.
- f. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

2.23 MECHANICAL STOPS AND HOLDERS

- A. Wall- and Floor-Mounted Stops: BHMA A156.16; polished cast brass, bronze, or aluminum base metal.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Architectural Builders Hardware Mfg., Inc.
 - b. Baldwin Hardware Corporation.
 - c. Burns Manufacturing Incorporated.
 - d. Cal-Royal Products, Inc.
 - e. Don-Jo Mfg., Inc.
 - f. Door Controls International, Inc.
 - g. Hager Companies.
 - h. Hiawatha, Inc.
 - i. IVES Hardware; an Ingersoll-Rand company.
 - j. Rockwood Manufacturing Company.
 - k. Stanley Commercial Hardware; Div. of The Stanley Works.
 - l. Trimco.

2.24 ELECTROMAGNETIC STOPS AND HOLDERS

- A. Electromagnetic Door Holders: BHMA A156.15, Grade 1; wall-mounted electromagnetic single unit with strike plate attached to swinging door; coordinated with fire detectors and interface with fire alarm system for labeled fire-rated door assemblies.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Architectural Builders Hardware Mfg., Inc.
 - b. DORMA Architectural Hardware; Member of The DORMA Group North America.
 - c. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

2.25 OVERHEAD STOPS AND HOLDERS

- A. Overhead Stops and Holders: BHMA A156.8.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Architectural Builders Hardware Mfg., Inc.
 - b. Glynn-Johnson; an Ingersoll-Rand company.
 - c. Rockwood Manufacturing Company.
 - d. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

2.26 DOOR GASKETING

- A. Door Gasketing: BHMA A156.22; air leakage not to exceed 0.50 cfm per foot (0.000774 cu. m/s per m) of crack length for gasketing other than for smoke control, as tested according to ASTM E 283; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hager Companies.
 - b. M-D Building Products, Inc.
 - c. National Guard Products.

- d. Pemko Manufacturing Co.; an ASSA ABLOY Group company.
- e. Reese Enterprises, Inc.
- f. Sealeze; a unit of Jason Incorporated.
- g. Zero International.

2.27 THRESHOLDS

- A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hager Companies.
 - b. M-D Building Products, Inc.
 - c. National Guard Products.
 - d. Pemko Manufacturing Co.; an ASSA ABLOY Group company.
 - e. Reese Enterprises, Inc.
 - f. Rixson Specialty Door Controls; an ASSA ABLOY Group company.
 - g. Sealeze; a unit of Jason Incorporated.
 - h. Zero International.

2.28 SLIDING DOOR HARDWARE

- A. Sliding Door Hardware: BHMA A156.14; consisting of complete sets including rails, hangers, supports, bumpers, floor guides, and accessories indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cox, Arthur, & Sons, Inc.
 - b. Hager Companies.
 - c. Henderson, PC Inc.
 - d. Johnson, L. E., Products, Inc.
 - e. Stanley Commercial Hardware; Div. of The Stanley Works.

2.29 METAL PROTECTIVE TRIM UNITS

- A. Metal Protective Trim Units: BHMA A156.6; fabricated from 0.050-inch- (1.3-mm-) thick aluminum; with manufacturer's standard machine or self-tapping screw fasteners.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Baldwin Hardware Corporation.
 - b. Burns Manufacturing Incorporated.
 - c. Don-Jo Mfg., Inc.
 - d. Hiawatha, Inc.
 - e. IPC Door and Wall Protection Systems, Inc.; Div. of InPro Corporation.
 - f. IVES Hardware; an Ingersoll-Rand company.
 - g. Pawling Corporation.
 - h. Rockwood Manufacturing Company.
 - i. Trimco.

2.30 AUXILIARY DOOR HARDWARE

- A. Auxiliary Hardware: BHMA A156.16.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Baldwin Hardware Corporation.
 - b. Cal-Royal Products, Inc.
 - c. Don-Jo Mfg., Inc.
 - d. Hager Companies.
 - e. Rockwood Manufacturing Company.
 - f. Stanley Commercial Hardware; Div. of The Stanley Works.
 - g. Trimco.

2.31 AUXILIARY ELECTRIFIED DOOR HARDWARE

- A. Auxiliary Electrified Door Hardware:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. DynaLock Corp.
 - b. GE Security, Inc.
 - c. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
 - d. Schlage Commercial Lock Division; an Ingersoll-Rand company.
 - e. Securitron Magnalock Corporation; an ASSA ABLOY Group company.
 - f. Security Door Controls.

2.32 FABRICATION

- A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rated labels and as otherwise approved by Architect.
 - 1. Manufacturer's identification is permitted on rim of lock cylinders only.
- B. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.
- C. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.
 - 1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
 - 2. Fire-Rated Applications:
 - a. Wood or Machine Screws: For the following:
 - 1) Hinges mortised to doors or frames.
 - 2) Strike plates to frames.
 - 3) Closers to doors and frames.
 - b. Steel Through Bolts: For the following unless door blocking is provided:
 - 1) Surface hinges to doors.
 - 2) Closers to doors and frames.
 - 3) Surface-mounted exit devices.
 - 3. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
 - 4. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."
 - 5. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.33 FINISHES

- A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable

variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
- B. Wood Doors: Comply with DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."

3.3 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 - 2. Custom Steel Doors and Frames: HMMA 831.
 - 3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing. Do not install surface-mounted items until finishes have been completed on substrates involved.
 - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- C. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- D. Intermediate Offset Pivots: Where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule but not fewer than one intermediate offset pivot per door and one additional intermediate offset pivot for every 30 inches (750 mm) of door height greater than 90 inches (2286 mm).
- E. Lock Cylinders: Install construction cores to secure building and areas during construction period.
 - 1. Replace construction cores with permanent cores as directed by Owner.

2. Furnish permanent cores to Owner for installation.
- F. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
 - G. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above in equipment room. Verify location with Architect.
 1. Configuration: Provide one power supply for each door opening with electrified door hardware.
 - H. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 07920 "Joint Sealants."
 - I. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.
 - J. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
 - K. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
 - L. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.
- 3.4 FIELD QUALITY CONTROL
- A. Independent Architectural Hardware Consultant: Owner will engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.
 1. Independent Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.
- 3.5 ADJUSTING
- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 1. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 30 degrees.
 2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
 3. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
 - B. Occupancy Adjustment: Approximately six months after date of Substantial Completion, Installer's Architectural Hardware Consultant shall examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.
- 3.6 CLEANING AND PROTECTION
- A. Clean adjacent surfaces soiled by door hardware installation.
 - B. Clean operating items as necessary to restore proper function and finish.
 - C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.7 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes. Refer to Section 01820 "Demonstration and Training."

3.8 DOOR HARDWARE SCHEDULE

- A. Provide hardware schedule for door hardware and trim. Consult with Airport and Architect for types and styles required for each door. See door hardware allowance.

END OF SECTION

SECTION 09 2500

GYPSUM BOARD

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Interior gypsum board.
- B. Exterior gypsum board for ceilings and soffits.
- C. Tile backing panels.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Section 091110 "Non-Load-Bearing Steel Framing" for non-structural framing and suspension systems that support gypsum board panels.
- C. Section 093100 "Ceramic Tile" for cementitious backer units installed as substrates for ceramic tile.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.5 FIELD CONDITIONS

- A. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- B. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or blotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

- B. **STC-Rated Assemblies:** For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- C. **Low-Emitting Materials:** For ceiling and wall assemblies, provide materials and construction identical to those tested in assembly and complying with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 GYPSUM BOARD, GENERAL

- A. **Size:** Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

- A. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 1. American Gypsum.
 2. CertainTeed Corp.
 3. Georgia-Pacific Gypsum LLC.
 4. Lafarge North America Inc.
 5. National Gypsum Company.
 6. PABCO Gypsum.
 7. Temple-Inland.
 8. USG Corporation.
 9. <Insert manufacturer's name>.
- B. **Gypsum Wallboard:** ASTM C 1396/C 1396M.
 1. Thickness: 5/8 inch (12.7 mm).
 2. Long Edges: Tapered.
- C. **Gypsum Board, Type X:** ASTM C 1396/C 1396M.
 1. Thickness: 5/8 inch (15.9 mm).
 2. Long Edges: Tapered.
- D. **Moisture- and Mold-Resistant Gypsum Board:** ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.
 1. Core: 5/8 inch (15.9 mm), Type X.
 2. Long Edges: Tapered.
 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.4 TILE BACKING PANELS

- A. **Glass-Mat, Water-Resistant Backing Board:** ASTM C 1178/C 1178M, with manufacturer's standard edges.
 1. **Products:** Subject to compliance with requirements, provide one of the following:
 - a. CertainTeed Corp.; GlasRoc Tile Backer.
 - b. Georgia-Pacific Gypsum LLC; DensShield Tile Backer.
 2. Core: 5/8 inch (15.9 mm), Type X.
 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- B. **Cementitious Backer Units:** ANSI A118.9 and ASTM C 1288 or 1325, with manufacturer's standard edges.
 1. **Products:** Subject to compliance with requirements, provide one of the following:
 - a. C-Cure; C-Cure Board 990.
 - b. CertainTeed Corp.; FiberCement Underlayment, BackerBoard.
 - c. Custom Building Products; Wonderboard, EasyBoard.

- d. National Gypsum Company, Permabase Cement Board.
- e. USG Corporation; DUROCK Cement Board.
- 2. Thickness: 5/8 inch (15.9 mm).
- 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

C. Water-Resistant Gypsum Backing Board: ASTM C 1396/C 1396M, with manufacturer's standard edges.

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Gypsum.
 - b. CertainTeed Corp.
 - c. Georgia-Pacific Gypsum LLC.
 - d. Lafarge North America Inc.
 - e. PABCO Gypsum.
 - f. Temple-Inland.
 - g. USG Corporation.
 - h. <Insert manufacturer's name>.
- 2. Core: 5/8 inch (15.9 mm), Type X.

2.5 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

- 1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.
- 2. Shapes:
 - a. Cornerbead.
 - b. Bullnose bead.
 - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - d. L-Bead: L-shaped; exposed long flange receives joint compound.
 - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - f. Expansion (control) joint.
 - g. Curved-Edge Cornerbead: With notched or flexible flanges.

B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Fry Reglet Corp.
 - b. Gordon, Inc.
 - c. Pittcon Industries.
- 2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221 (ASTM B 221M), Alloy 6063-T5.
- 3. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.

2.6 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

- 1. Interior Gypsum Board: Paper.
- 2. Exterior Gypsum Soffit Board: Paper.
- 3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
- 4. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

- 1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.

2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 3. Fill Coat: For second coat, use setting-type, sandable topping compound.
 4. Finish Coat: For third coat, use setting-type, sandable topping compound.
 5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.
- D. Joint Compound for Exterior Applications:
1. Exterior Gypsum Soffit Board: Use setting-type taping compound and setting-type, sandable topping compound.
 2. Glass-Mat Gypsum Sheathing Board: As recommended by sheathing board manufacturer.
- E. Joint Compound for Tile Backing Panels:
1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
 2. Cementitious Backer Units: As recommended by backer unit manufacturer.
 3. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and setting-type, sandable topping compound.
- ## 2.7 AUXILIARY MATERIALS
- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
1. Laminating adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Laminating adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- D. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
 2. Recycled Content of Blankets: Postconsumer recycled content plus one-half of preconsumer recycled content.
- E. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
1. Products: Subject to compliance with requirements, Provide one of the following:
 - a. Accumetric LLC; BOSS 824 Acoustical Sound Sealant.
 - b. Grabber Construction Products; Acoustical Sealant GSC.
 - c. Pecora Corporation; AC-20 FTR.
 - d. Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
 - e. USG Corporation; SHEETROCK Acoustical Sealant.

2. Acoustical joint sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Acoustical joint sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

F. Thermal Insulation: As specified in Section 07210 "Building Insulation."

G. Vapor Retarder: As specified in Section 07210 "Building Insulation."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
 2. Fit gypsum panels around ducts, pipes, and conduits.
 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.
- J. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
- K. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

- A. Single-Layer Application:
 - 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
 - 2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
 - 3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
 - 4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- B. Multilayer Application:
 - 1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches (400 mm) minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
 - 2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
 - 3. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
 - 4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.
- C. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.
- D. Curved Surfaces:

1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch- (300-mm-) long straight sections at ends of curves and tangent to them.
2. For double-layer construction, fasten base layer to studs with screws 16 inches (400 mm) o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches (300 mm) o.c.

3.4 APPLYING EXTERIOR GYPSUM PANELS FOR CEILINGS AND SOFFITS

- A. Apply panels perpendicular to supports, with end joints staggered and located over supports.
 1. Install with 1/4-inch (6.4-mm) open space where panels abut other construction or structural penetrations.
 2. Fasten with corrosion-resistant screws.

3.5 APPLYING TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and install at locations indicated to receive tile. Install with 1/4-inch (6.4-mm) gap where panels abut other construction or penetrations.
- B. Cementitious Backer Units: ANSI A108.11, at locations indicated to receive tile.
- C. Water-Resistant Backing Board: Install where indicated with 1/4-inch (6.4-mm) gap where panels abut other construction or penetrations.
- D. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.6 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
 1. Cornerbead: Use at outside corners unless otherwise indicated.
 2. LC-Bead: Use at exposed panel edges.
 3. L-Bead: Use where indicated.
 4. U-Bead: Use where indicated.
- D. Aluminum Trim: Install in locations indicated on Drawings.

3.7 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 2. Level 2: Panels that are substrate for tile.
 3. Level 3: Where indicated on Drawings.
 4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
 - a. Primer and its application to surfaces are specified in other Section 09912 "Interior Painting." Level 5 is suitable for surfaces receiving gloss and semigloss enamels and other surfaces subject to severe lighting. It is considered a high-quality gypsum board finish.
 5. Level 5: Where indicated on Drawings.
 - a. Primer and its application to surfaces are specified in other Section 09912 "Interior Painting."
- E. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.
- F. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.
- G. Cementitious Backer Units: Finish according to manufacturer's written instructions.
- 3.8 PROTECTION
- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

SECTION 09 6530

RESILIENT WALL BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Resilient base.
- B. Resilient molding accessories.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of product indicated.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Furnish not less than 10 linear feet (3 linear m) for every 500 linear feet (150 linear m) or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.5 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).

1.7 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive resilient products during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).
- C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 RESILIENT BASE

- A. Resilient Base:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allstate Rubber Corp.; Stoler Industries.
 - b. Armstrong World Industries, Inc.
 - c. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
 - d. Endura Rubber Flooring; Division of Burke Industries, Inc.
 - e. Estrie Products International; American Biltrite (Canada) Ltd.
 - f. Flexco, Inc.
 - g. Johnsonite.
 - h. Mondo Rubber International, Inc.
 - i. Musson, R. C. Rubber Co.
 - j. Nora Rubber Flooring; Freudenberg Building Systems, Inc.
 - k. PRF USA, Inc.
 - l. Roppe Corporation, USA.
 - m. VPI, LLC; Floor Products Division.
- B. Resilient Base Standard: ASTM F 1861.
 - 1. Material Requirement: Type TV (vinyl, thermoplastic).
 - 2. Manufacturing Method: Group I (solid, homogeneous).
 - 3. Style: Cove (base with toe).
- C. Minimum Thickness: 0.125 inch (3.2 mm).
- D. Height: 4 inches (64 mm).
- E. Lengths: Coils in manufacturer's standard length.
- F. Outside Corners: Job formed.
- G. Inside Corners: Job formed.
- H. Finish: Satin.
- I. Colors and Patterns: As indicated by manufacturer's designations.

2.2 RESILIENT MOLDING ACCESSORY

- A. Resilient Molding Accessory:
 - 1. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
 - b. Flexco, Inc.
 - c. Johnsonite.
 - d. R.C.A. Rubber Company (The).
 - e. Roppe Corporation, USA.
 - f. VPI, LLC; Floor Products Division.
- B. Description: Nosing for carpet, Nosing for resilient floor covering, Reducer strip for resilient floor covering, Joiner for tile and carpet, Transition strips.
- C. Material: Vinyl.
- D. Profile and Dimensions: As indicated.

- E. Colors and Patterns: As selected by Architect from full range of industry colors.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.
 - 1. Adhesives shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edges of tiles, and in maximum available lengths to minimize running joints.
- D. Floor Polish: Provide protective liquid floor polish products as recommended by resilient stair tread manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates for Resilient Stair Treads and Accessories: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer.
 - 4. Moisture Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install resilient products until they are same temperature as the space where they are to be installed.
 - 1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

- E. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Job-Formed Corners:
 - 1. Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends.
 - 2. Inside Corners: Use straight pieces of maximum lengths possible.

3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of carpet, resilient floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
- B. Perform the following operations immediately after completing resilient product installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover resilient products until Substantial Completion.

END OF SECTION

SECTION 09 9110
EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Section includes surface preparation and the application of paint systems on the following exterior substrates:
 - 1. Steel.
 - 2. Galvanized metal.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section 051200 "Structural Steel" for shop priming of metal substrates with primers specified in this Section.
- C. Section 099120 "Interior Painting" for surface preparation and the application of paint systems on interior substrates.

1.3 DEFINITIONS

- A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- D. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples for Initial Selection: For each type of topcoat product.
- C. Product List: For each product indicated, include the following:
 - 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
 - 2. Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
 - 3. VOC content.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Paint: 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Benjamin Moore & Co.
 - 2. Duron, Inc.
 - 3. Euclid Chemical Company.
 - 4. ICI Paints.
 - 5. PPG Architectural Finishes, Inc.
 - 6. Pratt & Lambert.
 - 7. Sherwin-Williams Company (The).

2.2 PAINT, GENERAL

- A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."
- B. Material Compatibility:
 - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- C. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.
- D. Colors: As selected by Architect from manufacturer's full range.
 - 1. 80 percent of surface area will be painted with deep tones.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
 - 2. Masonry (Clay and CMU): 12 percent.
 - 3. Wood: 15 percent.
 - 4. Portland Cement Plaster: 12 percent.
 - 5. Gypsum Board: 12 percent.
 - C. Exterior Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
 - D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
 - E. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.
- 3.2 PREPARATION
- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.
 - B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
 - C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
 - D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
 - E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
 - F. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
 - G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- 3.3 APPLICATION
- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
 - 3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
 - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- D. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
 1. Paint the following work where exposed to view:
 - a. Equipment, including panelboards and switch gear.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Tanks that do not have factory-applied final finishes.

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

- A. Concrete Substrates, Nontraffic Surfaces:
 1. Latex System:
 - a. Prime Coat: Latex, exterior, matching topcoat.
 - b. Topcoat: Latex, exterior flat (Gloss Level 1), MPI #10.
- B. Steel Substrates:
 1. Alkyd System:
 - a. Prime Coat: Primer, alkyd, anticorrosive for metal, MPI #79.
 - b. Intermediate Coat: Exterior alkyd enamel matching topcoat.

- c. Topcoat: Alkyd, exterior, semi-gloss (Gloss Level 5), MPI #94.
- C. Galvanized-Metal Substrates:
 - 1. Alkyd System:
 - a. Prime Coat: Primer, galvanized metal, as recommended in writing by topcoat manufacturer for exterior use on galvanized-metal substrates with topcoat indicated.
 - b. Intermediate Coat: Exterior alkyd enamel matching topcoat.
 - c. Topcoat: Alkyd, exterior, semi-gloss (Gloss Level 5), MPI #94.

END OF SECTION

SECTION 09 9120

INTERIOR PAINTING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Section includes surface preparation and the application of paint systems on the following interior substrates:
 - 1. Concrete.
 - 2. Steel.
 - 3. Cast iron.
 - 4. Galvanized metal.
 - 5. Wood.
 - 6. Gypsum board.
 - 7. Cotton or canvas insulation covering.
 - 8. ASJ insulation covering.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Section 051200 "Structural Steel" for shop priming of metal substrates with primers specified in this Section.

1.3 DEFINITIONS

- A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples for Initial Selection: For each type of topcoat product.
- C. Product List: For each product indicated, include the following:
 - 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
 - 2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.
 - 3. VOC content.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Paint: 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Benjamin Moore & Co.
 - 2. Benjamin Moore & Co. (Canada).
 - 3. Duron, Inc.
 - 4. Euclid Chemical Company.
 - 5. ICI Paints.
 - 6. PPG Architectural Finishes, Inc.
 - 7. Pratt & Lambert.
 - 8. Sherwin-Williams Company (The).

2.2 PAINT, GENERAL

- A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."
- B. Material Compatibility:
 - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- C. Colors: As selected by Architect from manufacturer's full range.
 - 1. 50 percent of surface area will be painted with deep tones.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
 - 2. Masonry (Clay and CMU): 12 percent.
 - 3. Wood: 15 percent.
 - 4. Gypsum Board: 12 percent.
 - 5. Plaster: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- F. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- G. Wood Substrates:
 - 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
 - 2. Sand surfaces that will be exposed to view, and dust off.
 - 3. Prime edges, ends, faces, undersides, and backsides of wood.
 - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

- H. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 - 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- D. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
 - 1. Paint the following work where exposed in equipment rooms:
 - a. Equipment, including panelboards and switch gear.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Tanks that do not have factory-applied final finishes.
 - h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - 2. Paint the following work where exposed in occupied spaces:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - h. Other items as directed by Architect.
 - 3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply

additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

- A. Concrete Substrates, Traffic Surfaces:
 - 1. Water-Based Clear Sealer System: (Non Hangar floor surfaces)
 - a. First Coat: Sealer, water based, for concrete floors, MPI #99.
 - b. Topcoat: Sealer, water based, for concrete floors, MPI #99.
 - 2. Resinous Urethane Coating: (Hangar floor surfaces)
 - a. See 09670 Resinous Flooring
- B. Steel Substrates:
 - 1. Water-Based Dry-Fall System: (Exposed Hangar Structure and misc)
 - a. Prime Coat: Shop primer specified in Section 05120 "Structural Steel" where substrate is specified and not previously primed.
 - b. Existing Factory primed surfaces: Reapply 2nd coat of primer over existing exposed structure after erection, making connections, and cleaning surfaces. Apply primer to exposed primary and secondary framing to a minimum dry film thickness of 1 mil (0.025 mm).
Primer: SSPC-Paint 15, Type I, grey/white oxide.
 - c. Topcoat: Dry fall, latex, flat[, MPI #118].
 - 2. Institutional Low-Odor/VOC Latex System:
 - a. Prime Coat: Primer, rust-inhibitive, water based MPI #107.
 - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
 - c. Topcoat: Latex, interior, institutional low odor/VOC, (Gloss Level 2), MPI #144.
- C. Galvanized-Metal Substrates:
 - 1. Institutional Low-Odor/VOC Latex System:
 - a. Prime Coat: Primer, galvanized, water based, MPI #134.
 - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
 - c. Topcoat: Latex, interior, institutional low odor/VOC, (Gloss Level 3), MPI #145.
- D. Wood Substrates: Including wood trim wood-based panel products.
 - 1. Institutional Low-Odor/VOC Latex System:
 - a. Prime Coat: Primer, latex, for interior wood, MPI #39.
 - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.

- E. Gypsum Board Substrates:
 - 1. Institutional Low-Odor/VOC Latex System:
 - a. Prime Coat: Primer sealer, interior, institutional low odor/VOC, MPI #149.
 - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
 - c. Topcoat: Latex, interior, institutional low odor/VOC, (Gloss Level 2), MPI #144.
- F. Cotton or Canvas and ASJ Insulation-Covering Substrates: Including pipe and duct coverings.
 - 1. Institutional Low-Odor/VOC Latex System:
 - a. Prime Coat: Primer sealer, latex, interior, MPI #50.
 - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
 - c. Topcoat: Latex, interior, institutional low odor/VOC, flat (Gloss Level 1), MPI #143.

END OF SECTION

SECTION 10 5230
FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section 10522 "Fire Extinguisher Cabinets."

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.
- B. Product Schedule: For fire extinguishers. Coordinate final fire extinguisher schedule with fire protection cabinet schedule to ensure proper fit and function. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Failure of hydrostatic test according to NFPA 10.
 - b. Faulty operation of valves or release levers.
 - 2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each mounting bracket indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Amerex Corporation.
 - b. Ansul Incorporated; Tyco International Ltd.
 - c. Badger Fire Protection; a Kidde company.
 - d. Buckeye Fire Equipment Company.
 - e. Fire End & Croker Corporation.
 - f. J. L. Industries, Inc.; a division of Activar Construction Products Group.
 - g. Kidde Residential and Commercial Division; Subsidiary of Kidde plc.
 - h. Larsen's Manufacturing Company.
 - i. Moon-American.
 - j. Pem All Fire Extinguisher Corp.; a division of PEM Systems, Inc.
 - k. Potter Roemer LLC.
 - l. Pyro-Chem; Tyco Safety Products.
- B. Fire Extinguishers made for exterior applications.
- C. Wet-Chemical Type UL-rated 2-A:1-B:C:K, 1.6-gal. (6-L) nominal capacity, with potassium acetate-based chemical in stainless-steel container; with pressure-indicating gage.
- D. Regular Dry-Chemical Type in Steel Container: UL-rated 10-B:C, 5-lb (1.1-kg) nominal capacity, with sodium bicarbonate-based dry chemical in enameled-steel container.

2.2 MOUNTING BRACKETS

- A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Amerex Corporation.
 - b. Ansul Incorporated; Tyco International Ltd.
 - c. Badger Fire Protection; a Kidde company.
 - d. Buckeye Fire Equipment Company.
 - e. Fire End & Croker Corporation.
 - f. J. L. Industries, Inc.; a division of Activar Construction Products Group.
 - g. Larsen's Manufacturing Company.
 - h. Potter Roemer LLC.
- B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
 - 1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.
 - a. Orientation: Vertical].

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fire extinguishers for proper charging and tagging.
 - 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.
 - 1. Mounting Brackets: 54 inches (1372 mm) above finished floor to top of fire extinguisher.
- B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION

SECTION 13 1250

METAL BUILDING SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Structural-steel framing.
- B. Metal roof panels.
- C. Metal wall panels.
- D. Thermal insulation.
- E. Accessories.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.3 DEFINITIONS

- A. Terminology Standard: See MBMA's "Metal Building Systems Manual" for definitions of terms for metal building system construction not otherwise defined in this Section or in referenced standards.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of metal building system component. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
 - 1. Structural-steel-framing system.
 - 2. Metal roof panels.
 - 3. Metal wall panels.
 - 4. Metal liner panels.
 - 5. Insulation and vapor retarder facings.
 - 6. Flashing and trim.
 - 7. Accessories.
- B. Shop Drawings: For the following metal building system components. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Anchor-Bolt Plans: Submit anchor-bolt plans and templates before foundation work begins. Include location, diameter, and projection of anchor bolts required to attach metal building to foundation. Indicate column reactions at each location.
 - 2. Structural-Framing Drawings: Show complete fabrication of primary and secondary framing; include provisions for openings. Indicate welds and bolted connections, distinguishing between shop and field applications. Include transverse cross-sections.
 - a. Show provisions for attaching roof curbs.
 - 3. Metal Roof and Wall Panel Layout Drawings: Show layouts of metal panels including methods of support. Include details of edge conditions, joints, panel profiles, corners, anchorages, trim, flashings, closures, and special details. Distinguish between factory- and field-assembled work; show locations of exposed fasteners.
 - a. Show roof-mounted items including roof hatches, equipment supports, pipe supports and penetrations, lighting fixtures, and items mounted on roof curbs.

- b. Show wall-mounted items including doors, windows, louvers, and lighting fixtures.
- 4. Accessory Drawings: Include details of the following items, at a scale of not less than 1-1/2 inches per 12 inches (1:8):
 - a. Flashing and trim.
 - b. Gutters.
 - c. Downspouts.
 - d. Louvers.

C. Samples for Initial Selection: For units with factory-applied color finish.

D. Delegated-Design Submittal: For metal building systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation. Design professional shall be licensed in the state in which the project is located.

1.5 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Metal Building System Certificates: For each type of metal building system, from manufacturer.

- 1. Letter of Design Certification: Signed and sealed by a qualified professional engineer. Include the following:
 - a. Name and location of Project.
 - b. Order number.
 - c. Name of manufacturer.
 - d. Name of Contractor.
 - e. Building dimensions including width, length, height, and roof slope.
 - f. Indicate compliance with AISC standards for hot-rolled steel and AISI standards for cold-rolled steel, including edition dates of each standard.
 - g. Governing building code and year of edition.
 - h. Design Loads: Include dead load, roof live load, collateral loads, roof snow load, deflection, wind loads/speeds and exposure, seismic design category or effective peak velocity-related acceleration/peak acceleration, and auxiliary loads (cranes).
 - i. Load Combinations: Indicate that loads were applied acting simultaneously with concentrated loads, according to governing building code.
 - j. Building-Use Category: Indicate category of building use and its effect on load importance factors.
 - k. AISC Certification for Category MB: Include statement that metal building system and components were designed and produced in an AISC-Certified Facility by an AISC-Certified Manufacturer.

C. Erector Certificates: For each product, from manufacturer.

D. Manufacturer Certificates: For each product, from manufacturer.

E. Material Test Reports: For each of the following products:

- 1. Structural steel including chemical and physical properties.
- 2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
- 3. Tension-control, high-strength, bolt-nut-washer assemblies.
- 4. Shop primers.
- 5. Nonshrink grout.

F. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for insulation and vapor-retarder facings. Include reports for thermal resistance, fire-test-response characteristics, water-vapor transmission, and water absorption.

- G. Source quality-control reports.
 - H. Field quality-control reports.
 - I. Surveys: Show final elevations and locations of major members. Indicate discrepancies between actual installation and the Contract Documents. Have surveyor who performed surveys certify their accuracy.
 - J. Warranties: Sample of special warranties.
- 1.6 CLOSEOUT SUBMITTALS
- A. Maintenance Data: For metal panel finishes include in maintenance manuals.
- 1.7 QUALITY ASSURANCE
- A. Manufacturer Qualifications: A qualified manufacturer and member of MBMA.
 - 1. AISC Certification for Category MB: An AISC-Certified Manufacturer that designs and produces metal building systems and components in an AISC-Certified Facility.
 - 2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
 - B. Land Surveyor Qualifications: A professional land surveyor who practices in jurisdiction where Project is located and who is experienced in providing surveying services of the kind indicated.
 - C. Erector Qualifications: An experienced erector who specializes in erecting and installing work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer.
 - D. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
 - E. Source Limitations: Obtain metal building system components, including primary and secondary framing and metal panel assemblies, from single source from single manufacturer.
 - F. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.3, "Structural Welding Code - Sheet Steel."
 - G. Structural Steel: Comply with AISC 360, "Specification for Structural Steel Buildings," for design requirements and allowable stresses.
 - H. Cold-Formed Steel: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" for design requirements and allowable stresses.
- 1.8 DELIVERY, STORAGE, AND HANDLING
- A. Deliver components, sheets, panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
 - B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
 - C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

1.9 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when weather conditions permit metal panels to be installed according to manufacturers' written instructions and warranty requirements.
- B. Field Measurements:
 - 1. Established Dimensions for Foundations: Comply with established dimensions on approved anchor-bolt plans, establishing foundation dimensions and proceeding with fabricating structural framing without field measurements. Coordinate anchor-bolt installation to ensure that actual anchorage dimensions correspond to established dimensions.
 - 2. Established Dimensions for Metal Panels: Where field measurements cannot be made without delaying the Work, either establish framing and opening dimensions and proceed with fabricating metal panels without field measurements, or allow for field trimming metal panels. Coordinate construction to ensure that actual building dimensions, locations of structural members, and openings correspond to established dimensions.

1.10 COORDINATION

- A. Coordinate sizes and locations of concrete foundations and casting of anchor-bolt inserts into foundation walls and footings. Concrete, reinforcement, and formwork requirements are specified in Section 03300 "Cast-in-Place Concrete."
- B. Coordinate installation of roof curbs, which are specified in Section 07720 "Roof Accessories."
- C. Coordinate metal panel assemblies with rain drainage work, flashing, trim, and construction of supports and other adjoining work to provide a leak proof, secure, and noncorrosive installation.

1.11 WARRANTY

- A. Special Warranty on Metal Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.
- B. Special Weather Tightness Warranty for Standing-Seam Metal Roof Panels: Manufacturer's standard form in which manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that leak or otherwise fail to remain weathertight within specified warranty period.
 - 1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. A&S Building Systems, Inc.; Division of NCI Building Systems, L.P.
 - 2. Alliance Steel, Inc.

3. American Buildings Company; Division of Magnatrx Corp.
4. American Steel Building Co., Inc.
5. BC Steel Buildings, Inc.
6. Behlen Mfg. Co.
7. Bigbee Steel Buildings, Inc.
8. Butler Manufacturing Company; a BlueScope Steel company.
9. CBC Steel Buildings; Division of Magnatrx Corp.
10. Ceco Building Systems; Division of NCI Building Systems, L.P.
11. Chief Buildings; Division of Chief Industries, Inc.
12. Elite Structures, Inc.
13. Garco Building Systems; Division of NCI Building Systems, L.P.
14. Gulf States Manufacturers, Inc.; Division of Magnatrx Corp.
15. Inland Buildings; Subsidiary of Behlen Mfg. Co.
16. Kirby Building Systems; Division of Magnatrx Corp.
17. Mesco Building Solutions; Division of NCI Building Systems, L.P.
18. Metallic Building Company; Division of NCI Building Systems, L.P.
19. Metco Metal Supply.
20. Mid-West Steel Building Company; Division of NCI Building Systems, L.P.
21. Nucor Building Systems.
22. Oakland Metal Buildings, Inc.
23. Olympia Steel Building Systems.
24. Package Industries, Inc.
25. Pinnacle Structures, Inc.
26. Robertson Building Systems; an NCI company.
27. Ruffin Building Systems, Inc.
28. Schulte Building Systems, LLP.
29. Spirco Manufacturing.
30. Star Building Systems; an NCI company.
31. Tyler Building Systems, L.P.
32. USA, Inc.
33. VP Buildings; a United Dominion company.
34. Vulcan Steel Structures, Inc.
35. Whirlwind Building Systems.

2.2 METAL BUILDING SYSTEMS

- A. Description: Provide a complete, integrated set of metal building system manufacturer's standard mutually dependent components and assemblies that form a metal building system capable of withstanding structural and other loads, thermally induced movement, and exposure to weather without failure or infiltration of water into building interior.
 1. Provide metal building system of size and with bay spacings, roof slopes, and spans indicated.
- B. Primary-Frame Type: Rigid Clear Span: Solid-member, structural-framing system without interior columns.
- C. End-Wall Framing: Manufacturer's standard, for buildings not required to be expandable, consisting of primary frame, capable of supporting one-half of a bay design load, and end-wall columns.
- D. Secondary-Frame Type: Manufacturer's standard purlins and joists and exterior-framed (bypass) girts.
- E. Eave Height: As indicated on drawings.
- F. Bay Spacing: As indicated on drawings.
- G. Roof Slope: As indicated.

- H. Roof System: Manufacturer's standard trapezoidal-rib, standing-seam metal roof panels with field-installed insulation.
- I. Exterior Wall System: Manufacturer's standard tapered-rib, exposed-fastener metal wall panels with field-installed insulation.

2.3 METAL BUILDING SYSTEM PERFORMANCE

- A. Delegated Design: Design metal building system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance: Metal building systems shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated according to procedures in MBMA's "Metal Building Systems Manual."
 - 1. Design Loads: As indicated on Drawings.
 - 2. Design Loads: As required by ASCE/SEI 7.
 - 3. Deflection Limits: Design metal building system assemblies to withstand design loads with deflections no greater than the following:
 - a. Purlins and Rafters: Vertical deflection of 1/240 of the span due to roof live load and 1/180 due to dead load plus roof live load.
 - b. Girts: Horizontal deflection of 1/240 of the span.
 - c. Metal Roof Panels: Vertical deflection of 1/240 of the span.
 - d. Metal Wall Panels: Horizontal deflection of 1/90 of the span.
 - e. Design secondary-framing system to accommodate deflection of primary framing and construction tolerances, and to maintain clearances at openings.
 - 4. Drift Limits: Engineer building structure to withstand design loads with drift limits no greater than the following:
 - a. Lateral Drift: Maximum of 1/200 of the building height.
 - 5. Metal panel assemblies shall withstand the effects of gravity loads and loads and stresses within limits and under conditions indicated according to ASTM E 1592.
- C. Seismic Performance: Metal building systems shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- D. Thermal Movements: Allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C) material surfaces.
- E. Air Infiltration for Metal Roof Panels: Air leakage through assembly of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) of roof area when tested according to ASTM E 1680 at negative test-pressure difference of 1.57 lbf/sq. ft. (75 Pa).
- F. Air Infiltration for Metal Wall Panels: Air leakage through assembly of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) of wall area when tested according to ASTM E 283 at static-air-pressure difference of 1.57 lbf/sq. ft. (75 Pa).
- G. Water Penetration for Metal Roof Panels: No water penetration when tested according to ASTM E 1646 at test-pressure difference of 2.86 lbf/sq. ft. (137 Pa).
- H. Water Penetration for Metal Wall Panels: No water penetration when tested according to ASTM E 331 at a wind-load design pressure of not less than 2.86 lbf/sq. ft. (137 Pa).
- I. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for Class 90.

- J. Thermal Performance: Provide vinyl faced insulation to meet the local energy code – ASHRAE 2016
 - 1. Roof:
 - a. R-Value: R-19 + R-11 Liner System (below purlins)
 - 2. Metal Wall Panel Assemblies:
 - a. R-Value: R-25 (exterior of girts) + R-10 (over interior face of girts)
- K. Solar Reflectance Index: Not less than 78 when calculated according to ASTM E 1980 based on testing identical products by a qualified testing agency.
- L. Energy Performance: Provide roof panels that are listed on the DOE's ENERGY STAR Roof Products Qualified Product List for low-slope roof products.
- M. Energy Performance: Provide roof panels with initial solar reflectance not less than 0.70 and emissivity not less than 0.75 when tested according to CRRC.

2.4 STRUCTURAL-STEEL FRAMING

- A. Primary Framing: Manufacturer's standard primary-framing system, designed to withstand required loads and specified requirements. Primary framing includes transverse and lean-to frames; rafter, rake, and canopy beams; sidewall, intermediate, end-wall, and corner columns; and wind bracing.
 - 1. General: Provide frames with attachment plates, bearing plates, and splice members. Factory drill for field-bolted assembly. Provide frame span and spacing indicated.
 - a. Slight variations in span and spacing may be acceptable if necessary to comply with manufacturer's standard, as approved by Architect.
 - 2. Rigid Clear-Span Frames: Rafter frames fabricated from I-shaped beam and column sections fabricated from shop-welded, built-up steel plates or structural-steel shapes.
 - 3. Frame Configuration: Single gable.
 - 4. Exterior Column Type: Tapered.
 - 5. Rafter Type: Uniform depth or tapered.
 - 6. Column Bases: Pinned.
- B. End-Wall Framing: Manufacturer's standard primary end-wall framing fabricated for field-bolted assembly to comply with the following:
 - 1. End-Wall and Corner Columns: I-shaped sections fabricated from structural-steel shapes; shop-welded, built-up steel plates; or C-shaped, cold-formed, structural-steel sheet.
 - 2. End-Wall Rafters: C-shaped, cold-formed, structural-steel sheet; or I-shaped sections fabricated from shop-welded, built-up steel plates or structural-steel shapes.
- C. Secondary Framing: Manufacturer's standard secondary framing, including purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members. Unless otherwise indicated, fabricate framing from either cold-formed, structural-steel sheet or roll-formed, metallic-coated steel sheet, prepainted with coil coating, to comply with the following:
 - 1. Purlins: C- or Z-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes; minimum 2-1/2-inch- (64-mm-) wide flanges.
 - a. Depth: As indicated.
 - 2. Purlins: Steel joists of depths indicated.
 - 3. Girts: C- or Z-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes. Form ends of Z-sections with stiffening lips angled 40 to 50 degrees from flange, with minimum 2-1/2-inch- (64-mm-) wide flanges.
 - a. Depth: As indicated.
 - 4. Eave Struts: Unequal-flange, C-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes; to provide adequate backup for metal panels.
 - 5. Flange Bracing: Minimum 2-by-2-by-1/8-inch (51-by-51-by-3-mm) structural-steel angles or 1-inch (- (25-mm-)) diameter, cold-formed structural tubing to stiffen primary-frame flanges.

6. Sag Bracing: Minimum 1-by-1-by-1/8-inch (25-by-25-by-3-mm) structural-steel angles.
 7. Base or Sill Angles: Minimum 3-by-2-inch (76-by-51-mm) zinc-coated (galvanized) steel sheet.
 8. Purlin and Girt Clips: Manufacturer's standard clips fabricated from steel sheet. Provide galvanized clips where clips are connected to galvanized framing members.
 9. Secondary End-Wall Framing: Manufacturer's standard sections fabricated from structural-steel sheet.
 10. Framing for Openings: Channel shapes; fabricated from cold-formed, structural-steel sheet or structural-steel shapes. Frame head and jamb of door openings and head, jamb, and sill of other openings.
 11. Miscellaneous Structural Members: Manufacturer's standard sections fabricated from cold-formed, structural-steel sheet; built-up steel plates; or zinc-coated (galvanized) steel sheet; designed to withstand required loads.
- D. Canopy Framing: Manufacturer's standard structural-framing system, designed to withstand required loads; fabricated from shop-welded, built-up steel plates or structural-steel shapes. Provide frames with attachment plates and splice members, factory drilled for field-bolted assembly.
1. Type: As indicated.
- E. Bracing: Provide adjustable wind bracing as follows:
1. Rods: ASTM A 36/A 36M; ASTM A 572/A 572M, Grade 50 (345); or ASTM A 529/A 529M, Grade 50 (345); minimum 1/2-inch- (13-mm-) diameter steel; threaded full length or threaded a minimum of 6 inches (152 mm) at each end.
 2. Cable: ASTM A 475, 1/4-inch- (6-mm-) diameter, extra-high-strength grade, Class B, zinc-coated, seven-strand steel; with threaded end anchors.
 3. Angles: Fabricated from structural-steel shapes to match primary framing, of size required to withstand design loads.
 4. Rigid Portal Frames: Fabricated from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads. These frames shall have pinned bases.
 5. Diaphragm Action of Metal Panels: Design metal building to resist wind forces through diaphragm action of metal panels.
 6. Bracing: Provide wind bracing using any method specified above, at manufacturer's option.
- F. Bolts: Provide plain-finish bolts for structural-framing components that are primed or finish painted.
- G. Materials:
1. W-Shapes: ASTM A 992/A 992M; ASTM A 572/A 572M, Grade 50 or 55 (345 or 380); or ASTM A 529/A 529M, Grade 50 or 55 (345 or 380).
 2. Channels, Angles, M-Shapes, and S-Shapes: ASTM A 36/A 36M; ASTM A 572/A 572M, Grade 50 or 55 (345 or 380); or ASTM A 529/A 529M, Grade 50 or 55 (345 or 380).
 3. Plate and Bar: ASTM A 36/A 36M; ASTM A 572/A 572M, Grade 50 or 55 (345 or 380); or ASTM A 529/A 529M, Grade 50 or 55 (345 or 380).
 4. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.
 5. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B or C, structural tubing.
 6. Structural-Steel Sheet: Hot-rolled, ASTM A 1011/A 1011M, Structural Steel (SS), Grades 30 through 55 (205 through 380), or High-Strength Low-Alloy Steel (HSLAS), Grades 45 through 70 (310 through 480); or cold-rolled, ASTM A 1008/A 1008M, Structural Steel (SS), Grades 25 through 80 (170 through 550), or High-Strength Low-Alloy Steel (HSLAS), Grades 45 through 70 (310 through 480).
 7. Joist Girders: Manufactured according to "Standard Specifications for Joist Girders," in SJI's "Standard Specifications and Load Tables for Steel Joists and Joist Girders";

with steel-angle, top- and bottom-chord members, and end- and top-chord arrangements as indicated and required for primary framing.

8. Steel Joists: Manufactured according to "Standard Specifications for Open Web Steel Joists, K-Series," in SJI's "Standard Specifications and Load Tables for Steel Joists and Joist Girders"; with steel-angle, top- and bottom-chord members, and end- and top-chord arrangements as indicated and required for secondary framing.
 9. Non-High-Strength Bolts, Nuts, and Washers: ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6), carbon-steel, hex-head bolts; ASTM A 563 (ASTM A 563M) carbon-steel hex nuts; and ASTM F 844 plain (flat) steel washers.
 - a. Finish: Plain.
 10. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy-hex steel structural bolts; ASTM A 563 (ASTM A 563M) heavy-hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M) hardened carbon-steel washers.
 - a. Finish: Plain.
 11. Unheaded Anchor Rods: ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6).
 - a. Configuration: Straight.
 - b. Nuts: ASTM A 563 (ASTM A 563M) heavy-hex carbon steel.
 - c. Plate Washers: ASTM A 36/A 36M carbon steel.
 - d. Washers: ASTM F 436 (ASTM F 436M) hardened carbon steel.
 - e. Finish: Plain.
 12. Headed Anchor Rods: ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6).
 - a. Configuration: Straight.
 - b. Nuts: ASTM A 563 (ASTM A 563M) heavy-hex carbon steel.
 - c. Plate Washers: ASTM A 36/A 36M carbon steel.
 - d. Washers: ASTM F 436 (ASTM F 436M) hardened carbon steel.
 - e. Finish: Plain.
 13. Threaded Rods: ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6).
 - a. Nuts: ASTM A 563 (ASTM A 563M) heavy-hex carbon steel.
 - b. Washers: ASTM F 436 (ASTM F 436M) hardened carbon steel.
 - c. Finish: Plain.
 14. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than [25] <Insert number> percent.
- H. Finish: Factory primed. Apply specified primer immediately after cleaning and pretreating.
1. Apply primer to primary and secondary framing to a minimum dry film thickness of 1 mil (0.025 mm).
 - a. Prime secondary framing formed from uncoated steel sheet to a minimum dry film thickness of 0.5 mil (0.013 mm) on each side.
 2. Interior Primer: SSPC-Paint 15, Type I, red oxide.
 3. Exterior Primer: See Section 09713 Architectural Steel Coatings

2.5 METAL ROOF PANELS

- A. Trapezoidal-Rib, Standing-Seam Metal Roof Panels: Formed with raised trapezoidal ribs at panel edges and intermediate stiffening ribs symmetrically spaced between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels and engaging opposite edge of adjacent panels.
1. Material: Zinc-coated (galvanized) steel sheet, 0.022-inch (0.56-mm) nominal thickness.
 - a. Exterior Finish: Fluoropolymer.
 - b. Color: Trim, gutters and downspouts; roof panels: to be selected from manufacturer's full range of finishes
 2. Clips: Manufacturer's standard, floating type to accommodate thermal movement; fabricated from zinc-coated (galvanized) steel sheet.
 3. Joint Type: Mechanically seamed, folded according to manufacturer's standard.
 4. Panel Coverage: 24 inches (610 mm).
 5. Panel Height: 3 inches (76 mm).
 6. Uplift Rating: UL 90.

- B. Materials:
 - 1. Metallic-Coated Steel Sheet: Restricted-flatness steel sheet, metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
 - a. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation; structural quality.
 - b. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40 (Class AZM150 coating designation, Grade 275); structural quality.
 - c. Surface: Smooth, flat finish.
- C. Finishes:
 - 1. Exposed Coil-Coated Finish:
 - a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).

2.6 METAL WALL PANELS

- A. Exposed-Fastener, Tapered-Rib, Metal Wall Panels: Formed with raised, trapezoidal major ribs and intermediate stiffening ribs symmetrically spaced between major ribs; designed to be installed by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps.
 - 1. Material: Zinc-coated (galvanized) steel sheet, 0.022-inch (0.56-mm) nominal thickness.
 - 2. Exterior Finish: Fluoropolymer.
 - 3. Color: Trim, gutters and downspouts; roof panels: to be selected from manufacturer's full range of finishes
 - 4. Major-Rib Spacing: 12 inches (305 mm) o.c.
 - 5. Panel Coverage: 36 inches (914 mm)
 - 6. Panel Height: 1.5 inches (38 mm)
- B. Flush-Profile, Metal Liner Panels: Solid panels formed with vertical panel edges and intermediate stiffening ribs symmetrically spaced between panel edges; with flush joint between panels; designed for interior side of metal wall panel assemblies and installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners and factory-applied sealant in side laps.
 - 1. Material: Zinc-coated (galvanized) steel sheet, 0.028-inch (0.71-mm) nominal thickness.
 - a. Exterior Finish: Acrylic enamel.
 - b. Color: As selected by Architect from manufacturer's full range.
 - 2. Sound Absorption: NRC not less than 0.65 when tested according to ASTM C 423.
 - 3. Panel Coverage: 36 inches (305 mm).
 - 4. Panel Height: 1.5 inches (38 mm).
- C. Materials:
 - 1. Metallic-Coated Steel Sheet: Restricted-flatness steel sheet, metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
 - a. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation; structural quality.
 - b. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40 (Class AZM150 coating designation, Grade 275); structural quality.

- c. Surface: Smooth, flat finish.

D. Finishes:

1. Exposed Coil-Coated Finish:
 - a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - b. Siliconized Polyester: Epoxy primer and silicone-modified, polyester-enamel topcoat; with a dry film thickness of not less than 0.2 mil (0.005 mm) for primer and 0.8 mil (0.02 mm) for topcoat. Provide at liner panels only.
2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).

2.7 THERMAL INSULATION

- A. Faced Metal Building Insulation: ASTM C 991, Type II, glass-fiber-blanket insulation; 0.5-lb/cu. ft. (8-kg/cu. m) density; 2-inch- (51-mm-) wide, continuous, vapor-tight edge tabs; with a flame-spread index of 25 or less.
1. Vapor-Retarder Facing: ASTM C 1136, with permeance not greater than 0.02 perm (1.15 ng/Pa x s x sq. m) when tested according to ASTM E 96/E 96M, Desiccant Method.
 - a. Composition: White polypropylene film facing and fiberglass-polyester-blend fabric backing.

2.8 ACCESSORIES

- A. General: Provide accessories as standard with metal building system manufacturer and as specified. Fabricate and finish accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes. Comply with indicated profiles and with dimensional and structural requirements.
1. Form exposed sheet metal accessories that are without excessive oil-canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
- B. Roof Panel Accessories: Provide components required for a complete metal roof panel assembly including copings, fasciae, corner units, ridge closures, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal roof panels unless otherwise indicated.
1. Closures: Provide closures at eaves and ridges, fabricated of same material as metal roof panels.
 2. Clips: Manufacturer's standard, formed from stainless-steel sheet, designed to withstand negative-load requirements.
 3. Cleats: Manufacturer's standard, mechanically seamed cleats formed from stainless-steel sheet or nylon-coated aluminum sheet.
 4. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 5. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal roof panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
 6. Thermal Spacer Blocks: Where metal panels attach directly to purlins, provide thermal spacer blocks of thickness required to provide 1-inch (25-mm) standoff; fabricated from extruded polystyrene.
- C. Wall Panel Accessories: Provide components required for a complete metal wall panel assembly including copings, fasciae, mullions, sills, corner units, clips, sealants, gaskets,

fillers, closure strips, and similar items. Match material and finish of metal wall panels unless otherwise indicated.

1. Closures: Provide closures at eaves and rakes, fabricated of same material as metal wall panels.
 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal wall panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- D. Flashing and Trim: Formed from 0.022-inch (0.56-mm) nominal-thickness, metallic-coated steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating; finished to match adjacent metal panels.
1. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers.
 2. Opening Trim: Formed from 0.022-inch (0.56-mm) nominal-thickness, metallic-coated steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating. Trim head and jamb of door openings, and head, jamb, and sill of other openings.
- E. Gutters: Formed from 0.022-inch (0.56-mm) 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. Match profile of gable trim, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch- (2438-mm-) long sections, sized according to SMACNA's "Architectural Sheet Metal Manual."
1. Gutter Supports: Fabricated from same material and finish as gutters.
 2. Strainers: Bronze, copper, or aluminum wire ball type at outlets.
- F. Downspouts: Formed from 0.022-inch (0.56-mm) nominal-thickness, zinc-coated (galvanized) steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating; finished to match metal wall panels. Fabricate in minimum 10-foot- (3-m-) long sections, complete with formed elbows and offsets.
1. Mounting Straps: Fabricated from same material and finish as gutters.
- G. Roof Curbs: Fabricated from minimum 0.052-inch (1.32-mm) nominal-thickness, metallic-coated steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating; finished to match metal roof panels; with welded top box and bottom skirt, and integral full-length cricket; capable of withstanding loads of size and height indicated.
1. Curb Subframing: Fabricated from 0.064-inch (1.63-mm) nominal-thickness, angle-, C-, or Z-shaped metallic-coated steel sheet.
 2. Insulation: 1-inch- (25-mm-) thick, rigid type.
- H. Pipe Flashing: Premolded, EPDM pipe collar with flexible aluminum ring bonded to base.
- I. Materials:
1. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide fasteners with heads matching color of materials being fastened by means of plastic caps or factory-applied coating.
 - a. Fasteners for Metal Roof Panels: Self-drilling, Type 410 stainless-steel or self-tapping, Type 304 stainless-steel or zinc-alloy-steel hex washer head, with EPDM washer under heads of fasteners bearing on weather side of metal panels.
 - b. Fasteners for Metal Wall Panels: Self-drilling, Type 410 stainless-steel or self-tapping, Type 304 stainless-steel or zinc-alloy-steel hex washer head, with EPDM sealing washers bearing on weather side of metal panels.
 - c. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws with hex washer head.

- d. Blind Fasteners: High-strength aluminum or stainless-steel rivets.
- 2. Corrosion-Resistant Coating: Cold-applied asphalt mastic, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
- 3. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.
- 4. Metal Panel Sealants:
 - a. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene-compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape of manufacturer's standard size.
 - b. Joint Sealant: ASTM C 920; one-part elastomeric polyurethane or polysulfide; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended by metal building system manufacturer.

2.9 SOURCE QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to evaluate product.
- B. Special Inspector: Owner will engage a qualified special inspector to perform the following tests and inspections and to submit reports. Special inspector will verify that manufacturer maintains detailed fabrication and quality-control procedures and will review the completeness and adequacy of those procedures to perform the Work.
 - 1. Special inspections will not be required if fabrication is performed by manufacturer registered and approved by authorities having jurisdiction to perform such Work without special inspection.
 - a. After fabrication, submit copy of certificate of compliance to authorities having jurisdiction, certifying that Work was performed according to Contract requirements.
- C. Testing: Test and inspect shop connections for metal buildings according to the following:
 - 1. Bolted Connections: Shop-bolted connections shall be inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
 - 2. Welded Connections: In addition to visual inspection, shop-welded connections shall be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at inspector's option:
 - a. Liquid Penetrant Inspection: ASTM E 165.
 - b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 - c. Ultrasonic Inspection: ASTM E 164.
 - d. Radiographic Inspection: ASTM E 94.
- D. Product will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

2.10 FABRICATION

- A. General: Design components and field connections required for erection to permit easy assembly.
 - 1. Mark each piece and part of the assembly to correspond with previously prepared erection drawings, diagrams, and instruction manuals.
 - 2. Fabricate structural framing to produce clean, smooth cuts and bends. Punch holes of proper size, shape, and location. Members shall be free of cracks, tears, and ruptures.

- B. Tolerances: Comply with MBMA's "Metal Building Systems Manual" for fabrication and erection tolerances.
- C. Primary Framing: Shop fabricate framing components to indicated size and section, with baseplates, bearing plates, stiffeners, and other items required for erection welded into place. Cut, form, punch, drill, and weld framing for bolted field assembly.
 - 1. Make shop connections by welding or by using high-strength bolts.
 - 2. Join flanges to webs of built-up members by a continuous, submerged arc-welding process.
 - 3. Brace compression flange of primary framing with steel angles or cold-formed structural tubing between frame web and purlin web or girt web, so flange compressive strength is within allowable limits for any combination of loadings.
 - 4. Weld clips to frames for attaching secondary framing.
 - 5. Shop Priming: Prepare surfaces for shop priming according to SSPC-SP 2. Shop prime primary framing with specified primer after fabrication.
- D. Secondary Framing: Shop fabricate framing components to indicated size and section by roll-forming or break-forming, with baseplates, bearing plates, stiffeners, and other plates required for erection welded into place. Cut, form, punch, drill, and weld secondary framing for bolted field connections to primary framing.
 - 1. Make shop connections by welding or by using non-high-strength bolts.
 - 2. Shop Priming: Prepare uncoated surfaces for shop priming according to SSPC-SP 2. Shop prime uncoated secondary framing with specified primer after fabrication.
- E. Metal Panels: Fabricate and finish metal panels at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements. Comply with indicated profiles and with dimensional and structural requirements.
 - 1. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of metal panel.

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 the Work.
- B. Before erection proceeds, survey elevations and locations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments to receive structural framing, with erector present, for compliance with requirements and metal building system manufacturer's tolerances.
 - 1. Engage land surveyor to perform surveying.
- C. Proceed with erection only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition.
- B. Provide temporary shores, guys, braces, and other supports during erection to keep structural framing secure, plumb, and in alignment against temporary construction loads and 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 ERECTION OF STRUCTURAL FRAMING

- A. Erect metal building system according to manufacturer's written erection instructions and erection drawings.
- B. Do not field cut, drill, or alter structural members without written approval from metal building system manufacturer's professional engineer.
- C. Set structural framing accurately in locations and to elevations indicated, according to AISC specifications referenced in this Section. Maintain structural stability of frame during erection.
- D. Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
 - 1. Set plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 - 3. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- E. Align and adjust structural framing before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with framing. 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 will be completed and in service.
- F. Primary Framing and End Walls: Erect framing level, plumb, rigid, secure, and true to line. Level baseplates to a true even plane with full bearing to supporting structures, set with double-nutted anchor bolts. Use grout to obtain uniform bearing and to maintain a level base-line elevation. Moist-cure grout for not less than seven days after placement.
 - 1. Make field connections using high-strength bolts installed according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for bolt type and joint type specified.
 - a. Joint Type: Snug tightened or pretensioned.
- G. Secondary Framing: Erect framing level, plumb, rigid, secure, and true to line. Field bolt secondary framing to clips attached to primary framing.
 - 1. Provide rake or gable purlins with tight-fitting closure channels and fasciae.
 - 2. Locate and space wall girts to suit openings such as doors and windows.
 - 3. Locate canopy framing as indicated.
 - 4. Provide supplemental framing at entire perimeter of openings, including doors, windows, louvers, ventilators, and other penetrations of roof and walls.
- H. Steel Joists: Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJL's "Standard Specifications and Load Tables for Steel Joists and Joist Girders," joist manufacturer's written instructions, and requirements in this Section.
 - 1. Before installation, splice joists delivered to Project site in more than one piece.
 - 2. Space, adjust, and align joists accurately in location before permanently fastening.
 - 3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.
 - 4. Bolt joists to supporting steel framework using carbon-steel bolts unless otherwise indicated.
 - 5. Bolt joists to supporting steel framework using high-strength structural bolts unless otherwise indicated. Comply with RCSC's "Specification for Structural Joints Using

ASTM A 325 or A 490 Bolts" for high-strength structural bolt installation and tightening requirements.

6. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.
 - I. Bracing: Install bracing in roof and sidewalls where indicated on erection drawings.
 1. Tighten rod and cable bracing to avoid sag.
 2. Locate interior end-bay bracing only where indicated.
 - J. Framing for Openings: Provide shapes of proper design and size to reinforce openings and to carry loads and vibrations imposed, including equipment furnished under mechanical and electrical work. Securely attach to structural framing.
 - K. Erection Tolerances: Maintain erection tolerances of structural framing within AISC 303.
- 3.4 METAL PANEL INSTALLATION, GENERAL
- A. Examination: Examine primary and secondary framing to verify that structural-panel support members and anchorages have been installed within alignment tolerances required by manufacturer.
 1. Examine roughing-in for components and systems penetrating metal panels, to verify actual locations of penetrations relative to seams before metal panel installation.
 - B. General: Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 1. Field cut metal panels as required for doors, windows, and other openings. Cut openings as small as possible, neatly to size required, and without damage to adjacent metal panel finishes.
 - a. Field cutting of metal panels by torch is not permitted unless approved in writing by manufacturer.
 2. Install metal panels perpendicular to structural supports unless otherwise indicated.
 3. Flash and seal metal panels with weather closures at perimeter of openings and similar elements. Fasten with self-tapping screws.
 4. Locate and space fastenings in uniform vertical and horizontal alignment.
 5. Locate metal panel splices over, but not attached to, structural supports with end laps in alignment.
 6. Lap metal flashing over metal panels to allow moisture to run over and off the material.
 - C. Lap-Seam Metal Panels: Install screw fasteners using power tools with controlled torque adjusted to compress EPDM washers tightly without damage to washers, screw threads, or metal panels. Install screws in predrilled holes.
 1. Arrange and nest side-lap joints so prevailing winds blow over, not into, lapped joints. Lap ribbed or fluted sheets one full rib corrugation. Apply metal panels and associated items for neat and weathertight enclosure. Avoid "panel creep" or application not true to line.
 - D. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal roof panel manufacturer.
 - E. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal panel assemblies. Provide types of gaskets, fillers, and sealants indicated; or, if not indicated, provide types recommended by metal panel manufacturer.
 1. Seal metal panel end laps with double beads of tape or sealant the full width of panel. Seal side joints where recommended by metal panel manufacturer.

2. Prepare joints and apply sealants to comply with requirements in Section 07920 "Joint Sealants."

3.5 METAL ROOF PANEL INSTALLATION

- A. General: Provide metal roof panels of full length from eave to ridge unless otherwise indicated or restricted by shipping limitations.
 1. Install ridge caps as metal roof panel work proceeds.
 2. Flash and seal metal roof panels with weather closures at eaves and rakes. Fasten with self-tapping screws.
- B. Standing-Seam Metal Roof Panels: Fasten metal roof panels to supports with concealed clips at each standing-seam joint, at location and spacing and with fasteners recommended by manufacturer.
 1. Install clips to supports with self-drilling or self-tapping fasteners.
 2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
 3. Snap Joint: Nest standing seams and fasten together by interlocking and completely engaging factory-applied sealant.
 4. Seamed Joint: Crimp standing seams with manufacturer-approved motorized seamer tool so that clip, metal roof panel, and factory-applied sealant are completely engaged.
 5. Rigidly fasten eave end of metal roof panels and allow ridge end free movement due to thermal expansion and contraction. Predrill panels for fasteners.
 6. Provide metal closures at peaks, and rake edges, rake walls .
- C. Metal Roof Panel Installation Tolerances: Shim and align metal roof panels within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.6 METAL WALL PANEL INSTALLATION

- A. General: Install metal wall panels in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts, extending full height of building, unless otherwise indicated. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 1. Unless otherwise indicated, begin metal panel installation at corners with center of rib lined up with line of framing.
 2. Shim or otherwise plumb substrates receiving metal wall panels.
 3. When two rows of metal panels are required, lap panels 4 inches (102 mm) minimum.
 4. When building height requires two rows of metal panels at gable ends, align lap of gable panels over metal wall panels at eave height.
 5. Rigidly fasten base end of metal wall panels and allow eave end free movement due to thermal expansion and contraction. Predrill panels.
 6. Flash and seal metal wall panels with weather closures at eaves, rakes, and at perimeter of all openings. Fasten with self-tapping screws.
 7. Install screw fasteners in predrilled holes.
 8. Install flashing and trim as metal wall panel work proceeds.
 9. Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete, and elsewhere as indicated; or, if not indicated, as necessary for waterproofing.
 10. Align bottom of metal wall panels and fasten with blind rivets, bolts, or self-drilling or self-tapping screws.
 11. Provide weatherproof escutcheons for pipe and conduit penetrating exterior walls.
- B. Metal Wall Panels: Install metal wall panels on exterior side of girts. Attach metal wall panels to supports with fasteners as recommended by manufacturer.

- C. Installation Tolerances: Shim and align metal wall panels within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m), nonaccumulative, on level, plumb, and on location lines as indicated, and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.7 THERMAL INSULATION INSTALLATION

- A. General: Install insulation concurrently with metal panel installation, in thickness indicated to cover entire surface, according to manufacturer's written instructions.
 - 1. Set vapor-retarder-faced units with vapor retarder toward warm side of construction unless otherwise indicated. Do not obstruct ventilation spaces except for firestopping.
 - 2. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to the surrounding construction to ensure airtight installation.
 - 3. Install factory-laminated, vapor-retarder-faced blankets straight and true in one-piece lengths, with both sets of facing tabs sealed, to provide a complete vapor retarder.
 - 4. Install blankets straight and true in one-piece lengths. Install vapor retarder over insulation, with both sets of facing tabs sealed, to provide a complete vapor retarder.
- B. Blanket Roof Insulation: Comply with the following installation method:
 - 1. Over-Purlin-with-Spacer-Block Installation: Extend insulation and vapor retarder over and perpendicular to top flange of secondary framing. Install layer of filler insulation over first layer to fill space formed by metal roof panel standoffs. Hold in place by panels fastened to standoffs.
 - a. Thermal Spacer Blocks: Where metal roof panels attach directly to purlins, install thermal spacer blocks.
 - 2. Under Purlin insulation shall be hung with straps as required.
 - 3. Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.
- C. Blanket Wall Insulation: Extend insulation and vapor retarder over and perpendicular to top flange of secondary framing. Hold in place by metal wall panels fastened to secondary framing.
 - 1. Thermal Spacer Blocks: Where metal wall panels attach directly to girts, install thermal spacer blocks.
 - 2. Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.
 - 3. Sound-Absorption Insulation: Where sound-absorption requirement is indicated for metal liner panels, cover insulation with polyethylene film and provide inserts of wire mesh to form acoustical spacer grid.

3.8 ACCESSORY INSTALLATION

- A. General: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
 - 1. Install components required for a complete metal roof panel assembly, including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
 - 2. Install components for a complete metal wall panel assembly, including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
 - 3. Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by manufacturer.
- B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide

concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

1. Install exposed flashing and trim that is without excessive oil-canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).
- C. Gutters: Join sections with riveted-and-soldered or lapped-and-sealed joints. Attach gutters to eave with gutter hangers spaced as required for gutter size, but not more than 36 inches (914 mm) o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.
- D. Downspouts: Join sections with 1-1/2-inch (38-mm) telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch (25 mm) away from walls; locate fasteners at top and bottom and at approximately 60 inches (1524 mm) o.c. in between.
1. Provide elbows at base of downspouts to direct water away from building.
 2. Tie downspouts to underground drainage system indicated.
- E. Roof Curbs: Install curbs at locations indicated on Drawings. Install flashing around bases where they meet metal roof panels.
- F. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to panel as recommended by manufacturer.

3.9 FIELD QUALITY CONTROL

- A. Special Inspections: Engage a qualified special inspector to perform the following special inspections:
1. Inspection of fabricators.
 2. Steel construction.
- B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- C. Tests and Inspections:
1. High-Strength, Field-Bolted Connections: Connections shall be[tested and] inspected during installation according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
 2. Welded Connections: In addition to visual inspection, field-welded connections shall be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at inspector's option:
 - a. Liquid Penetrant Inspection: ASTM E 165.
 - b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 - c. Ultrasonic Inspection: ASTM E 164.
 - d. Radiographic Inspection: ASTM E 94.
- D. Product will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

3.10 CLEANING AND PROTECTION

- A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Touchup Painting: After erection, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted structural framing and accessories.
 - 1. Clean and prepare surfaces by SSPC-SP 2, "Hand Tool Cleaning," or by SSPC-SP 3, "Power Tool Cleaning."
 - 2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.
- C. Metal Panels: Remove temporary protective coverings and strippable films, if any, as metal panels are installed. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
 - 1. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 21 0000

FIRE-SUPPRESSION PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. This Section includes the following fire-suppression piping inside the building:
 - 1. Dry-pipe sprinkler systems.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Division 33 for piping outside the building.
- C. Division 10 for cabinets and fire extinguishers.
- D. Division 21 or 26 for alarm devices not specified in this Section.
- E. Division 21 Section "Fire Pumps" for fire pumps, pressure-maintenance pumps, and pump controllers.
- F. Other Division 21 Sections for special extinguishing systems.
- G. Division 22 Section "Plumbing Specialties" for backflow preventers.

1.3 DEFINITIONS

- A. CPVC: Chlorinated polyvinyl chloride plastic.
- B. CR: Chlorosulfonated polyethylene synthetic rubber.
- C. High-Pressure Piping System: Fire-suppression piping system designed to operate at working pressure higher than standard 175 psig (1200 kPa).
- D. PE: Polyethylene plastic.
- E. Underground Service-Entrance Piping: Underground service piping below the building.

1.4 SYSTEM DESCRIPTIONS

- A. Dry-Pipe Sprinkler System: Automatic sprinklers are attached to piping containing compressed air. Opening of sprinklers releases compressed air and permits water pressure to open dry-pipe valve. Water then flows into piping and discharges from opened sprinklers.

1.5 PERFORMANCE REQUIREMENTS

- A. Standard Piping System Component Working Pressure: Listed for at least 175 psig (1200 kPa).
- B. High-Pressure Piping System Component Working Pressure: Listed for 250 psig (1725 kPa) minimum.
- C. Fire-suppression standpipe system design shall be approved by authorities having jurisdiction.

- D. Fire-suppression sprinkler system design shall be approved by authorities having jurisdiction.
1. Margin of Safety for Available Water Pressure: 10 psig (69 kPa), including losses through water-service piping, valves, and backflow preventers.
 2. Sprinkler Occupancy Hazard Classifications:
 - a. Automobile Parking Areas: Ordinary Hazard, Group 1.
 - b. Building Service Areas: Ordinary Hazard, Group 1.
 - c. Electrical Equipment Rooms: Ordinary Hazard, Group 1.
 - d. General Storage Areas: Ordinary Hazard, Group 1.
 - e. Laundries: Ordinary Hazard, Group 1.
 - f. Libraries, Except Stack Areas: Light Hazard.
 - g. Library Stack Areas: Ordinary Hazard, Group 2.
 - h. Machine Shops: Ordinary Hazard, Group 2.
 - i. Mechanical Equipment Rooms: Ordinary Hazard, Group 1.
 - j. Office and Public Areas: Light Hazard.
 - k. Repair Garages: Ordinary Hazard, Group 2.
 - l. Patient Living Areas: Light Hazard.
 - m. Restaurant Service Areas: Ordinary Hazard, Group 1.
 3. Minimum Density for Automatic-Sprinkler Piping Design:
 - a. Light-Hazard Occupancy: 0.10 gpm over 1500-sq. ft. (6.3 mL/s over 139-sq. m) area.
 - b. Ordinary-Hazard, Group 1 Occupancy: 0.15 gpm over 1500-sq. ft. (9.5 mL/s over 139-sq. m) area.
 - c. Ordinary-Hazard, Group 2 Occupancy: 0.20 gpm over 1500-sq. ft. (12.6 mL/s over 139-sq. m) area.
 - d. Special Occupancy Hazard: As determined by authorities having jurisdiction.
 4. Maximum Protection Area per Sprinkler:
 - a. Office Spaces: 225 sq. ft. (20.9 sq. m).
 - b. Storage Areas: 130 sq. ft. (12.1 sq. m).
 - c. Mechanical Equipment Rooms: 130 sq. ft. (12.1 sq. m).
 - d. Electrical Equipment Rooms: 130 sq. ft. (12.1 sq. m).
 - e. Other Areas: According to NFPA 13 recommendations.
 - f. Exception: Extended coverage sprinkler heads may be used where their use is in accordance with NFPA-13 and the listing of the sprinkler head.
 5. Total Combined Hose-Stream Demand Requirement: According to NFPA 13, otherwise indicated:
- E. Seismic Performance: Fire-suppression piping shall be capable of withstanding the effects of earthquake motions determined according to NFPA 13 and local building code.

1.6 SUBMITTALS

- A. Product Data: For the following:
1. Piping materials, including dielectric fittings, flexible connections, and sprinkler specialty fittings.
 2. Pipe hangers and supports, including seismic restraints.
 3. Valves, including listed fire-protection valves, unlisted general-duty valves, and specialty valves and trim.
 4. Air compressors, including electrical data.
 5. Sprinklers, escutcheons, and guards. Include sprinkler flow characteristics, mounting, finish, and other pertinent data.
 6. Hose connections, including size, type, and finish.
 7. Hose stations, including size, type, and finish of hose connections; type and length of fire hoses; finish of fire hose couplings; type, material, and finish of nozzles; and finish of rack.
 8. Fire department connections, including type; number, size, and arrangement of inlets; caps and chains; size and direction of outlet; escutcheon and marking; and finish.
 9. Alarm devices, including electrical data.

- B. Fire-hydrant flow test report.
 - 1. Exception: Furnish most recent annual fire pump test report where system is served by an existing fire pump.
- C. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, that have been approved by authorities having jurisdiction, including hydraulic calculations, if applicable.
- D. Field Test Reports and Certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13 and NFPA 14. Include "Contractor's Material and Test Certificate for Aboveground Piping" and "Contractor's Material and Test Certificate for Underground Piping."
- E. Welding certificates.
- F. Field quality-control test reports.
- G. Operation and Maintenance Data: For standpipe and sprinkler specialties to include in emergency, operation, and maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Requirements of Regulatory Authorities: All work shall comply with the rules and regulations of all federal, state and local authorities having jurisdiction.
- B. Requirements of the Owner's Insurance Underwriter: All work shall comply with the Owner's Insurance Underwriter's requirements. Where the Insurance Underwriter's requirements are more stringent than the requirements of these specifications the requirements of the Insurance Underwriter shall take precedence.
- C. These are performance specifications and the design and installation of the automatic sprinkler and standpipe systems shall be performed by a licensed Fire Protection Systems Contractor with a minimum of five (5) years' experience with projects of this size.
- D. Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX.
- E. NFPA Standards: Fire-suppression-system equipment, specialties, accessories, installation, and testing shall comply with the following:
 - 1. NFPA 13, "Installation of Sprinkler Systems."
 - 2. NFPA 24, "Installation of Private Fire Service Mains and Their Appurtenances."

1.8 COORDINATION

- A. Coordinate layout and installation of sprinkler heads with other construction that penetrates ceilings, including light fixtures, HVAC equipment, and partition assemblies.
- B. Coordinate layout and installation of piping and related appurtenances with work of other trades.

1.9 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Sprinkler Cabinets: Finished, wall-mounting, steel cabinet with hinged cover, with space for minimum of six spare sprinklers plus sprinkler wrench. Include number of sprinklers required by NFPA 13 and sprinkler wrench. Include separate cabinet with sprinklers and wrench for each type of sprinkler on Project.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 DUCTILE-IRON PIPE AND FITTINGS

- A. Mechanical-Joint, Ductile-Iron Pipe: AWWA C151, with mechanical-joint bell end and plain end.
 - 1. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 - 2. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron gland, rubber gasket, and steel bolts and nuts.
- B. Grooved-End, Ductile-Iron Pipe: AWWA C151, with factory- or field-formed, radius-cut-grooved ends according to AWWA C606.
 - 1. Grooved-Joint Piping Systems:
 - a. Manufacturers:
 - (1) Victaulic Co. of America.
 - b. Grooved-End Transition Flange: UL 213, gasketed fitting with key for ductile-iron-pipe dimensions. Include flange-type, ductile-iron housing with rubber gasket listed for use with housing and steel bolts and nuts.

2.3 STEEL PIPE AND FITTINGS

- A. Threaded-End, Standard-Weight Steel Pipe: ASTM A 53/A 53M, ASTM A 135, or ASTM A 795, hot-dip galvanized where indicated and with factory- or field-formed threaded ends.
 - 1. Cast-Iron Threaded Flanges: ASME B16.1.
 - 2. Malleable-Iron Threaded Fittings: ASME B16.3.
 - 3. Gray-Iron Threaded Fittings: ASME B16.4.
 - 4. Steel Threaded Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106, Schedule 40, seamless steel pipe hot-dip galvanized where indicated. Include ends matching joining method.
 - 5. Steel Threaded Couplings: ASTM A 865 hot-dip galvanized-steel pipe where indicated.
- B. Plain-End, Standard-Weight Steel Pipe: ASTM A 53/A 53M, ASTM A 135, or ASTM A 795 hot-dip galvanized-steel pipe where indicated.
 - 1. Steel Welding Fittings: ASTM A 234/A 234M, and ASME B16.9 or ASME B16.11.
 - 2. Steel Flanges and Flanged Fittings: ASME B16.5.
- C. Grooved-End, Standard-Weight Steel Pipe: ASTM A 53/A 53M, ASTM A 135, or ASTM A 795, hot-dip galvanized where indicated and with factory- or field-formed, square cut- or roll grooved ends.
 - 1. Grooved-Joint Piping Systems:
 - a. Manufacturers:
 - (1) Central Sprinkler Corp.
 - (2) National Fittings, Inc.
 - (3) Star Pipe Products; Star Fittings Div.
 - (4) Victaulic Co. of America.
 - b. Grooved-End Fittings: UL-listed, ASTM A 536, ductile-iron casting with OD matching steel-pipe OD.
 - c. Grooved-End-Pipe Couplings: UL 213 and AWWA C606, rigid pattern, unless otherwise indicated; gasketed fitting matching steel-pipe OD. Include ductile-

iron housing with keys matching steel-pipe and fitting grooves, rubber gasket listed for use with housing, and steel bolts and nuts.

- D. Plain-End, Schedule 10 Steel Pipe: ASTM A 135 or ASTM A 795, Schedule 10 in NPS 5 (DN 125) and smaller; and NFPA 13 specified wall thickness in NPS 6 to NPS 10 (DN 150 to DN 250).
 - 1. Steel Welding Fittings: ASTM A 234/A 234M, and ASME B16.9 or ASME B16.11.
 - 2. Steel Flanges and Flanged Fittings: ASME B16.5.
- E. Grooved-End, Schedule 10 Steel Pipe: ASTM A 135 or ASTM A 795, Schedule 10 in NPS 5 (DN 125) and smaller; and NFPA 13-specified wall thickness in NPS 6 to NPS 10 (DN 150 to DN 250); with factory- or field-formed, roll-grooved ends.
 - 1. Grooved-Joint Piping Systems:
 - a. Manufacturers:
 - (1) Central Sprinkler Corp.
 - (2) National Fittings, Inc.
 - (3) Star Pipe Products; Star Fittings Div.
 - (4) Victaulic Co. of America.
 - b. Grooved-End Fittings: UL-listed, ASTM A 536, ductile-iron casting with OD matching steel-pipe OD.
 - c. Grooved-End-Pipe Couplings: UL 213 and AWWA C606, rigid pattern, unless otherwise indicated; gasketed fitting matching steel-pipe OD. Include ductile-iron housing with keys matching steel-pipe and fitting grooves, rubber gasket listed for use with housing, and steel bolts and nuts.

2.4 FLEXIBLE CONNECTORS

- A. Flexible connectors shall have materials suitable for system fluid. Include 175-psig (1200-kPa) minimum working-pressure rating and ends according to the following:
 - 1. NPS 2 (DN 50) and Smaller: Threaded.
 - 2. NPS 2-1/2 (DN 65) and Larger: Flanged.
 - 3. Option for NPS 2-1/2 (DN 65) and Larger: Grooved for use with grooved-end-pipe couplings.
- B. Manufacturers:
 - 1. Mercer Rubber Co.
 - 2. Metraflex, Inc.
 - 3. Unaflex Inc.
- C. Stainless-Steel-Hose/Steel Pipe, Flexible Connectors: Corrugated, stainless-steel, inner tubing covered with stainless-steel wire braid. Include steel nipples or flanges, welded to hose.
- D. Stainless-Steel-Hose/Stainless-Steel Pipe, Flexible Connectors: Corrugated, stainless-steel, inner tubing covered with stainless-steel wire braid. Include stainless-steel nipples or flanges, welded to hose.

2.5 CORROSION-PROTECTIVE ENCASEMENT FOR PIPING

- A. Encasement for Underground Metal Piping: ASTM A 674 or AWWA C105, PE film, 0.008-inch (0.20-mm) minimum thickness, tube or sheet.

2.6 SPRINKLER SPECIALTY FITTINGS

- A. Sprinkler specialty fittings shall be UL listed or FMG approved, with 175-psig (1200-kPa) minimum working-pressure rating, and made of materials compatible with piping. Sprinkler specialty fittings shall have 250-psig (1725-kPa) minimum working-pressure rating if fittings are components of high-pressure piping system.

- B. Outlet Specialty Fittings:
 - 1. Manufacturers:
 - a. Central Sprinkler Corp.
 - b. National Fittings, Inc.
 - c. Star Pipe Products; Star Fittings Div.
 - d. Victaulic Co. of America.
 - 2. Mechanical-T and -Cross Fittings: UL 213, ductile-iron housing with gaskets, bolts and nuts, and threaded, locking-lug, or grooved outlets. U-bolt type fittings are not allowed.
- C. Sprinkler Drain and Alarm Test Fittings: Cast- or ductile-iron body; with threaded or locking-lug inlet and outlet, test valve, and orifice and sight glass.
 - 1. Manufacturers:
 - a. Central Sprinkler Corp.
 - b. Fire-End and Croker Corp.
 - c. Viking Corp.
 - d. Victaulic Co. of America.
- D. Sprinkler Branch-Line Test Fittings: Brass body with threaded inlet, capped drain outlet, and threaded outlet for sprinkler.
 - 1. Manufacturers:
 - a. Elkhart Brass Mfg. Co., Inc.
 - b. Fire-End and Croker Corp.
 - c. Potter-Roemer; Fire-Protection Div.
- E. Sprinkler Inspector's Test Fitting: Cast- or ductile-iron housing with threaded inlet and drain outlet and sight glass.
 - 1. Manufacturers:
 - a. AGF Manufacturing Co.
 - b. Central Sprinkler Corp.
 - c. Triple R Specialty of Ajax, Inc.
- F. Dry-Pipe-System Fittings: UL listed for dry-pipe service.

2.7 LISTED FIRE-PROTECTION VALVES

- A. Valves shall be UL listed or FMG approved, with 175-psig (1200 kPa) minimum pressure rating. Valves shall have 250-psig (1725-kPa) minimum pressure rating if valves are components of high-pressure piping system.
- B. Gate Valves with Wall Indicator Posts:
 - 1. Gate Valves: UL 262, cast-iron body, bronze mounted, with solid disc, nonrising stem, operating nut, and flanged ends.
 - 2. Indicator Posts: UL 789, horizontal-wall type, cast-iron body, with hand wheel, extension rod, locking device, and cast-iron barrel.
 - 3. Manufacturers:
 - a. Grinnell Fire Protection.
 - b. McWane, Inc.; Kennedy Valve Div.
 - c. NIBCO.
 - d. Stockham.
- C. Ball Valves: Comply with UL 1091, except with ball instead of disc.
 - 1. NPS 1-1/2 (DN 40) and Smaller: Bronze body with threaded ends.
 - 2. NPS 2 and NPS 2-1/2 (DN 50 and DN 65): Bronze body with threaded ends or ductile-iron body with grooved ends.
 - 3. NPS 3 (DN 80): Ductile-iron body with grooved ends.
 - 4. Manufacturers:
 - a. NIBCO.
 - b. Victaulic Co. of America.

- D. Butterfly Valves: UL 1091.
 - 1. NPS 2 (DN 50) and Smaller: Bronze body with threaded ends.
 - a. Manufacturers:
 - (1) Global Safety Products, Inc.
 - (2) Milwaukee Valve Company.
 - 2. NPS 2-1/2 (DN 65) and Larger: Bronze, cast-iron, or ductile-iron body; wafer type or with flanged or grooved ends.
 - a. Manufacturers:
 - (1) Central Sprinkler Corp.
 - (2) Global Safety Products, Inc.
 - (3) McWane, Inc.; Kennedy Valve Div.
 - (4) Mueller Company.
 - (5) NIBCO.
 - (6) Victaulic Co. of America.
- E. Check Valves NPS 2 (DN 50) and Larger: UL 312, swing type, cast-iron body with flanged or grooved ends.
 - 1. Manufacturers:
 - a. Globe Fire Sprinkler Corporation.
 - b. Reliable Automatic Sprinkler Co., Inc.
 - c. Star Sprinkler Inc.
 - d. Victaulic Co. of America.
- F. Gate Valves: UL 262, OS&Y type.
 - 1. NPS 2 (DN 50) and Smaller: Bronze body with threaded ends.
 - a. Manufacturers:
 - (1) Crane Co.; Crane Valve Group; Crane Valves.
 - (2) Hammond Valve.
 - (3) NIBCO.
 - 2. NPS 2-1/2 (DN 65) and Larger: Cast-iron body with flanged ends.
 - a. Manufacturers:
 - (1) Crane Co.; Crane Valve Group; Crane Valves.
 - (2) Hammond Valve.
 - (3) Milwaukee Valve Company.
 - (4) NIBCO.
- G. Indicating Valves: UL 1091, with integral indicating device and ends matching connecting piping.
 - 1. Indicator: Visual.
 - 2. NPS 2 (DN 50) and Smaller: Ball or butterfly valve with bronze body and threaded ends.
 - a. Manufacturers:
 - (1) Milwaukee Valve Company.
 - (2) NIBCO.
 - (3) Victaulic Co. of America.
 - 3. NPS 2-1/2 (DN 65) and Larger: Butterfly valve with cast- or ductile-iron body; wafer type or with flanged or grooved ends.
 - a. Manufacturers:
 - (1) Central Sprinkler Corp.
 - (2) Grinnell Fire Protection.
 - (3) Milwaukee Valve Company.
 - (4) Victaulic Co. of America.

2.8 UNLISTED GENERAL-DUTY VALVES

- A. Ball Valves NPS 2 (DN 50) and Smaller: MSS SP-110, 2-piece copper-alloy body with chrome-plated brass ball, 600-psig (4140-kPa) minimum CWP rating, blowout-proof stem, and threaded ends.

- B. Check Valves NPS 2 (DN 50) and Smaller: MSS SP-80, Type 4, Class 125 minimum, swing type with bronze body, nonmetallic disc, and threaded ends.
- C. Gate Valves NPS 2 (DN 50) and Smaller: MSS SP-80, Type 2, Class 125 minimum, with bronze body, solid wedge, and threaded ends.
- D. Globe Valves NPS 2 (DN 50) and Smaller: MSS SP-80, Type 2, Class 125 minimum, with bronze body, nonmetallic disc, and threaded ends.

2.9 SPECIALTY VALVES

- A. Sprinkler System Control Valves: UL listed or FMG approved, cast- or ductile-iron body with flanged or grooved ends, and 175-psig (1200-kPa) minimum pressure rating. Control valves shall have 250-psig (1725-kPa) minimum pressure rating if valves are components of high-pressure piping system.
 - 1. Manufacturers:
 - a. Reliable Automatic Sprinkler Co., Inc.
 - b. Star Sprinkler Inc.
 - c. Victaulic Co. of America.
 - d. Viking Corp.
 - 2. Alarm Check Valves: UL 193, designed for horizontal or vertical installation, with bronze grooved seat with O-ring seals, single-hinge pin, and latch design. Include trim sets for bypass, drain, electrical sprinkler alarm switch, pressure gages, retarding chamber, and fill-line attachment with strainer.
 - a. Drip Cup Assembly: Pipe drain without valves and separate from main drain piping.
 - 3. Dry-Pipe Valves: UL 260, differential type; with bronze seat with O-ring seals, single-hinge pin, and latch design. Include UL 1486, quick-opening devices, trim sets for air supply, drain, priming level, alarm connections, ball drip valves, pressure gages, priming chamber attachment, and fill-line attachment.
 - a. Air-Pressure Maintenance Device: UL 260, automatic device to maintain correct air pressure in piping. Include shutoff valves to permit servicing without shutting down sprinkler piping, bypass valve for quick filling, pressure regulator or switch to maintain pressure, strainer, pressure ratings with 14- to 60-psig (95- to 410-kPa) adjustable range, and 175-psig (1200-kPa) maximum inlet pressure.
 - (1) Manufacturers:
 - (a) Grinnell Fire Protection.
 - (b) Reliable Automatic Sprinkler Co., Inc.
 - (c) Star Sprinkler Inc.
 - (d) Viking Corp.
 - b. Air Compressor: UL 753, fractional horsepower, 120-V ac, 60 Hz, single phase.
 - (1) Manufacturers:
 - (a) Grinnell Fire Protection.
 - (b) Reliable Automatic Sprinkler Co., Inc.
 - (c) Viking Corp.
 - B. Pressure-Regulating Valves: UL 1468, brass or bronze, NPS 1-1/2 and NPS 2-1/2 (DN 40 and DN 65), 400-psig (2760-kPa) minimum rating. Include female NPS inlet and outlet, adjustable setting feature, and straight or 90-degree-angle pattern design as indicated.
 - 1. Finish: Rough metal.
 - 2. Manufacturers:
 - a. Grinnell Fire Protection.
 - b. Potter-Roemer; Fire Protection Div.
 - c. Zurn Industries, Inc.; Wilkins Div.
 - C. Automatic Drain Valves: UL 1726, NPS 3/4 (DN 20), ball-check device with threaded ends.
 - 1. Manufacturers:

- a. AFAC Inc.
- b. Grinnell Fire Protection.

2.10 SPRINKLERS

- A. Sprinklers shall be UL listed or FMG approved, with 175-psig (1200-kPa) minimum pressure rating. Sprinklers shall have 250-psig (1725-kPa) minimum pressure rating if sprinklers are components of high-pressure piping system.
- B. Manufacturers:
 - 1. Reliable Automatic Sprinkler Co., Inc.
 - 2. Star Sprinkler Inc.
 - 3. Victaulic Co. of America.
 - 4. Viking Corp.
- C. Automatic Sprinklers: With heat-responsive element complying with the following:
 - 1. UL 199, for nonresidential applications.
 - 2. UL 1626, for residential applications.
 - 3. UL 1767, for early-suppression, fast-response applications.
- D. Sprinkler Types and Categories: Nominal 1/2-inch (12.7-mm) orifice for "Ordinary" temperature classification rating, unless otherwise indicated or required by application.
 - 1. Orifice: 1/2 inch (12.7 mm), with discharge coefficient K between 5.3 and 5.8.
 - 2. Orifice: 17/32 inch (13.5 mm), with discharge coefficient K between 7.4 and 8.2.
- E. Sprinkler types, features, and options as follows:
 - 1. Concealed ceiling sprinklers, including cover plate.
 - 2. Extended-coverage sprinklers.
 - 3. High-pressure sprinklers.
 - 4. Institution sprinklers, made with a small, breakaway projection.
 - 5. Pendent sprinklers.
 - 6. Pendent, dry-type sprinklers.
 - 7. Quick-response sprinklers.
 - 8. Recessed sprinklers, including escutcheon.
 - 9. Sidewall sprinklers.
 - 10. Sidewall, dry-type sprinklers.
 - 11. Upright sprinklers.
- F. Sprinkler Finishes: Chrome plated, bronze, and painted.
- G. Special Coatings: Wax, lead, and corrosion-resistant paint.
- H. Sprinkler Escutcheons: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers.
 - 1. Ceiling Mounting: Chrome-plated steel, 2 piece, with 1-inch (25-mm) vertical adjustment.
 - 2. Sidewall Mounting: Chrome-plated steel, one piece, flat.
- I. Sprinkler Guards: Wire-cage type, including fastening device for attaching to sprinkler.

2.11 HOSE CONNECTIONS

- A. Manufacturers:
 - 1. Elkhart Brass Mfg. Co., Inc.
 - 2. Grinnell Fire Protection.
 - 3. Guardian Fire Equipment Incorporated.
 - 4. Potter-Roemer; Fire-Protection Div.

- B. Description: UL 668, brass or bronze, 300-psig (2070-kPa) minimum pressure rating, hose valve for connecting fire hose. Include angle pattern design; female NPS inlet and male hose outlet; and lugged cap, gasket, and chain. Include NPS 2-1/2 (DN 65 as indicated, and hose valve threads according to NFPA 1963 and matching local fire department threads.
 - 1. Valve Operation: Nonadjustable type, unless pressure-regulating type is indicated.
 - 2. Finish: Rough chrome-plated.

2.12 FIRE DEPARTMENT CONNECTIONS

- A. Manufacturers:
 - 1. Elkhart Brass Mfg. Co., Inc.
 - 2. Guardian Fire Equipment Incorporated.
 - 3. Potter-Roemer; Fire-Protection Div.
 - 4. Reliable Automatic Sprinkler Co., Inc.
- B. Wall-Type, Fire Department Connection: UL 405, 175-psig (1200-kPa) minimum pressure rating; with corrosion-resistant-metal body with brass inlets, brass wall escutcheon plate, brass lugged caps with gaskets and brass chains, and brass lugged swivel connections. Include inlets with threads according to NFPA 1963 and matching local fire department sizes and threads, outlet with pipe threads, extension pipe nipples, check devices or clappers for inlets, and escutcheon plate with marking similar to "AUTO SPKR & STANDPIPE."
 - 1. Finish: Polished brass.
- C. Exposed, Freestanding-Type, Fire Department Connection: UL 405, 175-psig (1200-kPa) minimum pressure rating; with corrosion-resistant-metal body, brass inlets with threads according to NFPA 1963 and matching local fire department sizes and threads, and bottom outlet with pipe threads. Include brass lugged caps, gaskets, and brass chains; brass lugged swivel connection and drop clapper for each hose-connection inlet; 18-inch- (460-mm-) high, brass sleeve; and round, floor, brass escutcheon plate with marking "AUTO SPKR & STANDPIPE."
 - 1. Finish Including Sleeve: Polished brass.

2.13 ALARM DEVICES

- A. Alarm-device types shall match piping and equipment connections.
- B. Water-Motor-Operated Alarm: UL 753, mechanical-operation type with pelton-wheel operator with shaft length, bearings, and sleeve to suit wall construction and 10-inch- (250-mm-) diameter, cast-aluminum alarm gong with red-enamel factory finish. Include NPS 3/4 (DN 20) inlet and NPS 1 (DN 25) drain connections.
 - 1. Manufacturers:
 - a. Grinnell Fire Protection.
 - b. Reliable Automatic Sprinkler Co., Inc.
 - c. Star Sprinkler Inc.
 - d. Viking Corp.
- C. Electrically Operated Alarm: UL 464, with 10-inch- (250-mm-) diameter, vibrating-type, metal alarm bell with red-enamel factory finish and suitable for outdoor use.
 - 1. Manufacturers:
 - a. Potter Electric Signal Company.
 - b. System Sensor.

- D. Water-Flow Indicator: UL 346, electrical-supervision, paddle-operated-type, water-flow detector with 250-psig (1725-kPa) pressure rating and designed for horizontal or vertical installation. Include two single-pole, double-throw circuit switches for isolated alarm and auxiliary contacts, 7 A, 125-V ac and 0.25 A, 24-V dc; complete with factory-set, field-adjustable retard element to prevent false signals and tamperproof cover that sends signal if removed.
 - 1. Manufacturers:
 - a. Grinnell Fire Protection.
 - b. Potter Electric Signal Company.
 - c. Viking Corp.
 - E. Pressure Switch: UL 753, electrical-supervision-type, water-flow switch with retard feature. Include single-pole, double-throw, normally closed contacts and design that operates on rising pressure and signals water flow.
 - 1. Manufacturers:
 - a. Grinnell Fire Protection.
 - b. Potter Electric Signal Company.
 - c. Viking Corp.
 - F. Valve Supervisory Switch: UL 753, electrical, single-pole, double-throw switch with normally closed contacts. Include design that signals controlled valve is in other than fully open position.
 - 1. Manufacturers:
 - a. McWane, Inc.; Kennedy Valve Div.
 - b. Potter Electric Signal Company.
 - c. System Sensor.
 - G. Indicator-Post Supervisory Switch: UL 753, electrical, single-pole, double-throw switch with normally closed contacts. Include design that signals controlled indicator-post valve is in other than fully open position.
 - 1. Manufacturers:
 - a. Potter Electric Signal Company.
 - b. System Sensor.
- 2.14 PRESSURE GAGES
- A. Manufacturers:
 - 1. AMETEK, Inc.; U.S. Gauge.
 - 2. Marsh Bellofram.
 - 3. WIKA Instrument Corporation.
 - B. Description: UL 393, 3-1/2- to 4-1/2-inch- (90- to 115-mm-) diameter, dial pressure gage with range of 0 to 250 psig (0 to 1725 kPa) minimum.
 - 1. Water System Piping: Include caption "WATER" or "AIR/WATER" on dial face.
 - 2. Air System Piping: Include retard feature and caption "AIR" or "AIR/WATER" on dial face.

PART 3 EXECUTION

3.1 PREPARATION

- A. Perform fire-hydrant flow test according to NFPA 13, and NFPA 291 or obtain most recent annual fire pump test report. Use test data for system hydraulic calculations.
- B. Report test results promptly and in writing.

3.2 EARTHWORK

- A. Refer to Division 31 Section "Earthwork for Water Piping" for excavating, trenching, and backfilling.

3.3 EXAMINATION

- A. Examine roughing-in for hose connections to verify actual locations of piping connections before installation.
- B. Examine walls and partitions for suitable thicknesses, fire- and smoke-rated construction, framing for valve cabinets, and other conditions where hose valves are to be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.4 PIPING APPLICATIONS, GENERAL

- A. Shop weld pipe joints where welded piping is indicated.
- B. Do not use welded joints for galvanized-steel pipe.
- C. Flanges, flanged fittings, unions, nipples, and transition and special fittings with finish and pressure ratings same as or higher than system's pressure rating may be used in aboveground applications, unless otherwise indicated.
- D. Piping between Fire Department Connections and Check Valves: Galvanized, standard-weight steel pipe with grooved ends; grooved-end fittings; grooved-end-pipe couplings; and grooved joints.
- E. Underground Service-Entrance Piping: Ductile-iron, mechanical-joint pipe and fittings and restrained joints. Include corrosion-protective encasement.

3.5 SPRINKLER SYSTEM PIPING APPLICATIONS

- A. Standard-Pressure, Wet-Pipe Sprinkler System, 175-psig (1200-kPa) Maximum Working Pressure:
 - 1. Sprinkler-Piping Fitting Option: Specialty sprinkler fittings, NPS 2 (DN 50) and smaller, including mechanical-T and -cross fittings, may be used downstream from sprinkler zone valves.
 - 2. NPS 2 (DN 50) and smaller: Threaded-end, black, standard-weight steel pipe; cast or malleable iron threaded fittings; and threaded joints.
 - 3. NPS 2-1/2 (DN 65) and larger: Plain-end, Schedule 10 steel pipe; steel welded fittings, and welded joints.
 - 4. NPS 2-1/2 (DN 65) and larger: Grooved-end, Schedule 10 steel pipe; grooved end fittings; grooved-end-pipe couplings; and grooved joints.
- B. Standard-Pressure, Dry-Pipe Sprinkler System, 175-psig (1200-kPa) Maximum Working Pressure:
 - 1. Sprinkler-Piping Fitting Option: Specialty sprinkler fittings, NPS 2 (DN 50) and smaller, including mechanical-T and -cross fittings, may be used downstream from sprinkler zone valves.
 - 2. NPS 2 (DN 50) and smaller: Threaded-end, galvanized, standard-weight steel pipe; cast- or malleable-iron threaded fittings; and threaded joints.
 - 3. NPS 2-1/2 (DN 65) or larger: Grooved-end, galvanized, standard-weight steel pipe; grooved-end fittings; grooved-end-pipe couplings; and grooved joints.

3.6 VALVE APPLICATIONS

- A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
 - 1. Listed Fire-Protection Valves: UL listed and FMG approved for applications where required by NFPA 13 and NFPA 14.
 - a. Shutoff Duty: Use ball, butterfly, or gate valves.
 - 2. Unlisted General-Duty Valves: For applications where UL-listed and FMG-approved valves are not required by NFPA 13 and NFPA 14.
 - a. Shutoff Duty: Use ball, butterfly, or gate valves.

3.7 JOINT CONSTRUCTION

- A. Refer to Division 22 Section "Basic Plumbing Materials and Methods" for basic piping joint construction.
- B. Threaded Joints: Comply with NFPA 13 for pipe thickness and threads. Do not thread pipe smaller than NPS 8 (DN 200) with wall thickness less than Schedule 40 unless approved by authorities having jurisdiction and threads are checked by a ring gage and comply with ASME B1.20.1.
- C. Grooved Joints: Assemble joints with listed coupling and gasket, lubricant, and bolts.
 - 1. Ductile-Iron Pipe: Radius-cut-groove ends of piping. Use grooved-end fittings and grooved-end-pipe couplings.
 - 2. Steel Pipe: Square-cut or roll-groove piping as indicated. Use grooved-end fittings and rigid, grooved-end-pipe couplings, unless otherwise indicated.
 - 3. Dry-Pipe Systems: Use fittings and gaskets listed for dry-pipe service.
- D. Dissimilar-Metal Piping Joints: Construct joints using dielectric fittings compatible with both piping materials.
 - 1. NPS 2 (DN 50) and Smaller: Use dielectric unions, couplings, or nipples.
 - 2. NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Use dielectric flanges.
 - 3. NPS 5 (DN 125) and Larger: Use dielectric flange insulation kits.

3.8 SERVICE-ENTRANCE PIPING

- A. Connect fire-suppression piping to water-service piping of size and in location indicated for service entrance to building. Refer to Division 33 Section "Water Distribution" for exterior piping. Refer to Division 22 Section "Plumbing Specialties" for interior backflow preventer.
- B. Install shutoff valve, backflow preventer, pressure gage, drain, and other accessories indicated at connection to water-service piping. Refer to Division 33 Section "Water Distribution" for backflow preventers.

3.9 PIPING INSTALLATION

- A. Refer to Division 22 Section "Basic Plumbing Materials and Methods" for basic piping installation.
- B. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated, as far as practical.
 - 1. Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Architect before deviating from approved working plans.
- C. Install underground ductile-iron service-entrance piping according to NFPA 24 and with restrained joints. Encase piping in corrosion-protective encasement.

- D. Use approved fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.
- E. Install unions adjacent to each valve in pipes NPS 2 (DN 50) and smaller. Unions are not required on flanged devices or in piping installations using grooved joints.
- F. Install flanges or flange adapters on valves, apparatus, and equipment having NPS 2-1/2 (DN 65) and larger connections.
- G. Install "Inspector's Test Connections" in sprinkler system piping, complete with shutoff valve, sized and located according to NFPA 13.
- H. Install sprinkler piping with drains for complete system drainage.
- I. Install ball drip valves to drain piping between fire department connections and check valves. Drain to floor drain or outside building.
- J. Install alarm devices in piping systems.
- K. Hangers and Supports: Comply with NFPA 13 for hanger materials.
 - 1. Install sprinkler system piping according to NFPA 13.
- L. In Seismic Rated Areas: Install piping according to NFPA 13, applicable building code and standards.
- M. Install pressure gages on riser or feed main, at each sprinkler test connection, and at top of each standpipe. Include pressure gages with connection not less than NPS 1/4 (DN 8) and with soft metal seated globe valve, arranged for draining pipe between gage and valve. Install gages to permit removal, and install where they will not be subject to freezing.
- N. Drain dry-pipe sprinkler piping.
- O. Pressurize and check dry-pipe sprinkler system piping and air-pressure maintenance devices and air compressors.
- P. Install flexible connectors on fire-pump and pressure-maintenance-pump supply and discharge connections and in fire-suppression piping as required.

3.10 VALVE INSTALLATION

- A. Install listed fire-protection valves, unlisted general-duty valves, specialty valves and trim, controls, and specialties according to NFPA 13 and authorities having jurisdiction.
- B. Install listed fire-protection shutoff valves supervised-open, located to control sources of water supply except from fire department connections. Install permanent identification signs indicating portion of system controlled by each valve.
- C. Install check valve and/or backflow preventers in water supply connection as indicated.
- D. Specialty Valves:
 - 1. Dry-Pipe Valves: Install trim sets for air supply, drain, priming level, alarm connections, ball drip valves, pressure gages, priming chamber attachment, and fill-line attachment.
 - a. Air-Pressure Maintenance Devices for Dry-Pipe Systems: Install shutoff valves to permit servicing without shutting down sprinkler system; bypass valve for quick system filling; pressure regulator or switch to maintain system pressure; strainer; pressure ratings with 14- to 60-psig (95- to 410-kPa) adjustable range; and 175-psig (1200-kPa) maximum inlet pressure.
 - b. Install air compressor and compressed-air supply piping.

3.11 SPRINKLER APPLICATIONS

- A. Drawings indicate sprinkler types to be used. Where specific types are not indicated, use the following sprinkler types:
 - 1. Rooms without Ceilings: Upright sprinklers.
 - 2. Rooms with Suspended Ceilings: [Recessed sprinklers] [Concealed sprinklers].
 - 3. Wall Mounting: Sidewall sprinklers.
 - 4. Spaces Subject to Freezing: Upright, pendent, dry sprinklers; and sidewall, dry sprinklers.
 - 5. Deluge-Sprinkler Systems: Upright and pendent, open sprinklers.
 - 6. Special Applications:
 - a. Quick-response heads shall be used throughout.
 - b. Extended coverage heads may be used at contractor's option.
 - 7. Sprinkler Finishes:
 - a. Upright, Pendent, and Sidewall Sprinklers: Chrome plated in finished spaces exposed to view; rough bronze in unfinished spaces not exposed to view; wax coated where exposed to acids, chemicals, or other corrosive fumes.
 - b. Concealed Sprinklers: Rough brass, with factory-painted white cover plate.
 - c. Recessed Sprinklers: Bright chrome, with bright chrome escutcheon unless noted otherwise.

3.12 SPRINKLER INSTALLATION

- A. Install sprinklers in suspended ceilings in center of [narrow dimension of] acoustical ceiling panels and tiles.
- B. Do not install pendent or sidewall, wet-type sprinklers in areas subject to freezing. Use dry-type sprinklers with water supply from heated space.

3.13 HOSE-CONNECTION INSTALLATION

- A. Install freestanding hose connections for access and minimum passage restriction.
- B. Install NPS 2-1/2 (DN 65) hose connections with NPS 2-1/2 by NPS 1-1/2 (DN 65 by DN 40) reducer adapter, cap, and chain.
- C. Install wall-mounting-type hose connections in cabinets. Include pipe escutcheons, with finish matching valves, inside cabinet where water-supply piping penetrates cabinet. Install valves at angle required for connection of fire hose. Refer to Division 10.

3.14 FIRE DEPARTMENT CONNECTION INSTALLATION

- A. Install wall-type, fire department connections in vertical wall.
- B. Install ball drip valve at each check valve for fire department connection.

3.15 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment to allow service and maintenance.
- C. Connect water-supply piping to fire-suppression piping. Include backflow preventer between water supply piping and fire-suppression piping. Refer to Division 22 Section "Plumbing Specialties" for interior backflow preventers.
- D. Install ball drip valves at each check valve for fire department connection. Drain to floor drain or outside building.

- E. Connect piping to specialty valves, hose valves, specialties, fire department connections, and accessories.
- F. Connect compressed-air supply to dry-pipe sprinkler piping.
- G. Connect air compressor to the following piping and wiring:
 - 1. Pressure gages and controls.
 - 2. Electrical power system.
 - 3. Fire alarm devices, including low-pressure alarm.
- H. Electrical Connections: Power wiring is specified in Division 26.
- I. Connect alarm devices to fire alarm.
- J. Ground equipment according to Division 26.
- K. Connect wiring according to Division 26.
- L. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.16 LABELING AND IDENTIFICATION

- A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13 and in Division 22 Section "Plumbing Identification."

3.17 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections and prepare test reports:
 - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - 3. Energize circuits to electrical equipment and devices.
 - 4. Start and run air compressors.
 - 5. Flush, test, and inspect sprinkler systems according to NFPA 13.
 - 6. Coordinate with fire alarm tests. Operate as required.
 - 7. Verify that equipment hose threads are same as local fire department equipment.
- B. Report test results promptly and in writing to Architect and authorities having jurisdiction.

3.18 CLEANING AND PROTECTION

- A. Clean dirt and debris from sprinklers.
- B. Remove and replace sprinklers with paint other than factory finish.
- C. Protect sprinklers from damage until Substantial Completion.

3.19 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain specialty valves. Refer to Division 01.

END OF SECTION

SECTION 22 0010

BASIC PLUMBING MATERIALS AND METHODS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. This Section includes the following:
 - 1. Piping materials and installation instructions common to post piping systems.
 - 2. Transition fittings.
 - 3. Dielectric fittings.
 - 4. Mechanical sleeve seals.
 - 5. Sleeves.
 - 6. Escutcheons.
 - 7. Grout.
 - 8. Demolition.
 - 9. Equipment installation requirements common to equipment sections.
 - 10. Painting and finishing.
 - 11. Concrete bases.
 - 12. Supports and anchorages.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section

1.3 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. The following are industry abbreviations for plastic materials:
 - 1. ABS: Acrylonitrile-butadiene-styrene plastic.
 - 2. CPVC: Chlorinated polyvinyl chloride plastic.
 - 3. PE: Polyethylene plastic.
 - 4. PVC: Polyvinyl chloride plastic.
- G. The following are industry abbreviations for rubber materials:
 - 1. EPDM: Ethylene-propylene-diene terpolymer rubber.
 - 2. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

- A. Product Data: For the following:
 - 1. Transition fittings.
 - 2. Dielectric fittings.
 - 3. Mechanical sleeve seals.
 - 4. Escutcheons.
- B. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."
- B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
 - 1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
 - 2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.
- C. Electrical Characteristics for Equipment: Electrical characteristics of equipment shall be as indicated on drawings. Contractor shall verify that connecting electrical services furnished by Division 26 Contractor match equipment requirements. Contractor shall notify Engineer of any discrepancies for resolution prior to ordering equipment. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.7 COORDINATION

- A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for installation.
- B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- C. Coordinate requirements for access panels and doors for items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 08.

1.8 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Plumbing piping shall be capable of withstanding the effects of earthquake motions determined according to NFPA 13 and local building code.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 PIPE, TUBE, AND FITTINGS

- A. Refer to individual Division 22 piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.3 JOINING MATERIALS

- A. Refer to individual Division 22 piping Sections for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
 - 1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch (3.2-mm) maximum thickness unless thickness or specific material is indicated.
 - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges
 - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges
 - 2. AWWA C110, rubber, flat face, 1/8 inch (3.2 mm) thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
- C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- D. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
- E. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- F. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.
- G. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- H. Solvent Cements for Joining Plastic Piping:
 - 1. CPVC Piping: ASTM F 493.
 - 2. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656

2.4 TRANSITION FITTINGS

- A. AWWA Transition Couplings: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.
 - 1. Manufacturers:
 - a. Dresser Industries, Inc.; DMD Div.
 - b. JCM Industries.
 - 2. Underground Piping NPS 2 (DN 50) and Larger: AWWA C219, metal sleeve-type coupling.
 - 3. Aboveground Pressure Piping: Pipe fitting.

- B. Plastic-to-Metal Transition Fittings: CPVC and PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.
 - 1. Manufacturers:
 - a. Eslon Thermoplastics.
- C. Plastic-to-Metal Transition Unions: MSS SP-107, CPVC and PVC four-part union. Include brass end, solvent-cement-joint end, rubber O-ring, and union nut.
 - 1. Manufacturers:
 - a. NIBCO, Inc.
 - b. NIBCO, Inc.; Chemtrol Div.
- D. Flexible Transition Couplings for Underground Nonpressure Drainage Piping: ASTM C 1173 with elastomeric sleeve, ends same size as piping to be joined, and corrosion-resistant metal band on each end.
 - 1. Manufacturers:
 - a. Fernco, Inc.
 - b. Mission Rubber Company.
 - c. Plastic Oddities, Inc.

2.5 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Dielectric Unions: Factory-fabricated, union assembly, rated for minimum 250-psig (1725-kPa) working pressure at 180 deg F (82 deg C).
 - 1. Manufacturers:
 - a. Epco Sales, Inc.
 - b. Hart Industries, International, Inc.
 - c. Watts Industries, Inc.; Water Products Div.
 - d. Zurn Industries, Inc.; Wilkins Div.
- D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig (1035 kPa) minimum working pressure as required to suit system pressures.
 - 1. Manufacturers:
 - a. Epco Sales, Inc.
 - b. Watts Industries, Inc.; Water Products Div.
- E. Dielectric-Flange Kits: Companion-flange assembly for field assembly. Include flanges, full-face- or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
 - 1. Manufacturers:
 - a. Advance Products & Systems, Inc.
 - b. Pipeline Seal and Insulator, Inc.
 - 2. Separate companion flanges and steel bolts and nuts shall be rated for minimum 150 psig (1035 kPa) minimum working pressure where required to suit system pressures.
- F. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and rated for minimum 300-psig (2070-kPa) working pressure at 225 deg F (107 deg C).
 - 1. Manufacturers:
 - a. Precision Plumbing Products, Inc.
 - b. Sioux Chief Manufacturing Co., Inc.
 - c. Victaulic Co. of America.

2.6 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
 - 1. Manufacturers:
 - a. Advance Products & Systems, Inc.
 - b. Metraflex Co.
 - c. Pipeline Seal and Insulator, Inc.
 - 2. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 - 3. Pressure Plates: Stainless steel. Include two for each sealing element.
 - 4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.7 SLEEVES

- A. Galvanized-Steel Sheet: 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint.
- B. Steel Pipe: ASTM A53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
 - 1. Underdeck Clamp: Clamping ring with set screws.

2.8 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- C. One-Piece, Cast-Brass Type: With set screw.
 - 1. Finish: Polished chrome-plated.
- D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
 - 1. Finish: Polished chrome-plated.

2.9 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
 - 1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
 - 2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength Packaging: Premixed and factory packaged.

PART 3 EXECUTION

3.1 DEMOLITION

- A. Refer to Division 01 Sections for general demolition requirements and procedures
- B. Disconnect, demolish, and remove systems, equipment, and components indicated to be removed.

1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
 3. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 4. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 5. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
- C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.2 PIPING SYSTEMS – COMMON REQUIREMENTS

- A. The installing contractor shall examine the pipe and fittings for defects or cracks. There shall be no defects of the pipe or fittings. Any damaged pipe or fittings shall be rejected.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved by the Engineer.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping to permit valve servicing.
- G. Install piping at required slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections, unless specified otherwise.
- J. Install piping to allow application of insulation.
- K. Select system components with pressure rating equal to or greater than system operating pressure.
- L. Pipe Protection: Provide protection against abrasion where copper tubing is in contact with other building members by wrapping with an approved tape or pipe insulation.
- M. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:
 1. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
 2. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
 3. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
 4. Bare Piping at Ceiling Penetrations in Finished Spaces: Split-casting, cast-brass type with polished chrome-plated finish.
- N. Sleeves are not required for core-drilled holes.

- O. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.
 - 1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches (50 mm) above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified
 - 2. Install sleeves in new walls and slabs as new walls and slabs are constructed. Install sleeves that are large enough to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
 - a. Cast Iron Pipe Sleeves: For pipes smaller than NPS 6 (DN 150).
 - b. Steel Sheet Sleeves: For pipes NPS 6 (DN 150) and larger.
 - c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches (50 mm) above finished floor level. Refer to Division 7 Section for flashing.
 - (1) Seal space outside of sleeve fittings with grout.
 - 3. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 7 for materials and installation.
 - P. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.
 - 1. Install steel pipe for sleeves smaller than 6 inches (150 mm) in diameter.
 - 2. Install cast-iron "wall pipes" for sleeves 6 inches (150 mm) and larger in diameter.
 - 3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
 - Q. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 7 for materials.
 - R. Verify final equipment locations for roughing-in.
 - S. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.
- 3.3 PIPING JOINT CONSTRUCTION
- A. Join pipe and fittings according to the following requirements and Division 22 Sections specifying piping systems.
 - B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
 - C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
 - D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
 - E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.

- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
- H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- I. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
 - 2. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
 - 3. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
 - 4. PVC Nonpressure Piping: Join according to ASTM D 2855.
- J. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.
- K. Plastic Nonpressure Piping Gasketed Joints: Join according to ASTM D 3212.
- L. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.
 - 1. Plain-End Pipe and Fittings: Use butt fusion.
 - 2. Plain-End Pipe and Socket Fittings: Use socket fusion.

3.4 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
 - 1. Install unions, in piping NPS 2 (DN 50) and smaller, adjacent to each valve and at final connection to each piece of equipment.
 - 2. Install flanges, in piping NPS 2-1/2 (DN 65) and larger, adjacent to flanged valves and at final connection to each piece of equipment.
 - 3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
 - 4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.5 EQUIPMENT INSTALLATION – COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

3.6 PAINTING

- A. Painting of systems, equipment, and components is specified in Division 9.
- B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.7 CONCRETE BASES

- A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.
 - 1. Construct concrete bases of dimensions indicated, but not less than 4 inches (100 mm) larger in all directions than supported unit.
 - 2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of the base.
 - 3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
 - 4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 5. Install anchor bolts to elevations required for proper attachment to supported equipment.
 - 6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
 - 7. Use 3000-psi (20.7-MPa), 28-day compressive-strength concrete and reinforcement as specified in Division 3.

3.8 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 05 for structural steel.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.
- C. Field Welding: Comply with AWS D1.1.
- D. Drilled-in Anchors:
 - 1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
 - 2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
 - 3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
 - 4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
 - 5. Set anchors to manufacturer's recommended torque, using a torque wrench.
 - 6. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

3.9 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

- A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor mechanical materials and equipment.
- B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.
- C. Attach to substrates as required to support applied loads.

3.10 GROUTING

- A. Mix and install grout for mechanical equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout.

END OF SECTION

SECTION 22 0519

PLUMBING METERS AND GAGES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. This Section includes the following meters and gages for plumbing systems:
 - 1. Thermometers.
 - 2. Gages.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 33 for domestic and fire-protection water service meters outside the building.

1.3 DEFINITIONS

- A. CR: Chlorosulfonated polyethylene synthetic rubber.
- B. EPDM: Ethylene-propylene-diene terpolymer rubber.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated; include performance curves.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 THERMOMETERS

- A. Manufacturers:
 - 1. Marsh.
 - 2. Weiss Instruments, Inc.
 - 3. Dresser Industries; Instrument Div.
- B. Case: Die-cast aluminum or brass, 9 inches 229 mm long.
- C. Tube: Red or blue reading, organic-liquid filled, with magnifying lens.
- D. Tube Background: Satin-faced, nonreflective aluminum with permanently etched scale markings.
- E. Window: Glass.
- F. Connector: Adjustable type, 180 degrees in vertical plane, 360 degrees in horizontal plane, with locking device.

- G. Stem: Copper-plated steel, aluminum, or brass for thermowell installation and of length to suit installation.
- H. Accuracy: Plus or minus 1 percent of range or plus or minus 1 scale division to maximum of 1.5 percent of range.

2.3 THERMOWELLS

- A. Manufacturers: Same as manufacturer of thermometer being used.
- B. Description: Pressure-tight, socket-type metal fitting made for insertion into piping and of type, diameter, and length required to hold thermometer.

2.4 PRESSURE GAGES

- A. Manufacturers:
 1. Ashcroft Commercial Instrument Operations; Dresser Industries; Instrument Div.
 2. Trerice, H. O. Co.
 3. Weiss Instruments, Inc.
 4. Weksler Instruments Operating Unit; Dresser Industries; Instrument Div.
- B. Direct-Mounting, Dial-Type Pressure Gages: Indicating-dial type complying with ASME B40.100.
 1. Case: Liquid-filled type, drawn steel or cast aluminum, 4-1/2-inch (114-mm) diameter.
 2. Pressure-Element Assembly: Bourdon tube, unless otherwise indicated.
 3. Pressure Connection: Brass, NPS 1/4 (DN 8), bottom-outlet type unless back-outlet type is indicated.
 4. Movement: Mechanical, with link to pressure element and connection to pointer.
 5. Dial: Satin-faced, nonreflective aluminum with permanently etched scale markings.
 6. Pointer: Red metal.
 7. Window: Glass.
 8. Accuracy: Grade B, plus or minus 2 percent of middle half scale.
 9. Vacuum-Pressure Range: 30-in. Hg of vacuum to 15 psig of pressure (100 kPa of vacuum to 103 kPa of pressure).
 10. Range for Fluids under Pressure: Two times operating pressure.
- C. Pressure-Gage Fittings:
 1. Valves: NPS 1/4 (DN 8) brass or stainless-steel needle type.
 2. Syphons: NPS 1/4 (DN 8) coil of brass tubing with threaded ends.
 3. Snubbers: ASME B40.5, NPS 1/4 (DN 8) brass bushing with corrosion-resistant, porous-metal disc of material suitable for system fluid and working pressure.

PART 3 EXECUTION

3.1 THERMOMETER APPLICATIONS

- A. Install liquid-in-glass thermometers in the following locations:
 1. Outlet of each domestic water heater.
 2. Inlet of each domestic hot water circulation pump.
- B. Provide the following temperature ranges for thermometers:
 1. Domestic Hot Water: 30 to 180 deg F, with 2-degree scale divisions (Minus 1 to plus 82 deg C, with 1-degree scale divisions).

3.2 GAGE APPLICATIONS

- A. Install liquid-filled-case-type pressure gages at suction and discharge of each pump, on the inlet and outlet of each pressure reducing valve and at medical gas zone valves.

3.3 INSTALLATIONS

- A. Install thermometers and adjust vertical and tilted positions.
- B. Install thermowells with socket extending to center of pipe and in vertical position in piping tees where thermometers are indicated.
- C. Install direct-mounting pressure gages in piping tees with pressure gage located on pipe at most readable position.
- D. Install needle-valve and snubber fitting in piping for each pressure gage for fluids.

3.4 CONNECTIONS

- A. Install meters and gages adjacent to machines and equipment to allow service and maintenance for meters, gages, machines, and equipment.

3.5 ADJUSTING

- A. Calibrate meters according to manufacturer's written instructions, after installation.
- B. Adjust faces of meters and gages to proper angle for best visibility.

END OF SECTION

SECTION 22 0523

PLUMBING VALVES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. This Section includes the following general-duty valves:
 - 1. Ball valves.
 - 2. Butterfly valves.
 - 3. Check valves.
 - 4. Gate valves.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 21 fire-suppression piping for fire-protection valves.
- C. Division 22 piping Sections for specialty valves applicable to those Sections only.
- D. Division 33 piping Sections for general-duty and specialty valves for site construction piping.

1.3 DEFINITIONS

- A. The following are standard abbreviations for valves:
 - 1. CWP: Cold working pressure.
 - 2. EPDM: Ethylene-propylene-diene terpolymer rubber.
 - 3. NBR: Acrylonitrile-butadiene rubber.
 - 4. PTFE: Polytetrafluoroethylene plastic.
 - 5. SWP: Steam working pressure.
 - 6. TFE: Tetrafluoroethylene plastic

1.4 SUBMITTALS

- A. Product Data: For each type of valve indicated. Include body, seating, and trim materials; valve design; pressure and temperature classifications; end connections; arrangement; dimensions; and required clearances. Include list indicating valve and its application. Include rated capacities; shipping, installed, and operating weights; furnished specialties; and accessories.

1.5 QUALITY ASSURANCE

- A. ASME B31.9 in paragraph below should cover piping systems in Part 3 "Valve Applications" Article up to 125 psig (860 kPa). Higher-pressure systems are covered by ASME B31.1. Domestic water, sanitary waste, and storm drainage piping are covered by plumbing codes, but valves in this Section are suitable for those applications. ASME Compliance for Ferrous Valves: ASME B16.10 and ASME B16.34 for dimension and design criteria.
- B. NSF Compliance: NSF 61 for valve materials for potable-water service.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
 - 1. Protect internal parts against rust and corrosion.
 - 2. Protect threads, flange faces, grooves, and weld ends.
 - 3. Set gate valves closed to prevent rattling.
 - 4. Set ball valves open to minimize exposure of functional surfaces.

5. Set butterfly valves closed or slightly open.
 6. Block check valves in either closed or open position.
- B. Use the following precautions during storage:
1. Maintain valve end protection.
 2. Store valves indoors and maintain at higher than ambient dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 VALVES, GENERAL

- A. Refer to Part 3 "Valve Applications" Article for applications of valves.
- B. Bronze Valves: NPS 2 (DN 50) and smaller with threaded ends, unless otherwise indicated.
- C. Ferrous Valves: NPS 2-1/2 (DN 65) and larger with flanged ends, unless otherwise indicated.
- D. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- E. Valve Sizes: Same as upstream pipe, unless otherwise indicated.
- F. Valve Actuators:
1. Handwheel: For valves other than quarter-turn types.
 2. Lever Handle: For quarter-turn valves NPS 6 (DN 150) and smaller.
- G. Extended Valve Stems: On insulated valves.
- H. Valve Flanges: ASME B16.1 for cast-iron valves, ASME B16.5 for steel valves, and ASME B16.24 for bronze valves.
- I. Valve Grooved Ends: AWWA C606.
- J. Solder Joint: With sockets according to ASME B16.18.
1. Caution: Use solder with melting point below 840 deg F (454 deg C) for check and gate valves; below 421 deg F (216 deg C) for ball valves.
- K. Threaded: With threads according to ASME B1.20.1.
- L. Valve Bypass and Drain Connections: MSS SP-45

2.3 BALL VALVES

- A. Manufacturers:
1. Ball Valves:
 - a. Conbraco Industries, Inc.; Apollo Div.
 - b. Crane Co.; Crane Valve Group; Stockham Div.

- c. Grinnell Corporation.
- d. NIBCO INC.
- e. Watts Industries, Inc.; Water Products Div.

B. Copper-Alloy Ball Valves, General: MSS SP-110

- C. Ball Valves: Brass or bronze body with full port chrome-plated solid bronze ball, PTFE or TFE seats, and 400-psig (2760-kPa) minimum CWP rating and blowout proof stem.

2.4 BUTTERFLY VALVES

A. Manufacturers:

1. Butterfly Valves:

- a. Crane Co.; Crane Valve Group; Stockham Div.
- b. Grinnell Corporation.
- c. NIBCO INC.
- d. Victaulic.

- B. Butterfly Valves, General: MSS SP-67, Type I, for tight shutoff, with disc and lining suitable for potable water, unless otherwise indicated.

- C. 150-psig (1035-kPa) Minimum CWP Rating, Ferrous-Alloy Butterfly Valves: Wafer type with two-piece stem.

2.5 CHECK VALVES

A. Manufacturers:

1. Check Valves:

- a. Crane Co.; Crane Valve Group; Stockham Div.
- b. Grinnell Corporation.
- c. NIBCO INC.
- d. Watts Industries, Inc.; Water Products Div.

- B. Bronze Check Valves, General: MSS SP-80

- C. Type 2, Class 150, Bronze, Horizontal Lift Check Valves: Bronze body with nonmetallic disc and bronze seat.

- D. Type 3, Class 125, Bronze, Swing Check Valves: Bronze body with bronze disc and seat.

2.6 GATE VALVES

A. Manufacturers:

1. Gate Valves:

- a. Crane Co.; Crane Valve Group; Stockham Div.
- b. Grinnell Corporation.
- c. NIBCO INC.
- d. Watts Industries, Inc.; Water Products Div.

- B. Gate Valves, General: MSS SP-80, with ferrous-alloy handwheel.

- C. Type 1, Class 125, Gate Valves: Bronze body with nonrising stem and bronze solid wedge and union-ring bonnet.

- D. Type 2, Class 150, Gate Valves: Bronze body with rising stem and bronze solid wedge and union-ring bonnet

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine piping system for compliance with requirements for installation tolerances and other conditions affecting performance.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- C. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- D. Examine threads on valve and mating pipe for form and cleanliness.
- E. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- F. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE APPLICATIONS

- A. Refer to piping Sections for specific valve applications. If valve applications are not indicated, use the following:
 - 1. Shutoff Service: Ball, butterfly, or gate, gate, or plug valves.
 - a. NPS 3 (DN 75) and smaller: Ball valve.
 - b. NPS 4 (DN 100) and larger: Gate or butterfly valve.
 - 2. Throttling Service: Ball valves.
- B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP class or CWP ratings may be substituted.
- C. Domestic Water Piping: Use the following types of valves:
 - 1. Ball Valves, NPS 3 (DN 75) and Smaller: Two or Three-piece, copper alloy.
 - 2. Butterfly Valves, NPS 4 (DN 100) and Larger: Flanged, ferrous alloy, with EPDM liner.
 - 3. Swing Check Valves, NPS 2 (DN 50) and Smaller: Type 4, bronze.
 - 4. Swing Check Valves, NPS 2-1/2 (DN 65) and Larger: Type II, gray iron.
- D. Select valves, except wafer and flangeless types, with the following end connections:
 - 1. For Copper Tubing, NPS 3 (DN 75) and Smaller: Solder-joint or threaded ends.
 - 2. For Copper Tubing, NPS 4 (DN 100) and Larger: Flanged ends.
 - 3. For Grooved-End, Copper Tubing: Valve ends may be grooved.

3.3 VALVE INSTALLATION

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- C. Locate valves for easy access and provide separate support where necessary.
- D. Install valves in horizontal piping with stem at or above center of pipe.
- E. Install valves in position to allow full stem movement.

- F. Install check valves for proper direction of flow and as follows:
 - 1. Swing Check Valves: In horizontal position with hinge pin level.

3.4 JOINT CONSTRUCTION

- A. Refer to Division 22 Section "Basic Plumbing Materials and Methods" for basic piping joint construction.
- B. Grooved Joints: Assemble joints with keyed coupling housing, gasket, lubricant, and bolts according to coupling and fitting manufacturer's written instructions.
- C. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

3.5 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

END OF SECTION

SECTION 22 0529

PLUMBING HANGERS AND SUPPORTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. This Section includes the following hangers and supports for system piping and equipment:
 - 1. Steel pipe hangers and supports.
 - 2. Trapeze pipe hangers.
 - 3. Metal framing systems.
 - 4. Thermal-hanger shield inserts.
 - 5. Fastener systems.
 - 6. Pipe stands.
 - 7. Pipe positioning systems.
 - 8. Equipment supports.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 05 for structural-steel shapes and plates for trapeze hangers for pipe and equipment supports.
- C. Division 21 for pipe hangers for fire-protection piping.
- D. Division 22 for vibration isolation devices for plumbing systems.

1.3 DEFINITIONS

- A. MSS: Manufacturers Standardization Society for The Valve and Fittings Industry Inc.
- B. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.4 PERFORMANCE REQUIREMENTS

- A. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
- B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

1.5 SUBMITTALS

- A. Product Data: For the following:
 - 1. Steel pipe hangers and supports.
 - 2. Thermal-hanger shield inserts.
 - 3. Powder-actuated fastener systems.
 - 4. Pipe positioning systems.
- B. Welding certificates.

1.6 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1, "Structural Welding Code--Steel."
 - 2. AWS D1.4, "Structural Welding Code--Reinforcing Steel."

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 STEEL PIPE HANGERS AND SUPPORTS

- A. Description: MSS SP-58, Types 1 through 58, factory-fabricated components. Refer to Part 3 "Hanger and Support Applications" Article for where to use specific hanger and support types.
- B. Manufacturers:
 - 1. B-Line Systems, Inc.; a division of Cooper Industries.
 - 2. Grinnell Corp.
 - 3. National Pipe Hanger Corporation.
 - 4. Tolco Inc.
- C. Galvanized, Metallic Coatings: hot dipped.
- D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

2.3 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural-steel shapes with MSS SP-58 hanger rods, nuts, saddles, and U-bolts.

2.4 METAL FRAMING SYSTEMS

- A. Description: MFMA-3, shop- or field-fabricated pipe-support assembly made of steel channels and other components.
- B. Manufacturers:
 - 1. B-Line Systems, Inc.; a division of Cooper Industries.
 - 2. Power-Strut Div.; Tyco International, Ltd.
 - 3. Tolco Inc.
 - 4. Unistrut Corp.; Tyco International, Ltd.
- C. Coatings: Manufacturer's standard finish, unless bare metal surfaces are indicated.
- D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

2.5 THERMAL-HANGER SHIELD INSERTS

- A. Description: 100-psig- (690-kPa-) minimum, compressive-strength insulation insert encased in sheet metal shield.
- B. Manufacturers:
 - 1. Carpenter & Paterson, Inc.
 - 2. ERICO/Michigan Hanger Co.

3. Pipe Shields, Inc.

- C. Insulation-Insert Material: ASTM C 552, Type II cellular glass with vapor barrier.
- D. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.
- E. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.
- F. Insert Length: Extend 2 inches (50 mm) beyond sheet metal shield for piping operating below ambient air temperature.

2.6 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
 - 1. Manufacturers:
 - a. Hilti, Inc.
 - b. ITW Ramset/Red Head.
- B. Mechanical-Expansion Anchors: Insert-wedge-type zinc-coated steel, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
 - 1. Manufacturers:
 - a. B-Line Systems, Inc.; a division of Cooper Industries.
 - b. Hilti, Inc.
 - c. ITW Ramset/Red Head.

2.7 PIPE STAND FABRICATION

- A. Pipe Stands, General: Shop or field-fabricated assemblies made of manufactured corrosion-resistant components to support roof-mounted piping.
- B. Compact Pipe Stand: One-piece plastic unit with integral-rod-roller, pipe clamps, or V-shaped cradle to support pipe, for roof installation without membrane penetration.
 - 1. Manufacturers:
 - a. ERICO/Michigan Hanger Co.
 - b. MIRO Industries.
- C. Low-Type, Single-Pipe Stand: One-piece stainless-steel base unit with plastic roller, for roof installation without membrane penetration.
 - 1. Manufacturers:
 - a. MIRO Industries.
- D. High-Type, Single-Pipe Stand: Assembly of base, vertical and horizontal members, and pipe support, for roof installation without membrane penetration.
 - 1. Manufacturers:
 - a. ERICO/Michigan Hanger Co.
 - b. MIRO Industries.
 - 2. Base: Stainless steel.
 - 3. Vertical Members: Two or more cadmium-plated-steel or stainless-steel, continuous-thread rods.
 - 4. Horizontal Member: Cadmium-plated-steel or stainless-steel rod with plastic or stainless-steel, roller-type pipe support.

2.8 PIPE POSITIONING SYSTEMS

- A. Description: IAPMO PS 42, system of metal brackets, clips, and straps for positioning piping in pipe spaces for plumbing fixtures for commercial applications.

- B. Manufacturers:
 1. C & S Mfg. Corp.
 2. HOLDRITE Corp.; Hubbard Enterprises.

2.9 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural-steel shapes.

2.10 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
 1. Properties: Nonstaining, noncorrosive, and nongaseous.
 2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

PART 3 EXECUTION

3.1 HANGER AND SUPPORT APPLICATIONS

- A. Specific hanger and support requirements are specified in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized, metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30 (DN 15 to DN 750).
 2. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8 (DN 15 to DN 200).
 3. Adjustable Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 2 (DN 15 to DN 50).
 4. U-Bolts (MSS Type 24): For support of heavy pipes, NPS 1/2 to NPS 30 (DN 15 to DN 750).
 5. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
 6. Pipe Stanchion Saddles (MSS Type 37): For support of pipes, NPS 4 to NPS 36 (DN 100 to DN 900), with steel pipe base stanchion support and cast-iron floor flange and with U-bolt to retain pipe.
- F. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20 (DN 20 to DN 500).
 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20 (DN 20 to DN 500), if longer ends are required for riser clamps.

- G. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
 - 2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction to attach to top flange of structural shape.
 - 3. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
 - 4. C-Clamps (MSS Type 23): For structural shapes.
 - 5. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:
 - a. Light (MSS Type 31): 750 lb. (340 kg).
 - b. Medium (MSS Type 32): 1500 lb. (680 kg).
 - c. Heavy (MSS Type 33): 3000 lb. (1360 kg).
 - 6. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
 - H. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
 - 2. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
 - I. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
 - 2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches (32 mm).
 - 3. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from hanger.
 - 4. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from base support.
 - J. Comply with MSS SP-69 for trapeze pipe hanger selections and applications that are not specified in piping system Sections.
 - K. Comply with MFMA-102 for metal framing system selections and applications that are not specified in piping system Sections.
 - L. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.
 - M. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.
- 3.2 HANGER AND SUPPORT INSTALLATION
- A. Steel Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
 - B. Trapeze Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping and support together on field-fabricated trapeze pipe hangers.
 - 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.
 - 2. Field fabricate from ASTM A 36/A 36M, steel shapes selected for loads being supported. Weld steel according to AWS D1.1.
 - C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled metal framing systems.

- D. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- E. Fastener System Installation:
 - 1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches (100 mm) thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
 - 2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- F. Pipe Stand Installation:
 - 1. Pipe Stand Type: Assemble components and mount on smooth roof surface. Do not penetrate roof membrane.
- G. Pipe Positioning System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture. Refer to Division 22 for plumbing fixtures.
- H. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.
- I. Equipment Support Installation: Fabricate from welded-structural=steel shapes.
- J. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- K. Install lateral bracing with pipe hangers and supports as required to prevent swaying and comply with the code required seismic restraint.
- L. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 (DN 65) and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- M. Load Distribution: Install hangers and supports so piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- N. Pipe Slopes: Install hangers and supports to provide required pipe slopes and so maximum pipe deflections allowed by ASME B31.9 (for building services piping) are not exceeded.
- O. Insulated Piping: Comply with the following:
 - 1. Attach clamps and spacers to piping.
 - a. Use thermal-hanger shield insert with clamp sized to match OD of insert.
 - b. Do not exceed pipe stress limits according to ASME B31.9 for building services piping.
 - 2. Install MSS SP-58, Type 40, protective shields on piping with vapor barrier. Shields shall span an arc of 180 degrees.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.
 - 3. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2 (DN 8 to DN 90): 12 inches (305 mm) long and 0.048 inch (1.22 mm) thick.
 - b. NPS 4 (DN 100): 12 inches (305 mm) long and 0.06 inch (1.52 mm) thick.
 - c. NPS 6 (DN 125 and DN 150): 18 inches (457 mm) long and 0.06 inch (1.52 mm) thick.
 - d. NPS 8 to NPS 14 (DN 200 to DN 350): 24 inches (610 mm) long and 0.075 inch (1.91 mm) thick.

- e. NPS 16 to NPS 24 (DN 400 to DN 600): 24 inches (610 mm) long and 0.105 inch (2.67 mm) thick. Pipes NPS 8 (DN 200) and Larger: Include wood inserts.
- 4. Insert Material: Length at least as long as protective shield.
- 5. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.3 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make smooth bearing surface.
- C. Provide lateral bracing for equipment supports as required to prevent swaying and comply with code required seismic restraint.

3.4 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1 procedures for shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work, and with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. Finish welds at exposed connections so no roughness shows after finishing and contours of welded surfaces match adjacent contours.

3.5 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches (40 mm).

3.6 PAINTING

- A. Touch Up: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION

SECTION 22 0553

PLUMBING IDENTIFICATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. This Section includes the following plumbing identification materials and their installation:
 - 1. Equipment nameplates.
 - 2. Pipe markers.
 - 3. Valve tags.
 - 4. Valve schedules.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Valve numbering scheme.
- C. Valve Schedules: For each piping system. Furnish extra copies (in addition to mounted copies) to include in maintenance manuals.

1.4 QUALITY ASSURANCE

- A. ASME Compliance: Comply with ASME A13.1, "Scheme for the Identification of Piping Systems," for letter size, length of color field, colors, and viewing angles of identification devices for piping.

1.5 COORDINATION

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with location of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 PRODUCTS

2.1 EQUIPMENT IDENTIFICATION DEVICES

- A. Equipment Nameplates: Metal, with data engraved or stamped by equipment manufacturer, for permanent attachment on equipment.
 - 1. Data:
 - a. Manufacturer, product name, model number, and serial number.
 - b. Capacity, operating and power characteristics, and essential data.
 - c. Labels of tested compliances.
 - 2. Location: Accessible and visible.
 - 3. Fasteners: As required to mount on equipment.

2.2 PIPING IDENTIFICATION DEVICES

- A. Manufactured Pipe Markers, General: Preprinted, color-coded, with lettering indicating service, and showing direction of flow.
 - 1. Colors: Comply with ASME A13.1, unless otherwise indicated.
 - 2. Lettering: Use piping system terms indicated and abbreviate only as necessary for each application length.
 - 3. Pipes with OD, Including Insulation, Less Than 6 Inches (150 mm): Full-band pipe markers extending 360 degrees around pipe at each location.
 - 4. Pipes with OD, Including Insulation, 6 Inches (150 mm) and Larger: Either full-band or strip-type pipe markers at least three times letter height and of length required for label.
 - 5. Arrows: Integral with piping system service lettering to accommodate both directions; or as separate unit on each pipe marker to indicate direction of flow.
- B. Plastic Tape: Continuously printed, vinyl tape at least 3 mils (0.08 mm) thick with pressure-sensitive, permanent-type, self-adhesive back.
 - 1. Width for Markers on Pipes with OD, Including Insulation, Less Than 6 Inches (150 mm): 3/4 inch (19 mm) minimum.
 - 2. Width for Markers on Pipes with OD, Including Insulation, 6 Inches (150 mm) or Larger: 1-1/2 inches (38 mm) minimum.

2.3 VALVE TAGS

- A. Valve Tags: Stamped or engraved with 1/4-inch (6.4-mm) letters for piping system abbreviation and 1/2-inch (13-mm) numbers, with numbering scheme approved by Architect. Provide 5/32 inch (4mm) hole for fastener.
 - 1. Material: 3/32-inch- (2.4-mm-) thick laminated plastic with 2 black surfaces and white inner layer.
 - 2. Valve-Tag Fasteners: Brass wire-link or beaded chain; or S-hook.

2.4 VALVE SCHEDULES

- A. Valve Schedules: For each piping system, on standard-size bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.
 - 1. Valve-Schedule Frames: Glazed display frame for removable mounting on masonry walls for each page of valve schedule. Include mounting screws.
 - 2. Frame: Extruded aluminum.
 - 3. Glazing: ASTM C 1036, Type I, Class 1, Glazing Quality B, 2.5-mm, single-thickness glass.

PART 3 EXECUTION

3.1 APPLICATIONS, GENERAL

- A. Products specified are for applications referenced in other Division 22 Sections. If more than single-type material, device, or label is specified for listed applications, selection is Installer's option.

3.2 EQUIPMENT IDENTIFICATION

- A. Install and permanently fasten equipment nameplates furnished by equipment manufacturer on each major item of plumbing equipment that does not have nameplate or has nameplate that is damaged or located where not easily visible. Locate nameplates where accessible and visible. Include nameplates for the following general categories of equipment:
 - 1. Fuel-burning units, including water heaters.
 - 2. Pumps, compressors and similar motor-driven units.

3.3 PIPING IDENTIFICATION

- A. Install manufactured pipe markers indicating service on each piping system. Install with flow indication arrows showing direction of flow.
 - 1. Pipes with OD, (Including Insulation), Less Than 6 Inches (150 mm): Self-adhesive pipe markers. Use color-coded, self-adhesive plastic tape, at least 3/4 inch (19 mm) wide to identify service, lapped at least 1-1/2 inches (38 mm) with separate flow direction indicator tape flow direction tape shall cover circumference of pipe.
 - 2. Pipes with OD, (Including Insulation), 6 Inches (150 mm) and Larger: Shaped pipe markers. Use size to match pipe and secure with fasteners.
 - 3. Pipes with OD, Including Insulation, 6 Inches (150 mm) and Larger: Self-adhesive pipe markers. Use color-coded, self-adhesive plastic tape, at least 1-1/2 inches (38 mm) wide, identify service, lapped at least 3 inches (75 mm) flow direction tape shall cover circumference of pipe.
- B. Locate pipe markers and color bands at locations as follows:
 - 1. Near each valve and control device.
 - 2. Near each branch connection, excluding short takeoffs for fixtures and terminal devices. Where flow pattern is not obvious, mark each pipe at branch.
 - 3. Near penetrations through walls, floors, ceilings, and nonaccessible enclosures.
 - 4. At access doors and similar access points that permit view of concealed piping.
 - 5. Near major equipment items and other points of origination and termination.
 - 6. Spaced at maximum intervals of 50 feet (15 m) along each run. Reduce intervals to 25 feet (7.6 m) in areas of congested piping and equipment.
 - 7. On piping above removable acoustical ceilings. Omit intermediately spaced markers.
 - 8. One marker per system in each room, minimum.

3.4 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; plumbing fixture supply stops; shutoff valves; faucets; convenience and lawn-watering hose connections and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.
- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following:
 - 1. Valve-Tag Size and Shape:
 - a. All services: 1-1/2 inches (38 mm), round.
 - 2. Valve-Tag Color:
 - a. All services: Black.
 - 3. Letter Color:
 - a. All Services: White.

3.5 VALVE-SCHEDULE INSTALLATION

- A. Mount valve schedule on wall in accessible location in each major equipment room.

3.6 ADJUSTING

- A. Relocate plumbing identification materials and devices that have become visually blocked by other work.

3.7 CLEANING

- A. Clean faces of plumbing identification devices and glass frames of valve schedules.

END OF SECTION

SECTION 22 0700
PLUMBING INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. This Section includes plumbing pipe insulation; insulating cements; field-applied jackets; accessories and attachments; and sealing compounds.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 07 for firestopping materials and requirements for penetrations through fire and smoke barriers.
- C. Division 22 Section "Plumbing Hangers and Supports" for pipe insulation shields and protection saddles.

1.3 SUBMITTALS

- A. Product Data: Identify thermal conductivity, thickness, and jackets (both factory and field applied, if any), for each type of product indicated.
- B. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets with requirements indicated. Include dates of tests.
- C. Installer Certificates: Signed by the Contractor certifying that installers comply with requirements.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the U.S. Department of Labor, Bureau of Apprenticeship and Training.
- B. Fire-Test-Response Characteristics: As determined by testing materials identical to those specified in this Section according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and sealer and cement material containers with appropriate markings of applicable testing and inspecting agency
 1. Insulation Installed Indoors: Flame-spread rating of 25 or less, and smoke-developed rating of 50 or less.
 2. Insulation Installed Outdoors: Flame-spread rating of 75 or less, and smoke-developed rating of 150 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Ship insulation materials in containers marked by manufacturer with appropriate ASTM specification designation, type and grade, and maximum use temperature.

1.6 COORDINATION

- A. Coordinate size and location of supports, hangers, and insulation shields specified in Division 22 Section "Plumbing Hangers and Supports."

- B. Coordinate clearance requirements with piping Installer for insulation application.
- C. Coordinate installation and testing of electric heat tracing.

1.7 SCHEDULING

- A. Schedule insulation application after testing piping systems and, where required, after installing and testing heat-trace tape. Insulation application may begin on segments of piping that have satisfactory test results.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Mineral-Fiber Insulation:
 - a. CertainTeed Manson.
 - b. Johns Manville.
 - c. Knauf FiberGlass GmbH.
 - d. Owens-Corning Fiberglas Corp.
 2. Flexible Elastomeric Thermal Insulation:
 - a. Armstrong World Industries, Inc.
 - b. Rubatex Corp.

2.2 INSULATION MATERIALS

- A. Mineral-Fiber Insulation: Glass fibers bonded with a thermosetting resin complying with the following:
 1. Preformed Pipe Insulation: Comply with ASTM C 547, Type 1, with factory-applied, all-purpose, vapor-retarder jacket.
 2. Blanket Insulation: Comply with ASTM C 553, Type II, without facing.
 3. Fire-Resistant Adhesive: Comply with MIL-A-3316C in the following classes and grades:
 - a. Class 1, Grade A for bonding glass cloth and tape to unfaced glass-fiber insulation, for sealing edges of glass-fiber insulation, and for bonding lagging cloth to unfaced glass-fiber insulation.
 4. Vapor-Retarder Mastics: Fire- and water-resistant, vapor-retarder mastic for indoor applications. Comply with MIL-C-19565C, Type II.
 5. Mineral-Fiber Insulating Cements: Comply with ASTM C 195
- B. Flexible Elastomeric Thermal Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.
 1. Adhesive: As recommended by insulation material manufacturer.
 2. Ultraviolet-Protective Coating: As recommended by insulation manufacturer.
- C. Prefabricated Thermal Insulating Fitting Covers: Comply with ASTM C 450 for dimensions used in preforming insulation to cover valves, elbows, tees, and flanges.

2.3 FIELD-APPLIED JACKETS

- A. General: ASTM C 921, Type 1, unless otherwise indicated.
- B. PVC Jacket: High-impact, ultraviolet-resistant PVC; 20 mils (0.5 mm) thick; roll stock ready for shop or field cutting and forming.
 1. Adhesive: As recommended by insulation material manufacturer.
 2. PVC Jacket Color: White.

- 3. PVC Jacket Color: Color-code piping jackets based on materials contained within the piping system.
 - C. Standard PVC Fitting Covers: Factory-fabricated fitting covers manufactured from 20-mil- (0.5-mm-) thick, high-impact, ultraviolet-resistant PVC.
 - 1. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, reducers, end caps, soil-pipe hubs, traps, and mechanical joints.
 - 2. Adhesive: As recommended by insulation material manufacturer.
 - D. Aluminum Jacket: Factory cut and rolled to indicate sizes. Comply with ASTM B 209 (ASTM B 209M), 3003 alloy, H-14 temper.
 - E. Aluminum Jacket: Aluminum roll stock, ready for shop or field cutting and forming to indicated sizes. Comply with ASTM B 209 (ASTM B 209M), 3003 alloy, H-14 temper.
 - 1. Finish and Thickness: Corrugated finish, 0.010 inch (0.25 mm) thick.
 - 2. Elbows: Preformed, 45- and 90-degree, short- and long-radius elbows; same material, finish, and thickness as jacket.
- 2.4 ACCESSORIES AND ATTACHMENTS.
- A. Glass Cloth and Tape: Comply with MIL-C-20079H, Type I for cloth and Type II for tape. Woven glass-fiber fabrics, plain weave, presized a minimum of 8 oz. /sq. yd. (270 g/sq. m).
 - 1. Tape Width: 4 inches (100 mm).
 - B. Bands: 3/4 inch (19mm) wide, in 0.007 inch (0.18mm) thick aluminum.

2.5 VAPOR RETARDERS

- A. Mastics: Materials recommended by insulation material manufacturer that are compatible with insulation materials, jackets, and substrates.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Preparation: Clean and dry pipe and fitting surfaces. Remove materials that will adversely affect insulation application.

3.3 GENERAL APPLICATION REQUIREMENTS

- A. Apply insulation materials, accessories, and finishes according to the manufacturer's written instructions; with smooth, straight, and even surfaces; free of voids throughout the length of piping, including fittings, valves, and specialties.
- B. Refer to schedules at the end of this Section for materials, forms, jackets, and thicknesses required for each piping system.
- C. Use accessories compatible with insulation materials and suitable for the service. Use accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

- D. Apply insulation with longitudinal seams at top and bottom of horizontal pipe runs.
- E. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- F. Seal joints and seams with vapor-retarder mastic on insulation indicated to receive a vapor retarder.
- G. Keep insulation materials dry during application and finishing.
- H. Apply insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by the insulation material manufacturer.
- I. Apply insulation with the least number of joints practical.
- J. Apply insulation over fittings, valves, and specialties, with continuous thermal and vapor-retarder integrity, unless otherwise indicated. Refer to special instructions for applying insulation over fittings, valves, and specialties.
- K. Hangers and Anchors: Where vapor retarder is indicated, seal penetrations in insulation at hangers, supports, anchors, and other projections with vapor-retarder mastic.
 - 1. Apply insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor retarders are indicated, extend insulation on anchor legs at least 12 inches (300 mm) from point of attachment to pipe and taper insulation ends. Seal tapered ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.
 - 3. Install insert materials and apply insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by the insulation material manufacturer.
 - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect the jacket from tear or puncture by the hanger, support, and shield.
- L. Insulation Terminations: For insulation application where vapor retarders are indicated, taper insulation ends. Seal tapered ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.
- M. Apply adhesives and mastics at the manufacturer's recommended coverage rate.
- N. Apply insulation with integral jackets as follows:
 - 1. Pull jacket tight and smooth.
 - 2. Circumferential Joints: Cover with 3-inch- (75-mm-) wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip and spaced 4 inches (100 mm) o.c.
 - 3. Longitudinal Seams: Overlap jacket seams at least 1-1/2 inches (40 mm). Apply insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches (100 mm) o.c.
 - a. Exception: Do not staple longitudinal laps on insulation having a vapor retarder.
 - 4. Vapor-Retarder Mastics: Where vapor retarders are indicated, apply mastic on seams and joints and at ends adjacent to flanges, unions, valves, and fittings.
 - 5. At penetrations in jackets for thermometers and pressure gages, fill and seal voids with vapor-retarder mastic.
- O. Roof Penetrations: Apply insulation for interior applications to a point even with top of roof flashing.
 - 1. Seal penetrations with vapor-retarder mastic.
 - 2. Apply insulation for exterior applications tightly joined to interior insulation ends.
 - 3. Extend metal jacket of exterior insulation outside roof flashing at least 2 inches (50 mm) below top of roof flashing.

4. Seal metal jacket to roof flashing with vapor-retarder mastic.
- P. Exterior Wall Penetrations: For penetrations of below-grade exterior walls, terminate insulation flush with mechanical sleeve seal. Seal terminations with vapor-retarder mastic.
- Q. Interior Wall and Partition Penetrations: Apply insulation continuously through walls and floors.
- R. Fire-Rated Wall and Partition Penetrations: Apply insulation continuously through penetrations of fire-rated walls and partitions.
 1. Firestopping and fire-resistive joint sealers are specified in Division 7.
- S. Floor Penetrations: Apply insulation continuously through floor assembly.
 1. For insulation with vapor retarders, seal insulation with vapor-retarder mastic where floor supports penetrate vapor retarder.

3.4 MINERAL-FIBER INSULATION APPLICATION

- A. Apply insulation to straight pipes and tubes as follows:
 1. Secure each layer of preformed pipe insulation to pipe with tape, or bands without deforming insulation materials.
 2. Where vapor retarders are indicated, seal longitudinal seams and end joints with vapor-retarder mastic. Apply vapor retarder to ends of insulation at intervals of 15 to 20 feet (4.5 to 6 m) to form a vapor retarder between pipe insulation segments.
 3. For insulation with factory-applied jackets, secure laps with outward clinched staples at 6 inches (150 mm) o.c.
 4. For insulation with factory-applied jackets with vapor retarders, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by the insulation material manufacturer and seal with vapor-retarder mastic.
- B. Apply insulation to flanges as follows:
 1. Apply preformed pipe insulation to outer diameter of pipe flange.
 2. Make width of insulation segment the same as overall width of the flange and bolts, plus twice the thickness of the pipe insulation.
 3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
 4. Apply canvas jacket material with manufacturer's recommended adhesive, overlapping seams at least 1 inch (25 mm), and seal joints with vapor-retarder mastic.
- C. Apply insulation to fittings and elbows as follows:
 1. Apply premolded insulation sections of the same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
 2. When premolded insulation elbows and fittings are not available, apply mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire, tape, or bands.
 3. Cover fittings with standard PVC fitting covers.
- D. Apply insulation to valves and specialties as follows:
 1. Apply premolded insulation sections of the same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
 2. When premolded insulation sections are not available, apply blanket insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation. For check valves, arrange insulation for access to stainer basket without disturbing insulation.
 3. Apply insulation to flanges as specified for flange insulation application.
 4. Use preformed standard PVC fitting covers for valve sizes where available. Secure fitting covers with manufacturer's attachments and accessories. Seal seams with tape and vapor-retarder mastic.
 5. For larger sizes where PVC fitting covers are not available, seal insulation with canvas jacket and sealing compound recommended by the insulation material manufacturer.

3.5 FLEXIBLE ELASTOMERIC THERMAL INSULATION APPLICATION

- A. Apply insulation to straight pipes and tubes as follows:
 - 1. Follow manufacturer's written instructions for applying insulation.
 - 2. Seal longitudinal seams and end joints with manufacturer's recommended adhesive. Cement to avoid openings in insulation that will allow passage of air to the pipe surface.
- B. Apply insulation to flanges as follows:
 - 1. Apply pipe insulation to outer diameter of pipe flange.
 - 2. Make width of insulation segment the same as overall width of the flange and bolts, plus twice the thickness of the pipe insulation.
 - 3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of the same thickness as pipe insulation.
 - 4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive. Cement to avoid openings in insulation that will allow passage of air to the pipe surface.
- C. Apply insulation to fittings and elbows as follows:
 - 1. Apply mitered sections of pipe insulation.
 - 2. Secure insulation materials and seal seams with manufacturer's recommended adhesive. Cement to avoid openings in insulation that will allow passage of air to the pipe surface.
- D. Apply insulation to valves and specialties as follows:
 - 1. Apply preformed valve covers manufactured of the same material as pipe insulation and attached according to the manufacturer's written instructions.
 - 2. Apply cut segments of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation. For check valves, fabricate removable sections of insulation arranged to allow access to stainer basket.
 - 3. Apply insulation to flanges as specified for flange insulation application.
 - 4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive. Cement to avoid openings in insulation that will allow passage of air to the pipe surface.

3.6 FIELD-APPLIED JACKET APPLICATION

- A. Apply PVC jacket over exposed interior piping within 7 feet of finished floor, with 1-inch (25-mm) overlap at longitudinal seams and end joints. Seal with manufacturers recommended adhesive.
- B. Apply metal jacket over exposed exterior piping, with 2-inch (50-mm) overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with aluminum bands 12 inches (300 mm) o.c. and at end joints.

3.7 FINISHES

- A. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of the insulation manufacturer's recommended protective coating.
- B. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.

3.8 PIPING SYSTEM APPLICATION

- A. Insulation materials and thicknesses are specified in schedules at the end of this Section.

- B. Items Not Insulated: Unless otherwise indicated, do not apply insulation to the following systems, materials, and equipment:
 1. Flexible connectors.
 2. Vibration-control devices.
 3. Fire-suppression piping.
 4. Drainage piping located in crawl spaces, unless otherwise indicated.
 5. Below-grade piping, unless otherwise indicated.
 6. Chrome-plated pipes and fittings, unless potential for personnel injury.
 7. Air chambers, unions, strainers, check valves and flow regulators.

3.9 FIELD QUALITY CONTROL

- A. Inspection: Perform the following field quality-control inspections, after installing insulation materials, jackets, and finishes, to determine compliance with requirements:
 1. Inspect fittings and valves randomly selected by Architect
- B. Insulation applications will be considered defective if sample inspection reveals noncompliance with requirements. Remove defective Work and replace with new materials according to these Specifications.
- C. Reinstall insulation and covers on fittings and valves uncovered for inspection according to these Specifications.

3.10 INSULATION APPLICATION SCHEDULE, GENERAL

- A. Refer to insulation application schedules for required insulation materials, vapor retarders, and field-applied jackets.
- B. Application schedules identify piping system and indicate pipe size ranges and material, thickness, and jacket requirements.

3.11 INSULATION APPLICATION SCHEDULE

- A. Service: Domestic cold water.
 1. Operating Temperature: 32 to 100 deg F (0 to 38 deg C).
 2. Insulation Material: Mineral fiber.
 3. Insulation Thickness: Apply the following insulation thicknesses:
 - a. Copper Pipe: 5 inch (DN 130) and smaller: 1/2 inch (13mm) thick.
 4. Field-Applied Jacket: See Paragraph 3.6.
 5. Vapor Retarder Required: Yes.
 6. Finish: None.
 7. Piping below slab-on-grade shall be insulated with 1/2 inch (25mm) thick elastomeric insulation. Polyethylene sleeve shall be installed over insulation.
- B. Service: Domestic hot and recirculated hot water.
 1. Operating Temperature: 35 to 140 deg F (2 to 60 deg C).
 2. Insulation Material: Mineral fiber.
 3. Insulation Thickness: Apply the following insulation thicknesses:
 - a. Copper Pipe: 1 1/4 inch (DN 35) and smaller: 1 inch (25 mm) thick.
 - b. Copper Pipe: 1-1/2 inch to 5 inch (DN 38 to DN 130) 1 1/2 inch (38 mm) thick.
 4. Field-Applied Jacket: See Section 3.6.
 5. Vapor Retarder Required: Yes.
 6. Finish: None.
 7. Piping below slab-on-grade shall be insulated with 1/2 inch (25mm) thick elastomeric insulation. Polyethylene sleeve shall be installed over insulation.
- C. Service: Rainwater conductors.
 1. Operating Temperature: 32 to 100 deg F (0 to 38 deg C).
 2. Insulation Material: Mineral fiber.

3. Insulation Thickness: Apply the following insulation thicknesses:
 - a. Cast Iron Pipe: 1 inch (25mm) thick.
 4. Field-Applied Jacket: See Section 3.6.
 5. Vapor Retarder Required: Yes.
 6. Finish: None.
 7. Insulate the Roof Drain Body, the Turn to Horizontal, The Horizontal, The 1st Turn to Vertical, and the 1st Foot of the Adjacent Vertical.
- D. Service: Roof drain bodies.
1. Operating Temperature: 32 to 100 deg F (0 to 38 deg C).
 2. Insulation Material: Mineral fiber.
 3. Insulation Thickness: 1 inch (25mm) thick.
 4. Field-Applied Jacket: None.
 5. Vapor Retarder Required: Yes.
 6. Finish: None.
- E. Service: Condensate drain piping and other waste piping carrying condensate and subject to sweating.
1. Operating Temperature: 35 to 75 deg F (2 to 24 deg C).
 2. Insulation Material: Mineral fiber.
 3. Insulation Thickness: 1/2 inch (13mm) thick.
 4. Field-Applied Jacket: See Paragraph 3.6.
 5. Vapor Retarder Required: Yes.
 6. Finish: None.

END OF SECTION

SECTION 22 1005

PLUMBING SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This Section includes the following plumbing specialties:

1. Backflow preventers.
2. Water regulators.
3. Balancing valves.
4. Water filters.
5. Thermostatic water mixing valves.
6. Strainers.
7. Outlet boxes.
8. Washer-supply outlets.
9. Hose stations.
10. Wall hydrants.
11. Nondraining Nonfreeze post hydrants.
12. Trap seal primer valves.
13. Drain valves.
14. Backwater valves.
15. Miscellaneous piping specialties.
16. Cleanouts.
17. Floor drains.
18. Roof drains.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 22 "Plumbing Meters and Gauges" for water meters, thermometers, and pressure gages.

1.3 DEFINITIONS

A. The following are industry abbreviations for plastic piping materials:

1. ABS: Acrylonitrile-butadiene-styrene plastic.
2. PE: Polyethylene plastic.
3. PVC: Polyvinyl chloride plastic.

1.4 PERFORMANCE REQUIREMENTS

A. Provide components and installation capable of producing piping systems with following minimum working-pressure ratings, unless otherwise indicated:

1. Domestic Water Piping: 125 psig (860 kPa).
2. Sanitary Waste and Vent Piping: 10-foot head of water (30 kPa).
3. Storm Drainage Piping: 10-foot head of water (30 kPa).
4. Force-Main Piping: 100 psig (690 kPa).

1.5 SUBMITTALS

A. Product Data: Include rated capacities and shipping, installed, and operating weights. Indicate materials, finishes, dimensions, required clearances, and methods of assembly of components; and piping and wiring connections for the following:

1. Backflow preventers and water regulators.
2. Balancing valves, water filters, and strainers.
3. Thermostatic water mixing valves and water tempering valves.

4. Water hammer arresters, air vents, and trap seal primer valves and systems.
 5. Drain valves, hose bibbs, hydrants, and hose stations.
 6. Outlet boxes and washer-supply outlets.
 7. Backwater valves, cleanouts, floor drains, open receptors, trench drains, and roof drains.
 8. Roof flashing assemblies.
- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Field test reports.
- D. Maintenance Data: For plumbing specialties to include in maintenance manuals. Include the following:
1. Backflow preventers and water regulators.
 2. Water filters.
 3. Thermostatic water mixing valves and water tempering valves.
 4. Trap seal primer valves and systems.
 5. Hose stations and hydrants.
- 1.6 QUALITY ASSURANCE
- A. Product Options: Drawings indicate size, profiles, and dimensional requirements of plumbing specialties and are based on the specific system indicated. Refer to Division 01.
- B. Plumbing specialties shall bear label, stamp, or other markings of specified testing agency.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. ASME Compliance: Comply with ASME B31.9, "Building Services Piping," for piping materials and installation.
- E. NSF Compliance:
1. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic domestic water piping components. Include marking "NSF-pw" on plastic potable-water piping and "NSF-dwv" on plastic drain, waste, and vent piping.
 2. Comply with NSF 61, "Drinking Water System Components--Health Effects, Sections 1 through 9," for potable domestic water plumbing specialties.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Water Filter Cartridges: Equal to 200 percent of amount installed for each type and size indicated.
 2. Operating Key Handles: Equal to 50 percent of amount installed for each key-operated hose bibb and hydrant installed.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 BACKFLOW PREVENTERS

- A. Manufacturers:
 - 1. Ames Co., Inc.
 - 2. CMB Industries, Inc.; Febco Backflow Preventers.
 - 3. Conbraco Industries, Inc.
 - 4. Mueller Co.; Hersey Meters Div.
 - 5. Watts Industries, Inc.; Water Products Div.
 - 6. Zurn Industries, Inc.; Wilkins Div.
- B. General: ASSE standard, backflow preventers.
 - 1. NPS 2 (DN 50) and Smaller: Bronze body with threaded ends.
 - 2. NPS 2-1/2 (DN 65) and Larger: Bronze, cast-iron, steel, or stainless-steel body with flanged ends.
 - a. Interior Lining: AWWA C550 or FDA-approved, epoxy coating for backflow preventers having cast-iron or steel body.
 - 3. Interior Components: Corrosion-resistant materials.
 - 4. Exterior Finish: Polished chrome plate if used in chrome-plated piping system.
 - 5. Strainer: On inlet.
 - 6. Shut-Off Valve (Inlet of Strainer): Same as valves on inlet/outlet of backflow preventer.
- C. Pipe-Applied, Atmospheric-Type Vacuum Breakers: ASSE 1001, with floating disc and atmospheric vent.
- D. Hose-Connection Vacuum Breakers: ASSE 1011, nickel plated, with nonremovable and manual drain features, and ASME B1.20.7, garden-hose threads on outlet. Units attached to rough-bronze-finish hose connections may be rough bronze.
- E. Reduced-Pressure-Principle Backflow Preventers: ASSE 1013, suitable for continuous pressure application. Include outside screw and yoke gate valves on inlet and outlet, and strainer on inlet; test cocks; and pressure-differential relief valve with ASME A112.1.2 air-gap fitting located between two positive-seating check valves.
 - 1. Pressure Loss: As scheduled on drawings.
- F. Double-Check Backflow Prevention Assemblies: ASSE 1015, suitable for continuous pressure application. Include shutoff valves on inlet and outlet, and strainer on inlet; test cocks; and two positive-seating check valves.
 - 1. Pressure Loss: As scheduled on drawings.
- G. Antisiphon-Pressure-Type Vacuum Breakers: ASSE 1020, suitable for continuous pressure application. Include shutoff valves, spring-loaded check valve, spring-loaded floating disc, test cocks, and atmospheric vent.
- H. Dual-Check-Valve-Type Backflow Preventers: ASSE 1024, suitable for continuous pressure application. Include union inlet and two independent check valves.
- I. Dual-Check-Valve-Type Backflow Preventers: ASSE 1032, suitable for continuous pressure application for carbonated beverage dispensers. Include stainless-steel body; primary and secondary checks; ball check; intermediate atmospheric-vent port for relieving carbon dioxide; and threaded ends.
- J. Laboratory Faucet Vacuum Breakers: ASSE 1035, suitable for continuous pressure application and chrome plated; consisting of primary and secondary checks; intermediate vacuum breaker; and threaded ends.
- K. Double-Check Detector Assembly Backflow Preventers: ASSE 1048, FM approved or UL listed, and suitable for continuous pressure application. Include outside screw and yoke gate valves on inlet and outlet, and strainer on inlet. Include test cocks; two positive-seating check valves; and bypass with displacement-type water meter, valves, and double-check backflow preventer.

1. Pressure Loss: As scheduled on drawings.

- L. Hose-Connection Backflow Preventers: ASSE 1052, suitable for at least 3-gpm (0.19-L/s) flow and applications with up to 10-foot head of water (30-kPa) back pressure. Include two check valves; intermediate atmospheric vent; and nonremovable, ASME B1.20.7, garden-hose threads on outlet.

2.3 BALANCING VALVES

- A. Calibrated Balancing Valves: Adjustable, with two readout ports and memory setting indicator. Include manufacturer's standard hoses, fittings, valves, differential pressure meter, and carrying case.
 1. Manufacturers:
 - a. Amtrol, Inc.
 - b. Armstrong Pumps, Inc.
 - c. ITT Industries; Bell & Gossett Div.
 - d. Taco, Inc.
 - e. Tour & Anderson, Inc.
 - f. Watts Industries, Inc.; Water Products Div.
 2. NPS 2 (DN 50) and Smaller: Bronze body with brass ball, adjustment knob, calibrated nameplate, and threaded or solder-joint ends.
 3. NPS 2-1/2 (DN 65) and Larger: Cast-iron, Y-pattern body with bronze disc and flanged or grooved ends.

2.4 WATER FILTERS

- A. Manufacturers:
 1. Filtrine Manufacturing Company; Drinking Water Division.
 2. Manitowoc Ice, Inc.
 3. U.S. Filter; Filterite Div.
 4. Watts Industries, Inc.; Water Products Div.
- B. General: Cartridge-type assemblies suitable for potable water. Include housing, fittings, filter cartridges, and cartridge end caps.
- C. Wall-Mounting Type: Housing head section with threaded inlet and outlet, mounting bracket, and removable lower section for 10-inch- (250-mm-) long filter cartridge.
 1. Housing Material: Plastic, 125-psig (860-kPa) minimum operating pressure.
 2. Cartridge: Activated-charcoal filter media, 10 inches (250 mm), 10-micron-particulate removable rating.

2.5 THERMOSTATIC WATER MIXING VALVES

- A. Manufacturers:
 1. Lawler Manufacturing Company, Inc.
 2. Leonard Valve Company.
 3. Mark Controls Corp.; Powers Process Controls.
 4. Symmons Industries, Inc.
 5. T & S Brass and Bronze Works, Inc.
- B. General: ASSE 1017, manually adjustable, thermostatic water mixing valve with bronze body. Include check stop and union on hot- and cold-water-supply inlets, adjustable temperature setting, and thermometer.
 1. Type: Bimetal thermostat, operation and pressure rating 125 psig (860 kPa) minimum.
- C. Thermostatic Water Mixing Valves: Unit, with the following:
 1. Piping, valves, thermometer, and unions.
 2. Piping Component Finish: Polished chrome plate for finished spaces; Rough bronze for unfinished/equipment spaces.

3. Cabinet (where indicated): Recessed-mounting stainless-steel box with stainless-steel hinged door and thermometer in front.

2.6 STRAINERS

- A. Strainers: Y-pattern, unless otherwise indicated, and full size of connecting piping. Include ASTM A 666, Type 304, stainless-steel screens with 3/64-inch (1.2-mm) round perforations, unless otherwise indicated.
 1. Pressure Rating: 125-psig (860-kPa) minimum steam working pressure, unless otherwise indicated.
 2. NPS 2 (DN 50) and Smaller: Bronze body, with female threaded ends.
 3. NPS 2-1/2 (DN 65) and Larger: Cast-iron body, with interior AWWA C550 or FDA-approved, epoxy coating and flanged ends.
 4. Y-Pattern Strainers: Screwed screen retainer with centered blowdown.
 5. Drain: Factory- or field-installed, hose-end drain valve.

2.7 OUTLET BOXES

- A. Manufacturers:
 1. Acorn Engineering Company.
 2. Gray, Guy Manufacturing Co., Inc.
 3. Oatey.
 4. Plastic Oddities, Inc.
 5. Zurn Industries, Inc.; Jonespec Div.
- B. General: Recessed-mounting outlet boxes with supply fittings complying with ASME A112.18.1M. Include box with faceplate, services indicated for equipment connections, and wood-blocking reinforcement.
- C. Reinforcement: 2-by-4-inch (38-by-89-mm) fire-retardant-treated-wood blocking between studs. Fire-retardant-treated-wood blocking is specified in Division 6.

2.8 WALL HYDRANTS

- A. Manufacturers:
 1. Josam Co.
 2. Murdock, Inc.
 3. Smith, Jay R. Mfg. Co.
 4. Tyler Pipe; Wade Div.
 5. Wade.
 6. Watts Industries, Inc.; Drainage Products Div.
 7. Woodford Manufacturing Co.
 8. Zurn Industries, Inc.; Jonespec Div.
 9. Zurn Industries, Inc.; Specification Drainage Operation.
- B. General: ASME A112.21.3M, handle or key-operation hydrant with pressure rating of 125 psig (860 kPa).
 1. Inlet: NPS 3/4 or NPS 1 (DN 20 or DN 25) threaded or solder joint.
 2. Outlet: ASME B1.20.7, garden-hose threads.
 3. Operating Keys: One with each key-operation hydrant.
- C. Nonfreeze Exposed-Outlet Wall Hydrants: ASSE 1019, self-drainable with integral nonremovable hose-connection vacuum breaker, casing and operating rod to match wall thickness, projecting outlet, and wall clamp.
 1. Classification: Type B, for automatic draining with hose removed or with hose attached and nozzle closed.
 2. Nozzle and Wall Plate Finish: as scheduled on drawings.

2.9 TRAP SEAL PRIMER VALVES

- A. Supply-Type Trap Seal Primer Valves: ASSE 1018, water-supply-fed type, with the following characteristics:
 - 1. Manufacturers:
 - a. Precision Plumbing Products, Inc.
 - 2. 125-psig (860-kPa) minimum working pressure.
 - 3. Bronze body with atmospheric-vented drain chamber.
 - 4. Inlet and Outlet Connections: threaded, union, or solder joint.
 - 5. Gravity Drain Outlet Connection: threaded or solder joint.
 - 6. Finish: Chrome plated, or rough bronze for units above ceiling or in unfinished spaces.

2.10 DRAIN VALVES

- A. Hose-End Drain Valves: MSS SP-110, NPS 3/4 (DN 20) ball valve, rated for 400-psig (2760-kPa) minimum CWP. Include two-piece, copper-alloy body with standard port, chrome-plated brass ball, replaceable seats and seals, blowout-proof stem, and vinyl-covered steel handle.
 - 1. Inlet: Threaded or solder joint.
 - 2. Outlet: Short-threaded nipple with ASME B1.20.7, garden-hose threads, vacuum breaker, and cap.

2.11 BACKWATER VALVES

- A. Manufacturers:
 - 1. Josam Co.
 - 2. Smith, Jay R. Mfg. Co.
 - 3. Wade.
 - 4. Watts Industries, Inc.; Drainage Products Div.
 - 5. Zurn Industries, Inc.; Specification Drainage Operation.
- B. Horizontal Backwater Valves: ASME A112.14.1, cast-iron body, with removable bronze swing-check valve and threaded or bolted cover.
 - 1. Closed-Position Check Valve: Factory assembled to hang closed.
 - 2. Extension: ASTM A 74, Service class; full-size, cast-iron, soil-pipe extension to field-installed cleanout at floor, instead of cover.

2.12 MISCELLANEOUS PIPING SPECIALTIES

- A. Water Hammer Arresters: ASSE 1010 or PDI-WH 201, piston type with pressurized metal-tube cushioning chamber listed for inaccessible concealed installations. Sizes indicated are based on ASSE 1010, Sizes AA and A through F or PDI-WH 201, Sizes A through F.
 - 1. Manufacturers:
 - a. Josam Co.
 - b. Precision Plumbing Products, Inc.
 - c. Sioux Chief Manufacturing Co., Inc.
 - d. Wade.
 - e. Watts Industries, Inc.; Drainage Products Div.
 - f. Watts Industries, Inc.; Water Products Div.
 - g. Zurn Industries, Inc.; Wilkins Div.
- B. Hose Bibbs: Bronze body with replaceable seat disc complying with ASME A112.18.1M for compression-type faucets. Include NPS 3/4 (DN 15 or DN 20) threaded or solder-joint inlet, of design suitable for pressure of at least 125 psig (860 kPa); integral, nonremovable, drainable hose-connection vacuum breaker; and garden-hose threads complying with ASME B1.20.7 on outlet.
 - 1. Finish: Chrome or nickel plated.
 - 2. Operation: Removable operating key.
 - 3. Include operating key with each operating-key hose bibb.
 - 4. Include integral wall flange with each chrome- or nickel-plated hose bibb.

- C. Open Drains: Shop or field fabricate from ASTM A 74, Service class, hub-and-spigot, cast-iron, soil-pipe fittings. Include P-trap, hub-and-spigot riser section; and where required, increaser fitting, joined with ASTM C 564, rubber gaskets.
- D. Deep-Seal Traps: Cast-iron or bronze casting, with inlet and outlet matching connected piping and cleanout trap seal primer valve connection.
 - 1. NPS 2 (DN 50): 4-inch- (100-mm-) minimum water seal.
 - 2. NPS 2-1/2 (DN 65) and Larger: 5-inch- (125-mm-) minimum water seal.
- E. Floor-Drain Inlet Fittings: Cast iron, with threaded inlet and threaded or spigot outlet, and trap seal primer valve connection.
- F. Fixed Air-Gap Fittings: Manufactured cast-iron or bronze drainage fitting with semi open top with threads or device to secure drainage inlet piping in top and bottom spigot or threaded outlet larger than top inlet. Include design complying with ASME A112.1.2 that will provide fixed air gap between installed inlet and outlet piping.
- G. Expansion Joints: ASME A112.21.2M, assembly with cast-iron body with bronze sleeve, packing gland, and packing; of size and end types corresponding to connected piping.

2.13 CLEANOUTS AND DRAINS

- A. Cleanouts and drains as scheduled on drawings.
 - 1. Manufacturers:
 - a. Josam Co.
 - b. MIFAB Manufacturing, Inc.
 - c. Smith, Jay R. Mfg. Co.
 - d. Tyler Pipe, Wade Div.
 - e. Wade.
 - f. Watts Industries, Inc., Drainage Products Div.
 - g. Zurn Industries, Inc., Jonespec Div.
 - h. Zurn Industries, Inc., Specification Drainage Operation.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Refer to Division 22 Section "Basic Plumbing Materials and Methods" for piping joining materials, joint construction, and basic installation requirements.
- B. Install backflow preventers in each water supply to mechanical equipment and systems and to other equipment and water systems that may be sources of contamination. Comply with authorities having jurisdiction.
 - 1. Install drain for backflow preventers with atmospheric-vent drain connection with air-gap fitting, fixed air-gap fitting, or equivalent positive pipe separation of at least two pipe diameters in drain piping and pipe as indicated. Locate air-gap device attached to or under backflow preventer. Simple air breaks are not acceptable for this application.
 - 2. Do not install bypass piping around backflow preventers.
- C. Install strainers on supply side of each control valve, pressure regulator, and solenoid valve.
- D. Install trap seal primer valves with outlet piping pitched down toward drain trap a minimum of 1 percent and connect to auxiliary inlet fitting at floor drain. Adjust valve for proper flow.
- E. Install backwater valves in building drain piping where indicated. For interior installation, provide cleanout deck plate flush with floor and centered over backwater valve cover, and of adequate size to remove valve cover for servicing.

- F. Install expansion joints at roof drain outlets where rainwater leader does not turn horizontal immediately down stream of drain.
- G. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:
 - 1. Size same as drainage piping up to NPS 4 (DN 100). Use NPS 4 (DN 100) for larger drainage piping unless larger cleanout is indicated.
 - 2. Locate at each change in direction of piping greater than 45 degrees.
 - 3. Locate at minimum intervals of 50 feet (15 m) for piping NPS 3 (DN 75) and smaller and 100 feet (30 m) for larger piping.
 - 4. Locate at base of each vertical soil and waste stack.
 - 5. Install exterior cleanout in 18-inch square by 6-inch thick concrete pad flush with grade.
- H. Install floor cleanout deck plates with top flush with finished floor.
- I. Install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.
- J. Install flashing flange and clamping device with each stack and cleanout passing through floors with waterproof membrane.
- K. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.
 - 1. Position floor drains for easy access and maintenance.
 - 2. Set top of floor drains between 1/4-inch and 1/2 inch below elevation of surrounding finished floor to allow floor drainage. Slope of floor shall not exceed 1 percent.
 - 3. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.
 - 4. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.
- L. Install roof drains at low points of roof areas according to roof membrane manufacturer's written installation instructions.
 - 1. Install roof-drain flashing collar or flange so no leakage occurs between drain and adjoining roofing. Maintain integrity of waterproof membranes where penetrated.
 - 2. Position roof drains for easy access and maintenance.
- M. Fasten wall-hanging plumbing specialties securely to supports attached to building substrate if supports are specified and to building wall construction if no support is indicated.
- N. Fasten recessed-type plumbing specialties to reinforcement built into walls.
- O. Install wood-blocking reinforcement for wall-mounting and recessed-type plumbing specialties.
- P. Install individual shutoff valve in each water supply to plumbing specialties. Use ball valve if specific valve is not indicated. Install shutoff valves in accessible locations. Refer to Division 22 Plumbing Valves Section for general-duty ball, butterfly, check and gate.
- Q. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.
- R. Install escutcheons at wall, floor, and ceiling penetrations in exposed finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding pipe fittings.

3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment to allow service and maintenance.
- C. Connect plumbing specialties to piping specified in other Division 22 Sections.
- D. Ground equipment.
- E. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- F. Connect plumbing specialties and devices that require power according to Division 26 Sections.

3.3 LABELING AND IDENTIFYING

- A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each backflow preventer and thermostatic water mixing valve.
 - 1. Text: Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit.
 - 2. Refer to Division 22 Section "Plumbing Identification" for nameplates and signs.

3.4 PROTECTION

- A. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION

SECTION 22 1116.01

DOMESTIC WATER PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. This Section includes domestic water piping inside the building.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 22 Section "Plumbing Meters and Gages" for thermometers, pressure gages, and fittings.
- C. Division 22 Section "Plumbing Specialties" for water distribution piping specialties.
- D. Division 33 Section "Water Distribution" for water-service piping outside the building from source to a point five-feet outside the building.

1.3 DEFINITIONS

- A. CPVC: Chlorinated polyvinyl chloride plastic.
- B. PVC: Polyvinyl chloride plastic.

1.4 PERFORMANCE REQUIREMENTS

- A. Provide components and installation capable of producing domestic water piping systems with 80 psig (550 kPa), unless otherwise indicated.

1.5 SUBMITTALS

- A. Product Data: For pipe, tube, fittings, and couplings. Data shall include factory documentation of testing agency approval and compliance with manufacturing standards.
- B. Field quality-control test reports.

1.6 QUALITY ASSURANCE

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. Products shall be manufactured in accordance with applicable standards.
- C. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9," for potable domestic water piping and components.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 PIPING MATERIALS

- A. Refer to Part 3 "Pipe and Fitting Applications" Article for applications of pipe, tube, fitting, and joining materials.
- B. Transition Couplings for Aboveground Pressure Piping: Coupling or other manufactured fitting the same size as, with pressure rating at least equal to and ends compatible with, piping to be joined

2.3 DUCTILE-IRON PIPE AND FITTINGS

- A. Push-on-Joint, Ductile-Iron Pipe: AWWA C151, with push-on-joint, bell-and plain spigot end unless grooved or flanged ends are indicated.
 - 1. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 - a. Gaskets: AWWA C111, rubber.
- B. Grooved-End, Ductile-Iron Pipe: AWWA C151, with one or both ends with cut rounded grooves according to AWWA C606.
 - 1. Ductile-Iron, Grooved-End Fittings: ASTM A 47 (ASTM A 47M), malleable-iron castings or ASTM A 536, ductile-iron castings with dimensions matching pipe.
 - 2. Ductile-Iron-Piping Keyed Couplings: AWWA C606, for ductile-iron-pipe dimensions. Include ferrous housing sections, gasket suitable for water, and bolts and nuts.

2.4 COPPER TUBE AND FITTINGS

- A. Soft Copper Tube: ASTM B 88, Types K and L (ASTM B 88M, Types A and B), water tube, annealed temper.
 - 1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
 - 2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends. Furnish Class 300 flanges if required to match piping.
 - 3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.
- B. Hard Copper Tube: ASTM B 88, Types L (ASTM B 88M, Types B), water tube, drawn temper.
 - 1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
 - 2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends. Furnish Class 300 flanges if required to match piping.
 - 3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.
 - 4. Copper, Grooved-End Fittings: ASTM B 75 (ASTM B 75M) copper tube or ASTM B 584 bronze castings.
 - a. Grooved-End-Tube Couplings: Copper-tube dimensions and design similar to AWWA C606. Include ferrous housing sections, gasket suitable for hot water, and bolts and nuts.
 - 5. Press Fitting: Shall conform to material requirements of ASME B16.18, ASME B16.22, or ASME B16.51. Performance criteria of mechanical pressed copper fittings shall conform to IAPMO PS-117 or ASME B16.51. O-rings for copper press fittings shall be EPDM. Mechanical pressed copper fittings shall conform to the approved jointing manufacturers listed below.
 - a. Mueller Streamline PRS.
 - b. Ridge Tool Company or Viega

2.5 VALVES

- A. Bronze and cast-iron, general-duty valves are specified in Division 22 Section "Plumbing Valves."

- B. Balancing and drain valves are specified in Division 22 Section "Plumbing Specialties."

PART 3 EXECUTION

3.1 EXCAVATION

- A. Excavating, trenching, and backfilling for exterior piping within five feet of exterior building wall are specified in Division 31.
- B. Trenching and backfilling for piping below slab-on-grade shall be in accordance with slab construction requirements.

3.2 PIPE AND FITTING APPLICATIONS

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below, unless otherwise indicated.
- B. Flanges may be used on aboveground piping, unless otherwise indicated.
- C. Grooved joints may be used on aboveground grooved-end piping.
- D. Fitting Option: Extruded-tee connections and brazed joints may be used on aboveground copper tubing.
- E. Under-Building-Slab, Domestic Water Piping:
 - 1. NPS 2 (DN 50) and smaller: Soft copper tube, Type K (Type A); no fittings or joints.
 - 2. NPS 2-1/2 to 4 (DN 65 to DN 100): Soft or hard copper tube, Type K (Type A); copper pressure fittings; and brazed joints.
 - 3. NPS 6 (DN 150) and larger: Cement-lined ductile iron with restrained joint fittings.
- F. Aboveground Domestic Water Piping: Hard copper tube, Type L (Type B); copper pressure fittings; soldered joints.

3.3 VALVE APPLICATIONS

- A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
 - 1. Shutoff Duty: Use bronze ball valves for piping NPS 4 (DN 100) and smaller. Use cast-iron butterfly valves with flanged ends for piping NPS 6 (DN 150) and larger.
 - 2. Hot-Water-Piping, Balancing Duty: Calibrated balancing valves.
 - 3. Drain Duty: Hose-end drain valves
- B. Grooved-end valves may be used with grooved-end piping.
- C. Install shutoff valve close to water main on each branch and riser serving plumbing fixtures or equipment, on each water supply to equipment, and on each water supply to plumbing fixtures that do not have supply stops.
- D. Install drain valves for equipment at base of each water riser, at low points in horizontal piping, and where required to drain water piping.
 - 1. Install hose-end drain valves at low points in water mains, risers, and branches.
 - 2. Install stop-and-waste drain valves where indicated.
- E. Install calibrated balancing valves in each hot-water circulation return branch. Set calibrated balancing valves partly open to restrict but not stop flow. Calibrated balancing valves are specified in Division 22 Section "Plumbing Specialties."

3.4 PIPING INSTALLATION

- A. Basic piping installation requirements are specified in Division 22 Section "Basic Plumbing Materials and Methods."
- B. Install under-building-slab copper tubing according to CDA's "Copper Tube Handbook."
- C. Install cast-iron sleeve with water stop and mechanical seal at each service pipe penetration through foundation wall. Where service pipe penetration is through core-drilled concrete wall, mechanical seal may be installed without a sleeve. Select number of interlocking rubber links required to make installation watertight. Sleeves and mechanical seals are specified in Division 22 Section "Basic Plumbing Materials and Methods."
- D. Install shutoff valve, hose-end drain valve, strainer, pressure gage, inside the building at each domestic water service entrance. Pressure gages are specified in Division 22 Section "Plumbing Meters and Gages," and drain valves and strainers are specified in Division 22 Section "Plumbing Specialties."
- E. Install domestic water piping level and plumb.

3.5 JOINT CONSTRUCTION

- A. Basic piping joint construction requirements are specified in Division 22 Section "Basic Plumbing Materials and Methods."
- B. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.
- C. Grooved Joints: Assemble joints with grooved-end-pipe or grooved-end-tube coupling housing, gasket, lubricant, and bolts according to coupling and fitting manufacturer's written instructions.
- D. Extruded-Tee Connections: Form tee in copper tube according to ASTM F 2014. Use tool designed for copper tube; drill pilot hole, form collar for outlet, dimple tube to form seating stop, and braze branch tube into collar.
- E. Press Connections: Copper press fittings shall be made in accordance with the manufacturer's installation instructions. The tubing shall be fully inserted into the fitting and the tubing marked at the shoulder of the fitting. The fitting alignment shall be checked against the mark on the tubing to assure the tubing is fully engaged (inserted) in the fitting. The joints shall be pressed using the tool approved by the manufacturer.

3.6 HANGER AND SUPPORT INSTALLATION

- A. Seismic-restraint devices are specified in Division 22 Section "Plumbing Vibration and Seismic Controls."
- B. Pipe hanger and support devices are specified in Division 22 Section "Plumbing Hangers and Supports." Install the following:
 - 1. Vertical Piping: MSS Type 8 or Type 42, clamps.
 - 2. Individual, Straight, Horizontal Piping Runs: According to the following:
 - a. 100 Feet (30 m) and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet (30 m): MSS Type 43, adjustable roller hangers.
 - 3. Multiple, Straight, Horizontal Piping Runs 100 Feet (30 m) or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
 - 4. Base of Vertical Piping: MSS Type 52, spring hangers.
- C. Install supports according to Division 22 Section "Plumbing Hangers and Supports."
- D. Support vertical piping and tubing at base and at each floor.

- E. Rod diameter may be reduced 1 size for double-rod hangers, to a minimum of 3/8 inch (10 mm).
- F. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 3/4 (DN 20) and Smaller: 60 inches (1500 mm) with 3/8-inch (10-mm) rod.
 - 2. NPS 1 and NPS 1-1/4 (DN 25 and DN 32): 72 inches (1800 mm) with 3/8-inch (10-mm) rod.
 - 3. NPS 1-1/2 and NPS 2 (DN 40 and DN 50): 96 inches (2400 mm) with 3/8-inch (10-mm) rod.
 - 4. NPS 2-1/2 (DN 65): 108 inches (2700 mm) with 1/2-inch (13-mm) rod.
 - 5. NPS 3 to NPS 5 (DN 80 to DN 125): 10 feet (3 m) with 1/2-inch (13-mm) rod.
 - 6. NPS 6 (DN 150): 10 feet (3 m) with 5/8-inch (16-mm) rod.
 - 7. NPS 8 (DN 200): 10 feet (3 m) with 3/4-inch (19-mm) rod.
- G. Install supports for vertical copper tubing every 10 feet (3 m).
- H. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.7 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment and machines to allow service and maintenance.
- C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.

3.8 FIELD QUALITY CONTROL

- A. Inspect domestic water piping as follows:
 - 1. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
 - 2. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
 - a. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 - b. Final Inspection: Arrange final inspection for authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
 - 3. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
 - 4. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- B. Test domestic water piping as follows:
 - 1. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
 - 2. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
 - 3. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 - 4. Cap and subject piping to static water pressure of 50 psig (345 kPa) above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.

5. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.
6. Prepare reports for tests and required corrective action.

3.9 ADJUSTING

- A. Perform the following adjustments before operation:
 1. Close drain valves, hydrants, and hose bibbs.
 2. Open shutoff valves to fully open position.
 3. Adjust calibrated balancing valves in hot-water-circulation return piping to provide flows required.
 4. Remove plugs used during testing of piping and plugs used for temporary sealing of piping during installation.
 5. Remove and clean strainer screens. Close drain valves and replace drain plugs.
 6. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
 7. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.10 CLEANING

- A. Clean interior of domestic water piping system. Remove dirt and debris as work progresses
- B. Clean and disinfect domestic water piping as follows:
 1. Purge new piping and parts of existing domestic water piping that have been altered, extended, or repaired before using.
 2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction or, if methods are not prescribed, procedures described in either AWWA C651 or AWWA C652 or as described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Fill and isolate system according to either of the following:
 - (1) Fill system or part thereof with water/chlorine solution with at least 50 ppm (50 mg/L) of chlorine. Isolate with valves and allow to stand for 24 hours.
 - (2) Fill system or part thereof with water/chlorine solution with at least 200 ppm (200 mg/L) of chlorine. Isolate and allow to stand for three hours.
 - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
 - d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.
- C. Prepare and submit reports of purging and disinfecting activities.

END OF SECTION

SECTION 22 1123

DOMESTIC WATER BOOSTER PUMPS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Domestic water pressure boosting duplex pump set with control panel, gages, controls, valves, and piping.

1.2 RELATED SECTIONS

- A. Section 23 0100 - GENERAL PROVISIONS, MECHANICAL
- B. Section 22 1116 - DOMESTIC WATER PIPING AND INSULATION.
- C. DIVISION 26 - ELECTRICAL.

1.3 SUBMITTALS

- A. Submit under provisions of Division 01.

PART 2 PRODUCTS

2.1 PUMP SYSTEM

- A. System shall consist of two variable speed pumping units with no flow shut down and adjacent control panel as a packaged unit. The variable speed drives shall be self modulating and mounted external of the control panel.
- B. Pumping system shall be mounted on a concrete base, and shall be supported by vibration isolators furnished by the pump manufacturer.
- C. Piping, valves and fittings shall be as specified hereinbefore.
- D. Bladder tank, located as indicated and sized as required.
- E. Install vibration isolation dampers.

PART 3 EXECUTION

3.1 OPERATION

- A. Authorized manufacturer's representative shall be made available for system start-up and adjustment.

3.2 OPERATING INSTRUCTIONS

- A. After system is put into operation, provide to the owner's representative a minimum of three (3) copies of detailed operating and maintenance instructions.

3.3 ELECTRICAL WORK

- A. All wiring which is required by the pumping system shall be installed by the electrical section.

- B. System shall operate on the electrical characteristics set forth on the drawings. Deviations in equipment furnished must be coordinated with the electrical section.

END OF SECTION

SECTION 22 1313

SANITARY SEWER

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Provide sanitary sewer pipe.
- B. Provide cleanouts.
- C. Provide manholes and covers.
- D. Provide lines, grades, stakes, and templates.

1.2 RELATED SECTIONS

- A. DIVISION 31 - SITEWORK.
- B. DIVISION 26 - ELECTRICAL.

1.3 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies: All work shall comply with rules and regulations of local and state agencies having jurisdiction.

1.4 JOB CONDITIONS

- A. Existing Conditions: Carefully maintain bench marks, monuments, and survey control references.

1.5 SERVICES AND CHARGES

- A. Make arrangements with the Local Utility or Department for requirements and approval, and service connection. PAY ALL CHARGES THEREFOR AND INCLUDE THE COST THEREOF IN THE CONTRACT PRICE.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Sanitary Gravity Sewer Pipe: This shall be plain end pipe with PVC sleeve and polyurethane elastomer compression seal or bell and spigot pipe with truing rings in bell and on spigot for compressible "O" ring gasket seal, all meeting the requirements of ASTM C700 for extra strength vitrified clay pipe, with ASTM C425 compression type joints for pipe and fittings."
- B. Wyes and other fittings for clay pipe shall have the same materials, strengths, and joint types as those specified above for the pipe types involved.
- C. Manhole Rims and Covers: Cast iron heavy traffic pattern with covers marked SEWER, total weight at least 365 pounds, metal used in the manufacturer of castings shall conform to minimum requirements of ASTM A48 Class 30B for Gray iron; machine surfaces for the prevention of warbling; one of the following or as approved:
 - 1. John Bouchard & Sons Company, Nashville, TN, No. 1020.
 - 2. Harper Foundry & Machine Company, Jackson, MS, No.7.
- D. Precast Manhole Sections: These shall conform to ASTM C478; straight sections shall be of the lengths required for each manhole assembly; top sections shall be 36 inches high and conical,

either concentric or eccentric, tapering uniformly to 24 inch inside diameter at the top; each precast section shall have tongue and groove joints, and lifting holes to facilitate handling and laying. Embed manhole steps arranged on 16 inch uniform vertical centers in the completed manhole.

- E. Manhole Steps: One of the following or approved:
 - 1. John Bouchard & Sons Company, Nashville, TN, No. 1800, cast iron.
 - 2. Johnson City (TN) Foundry & Machine Works, No. M357, cast iron.
 - 3. Harper Foundry & Machine Company, Jackson, MS, "Standard", cast iron.
- F. Cleanouts: Iron body countersunk head brass plug type.
- G. Adapters to connect concrete or clay pipe to cast iron pipe: suitable factory-made type, of same materials and with same type of joints as those of the concrete or clay pipe.
- H. Cleanout Riser Pipe: cast iron.

PART 3 EXECUTION

3.1 TRENCHING AND EXCAVATING

- A. Excavate trenches to depth indicated on drawings or required line notes which will provide full length solid bearing for pipe barrels and sufficient depth for granular bedding materials for sanitary sewer. Provide 24 inches minimum earth cover over all pipes.
- B. Provide bell holes in trench bottoms to facilitate jointing and to prevent pipe hubs and couplings from bearing on ground before backfilling.
- C. Sheet and brace excavations as required to prevent cave-ins and to protect personnel and adjacent structures.
- D. Where pipelines are below footings, the horizontal distance between footings and pipelines shall be as required to provide a slope not steeper than 1:1 ratio between footing bottoms and the trench bottoms at any point.
- E. Unsuitable Subsurface Conditions: Where excavation bottoms at required elevations are found to be unstable, or where rock, cinders, rubbish or other deleterious materials are encountered, extend excavations down to firm earth and at least six inches below deleterious materials. The excavation bottoms shall be brought up to pipe laying elevation by backfilling with suitable material compacted in place. Suitable materials and compaction shall be as specified above. Dispose of excavated unsuitable materials in an approved manner.

3.2 BACKFILLING

- A. After each pipeline has been laid, tested, and approved thoroughly hand tamp backfill up to twelve inches above pipe top. Then place remaining backfill in eight inch loose layers maximum and compact each layer with pneumatic or other suitable power tamper to at least the density of the adjacent undisturbed soil. Backfill materials shall be of the following types:
 - 1. Up to twelve inches above pipe tops: selected earth or sand which is free of rocks, stones, bricks, cinders, broken concrete, rubbish, wood, vegetable matter, topsoil, and other unsuitable materials.
 - 2. From twelve inches above pipe tops to finished grade or subgrade: any materials removed for the excavation which are suitable for backfill. Do not use as backfill any pieces of rock, stone, concrete, asphalt paving, or masonry larger than six inches in their greatest dimension.

3.3 INSTALLATION

- A. Pipe Bedding: Lay gravity sanitary sewer lines with Class "C" bedding. This shall consist of granular bedding material of crushed rock, crushed stone, or washed gravel passing a 3/4 inch screen and 95 percent retained on a No. 4 sieve or sand may be used. Granular bedding material shall be placed on trench bottom and extend up the sides of the pipe to at least 1/6 pipe outside diameter. Initial backfill from the top of the granular bedding material up to 12 inches above pipe top shall consist of select finely divided earth, hand placed, and compacted before placing the remaining backfill.
- B. Gravity Flow Sewer Pipe:
 - 1. General: lay gravity flow sewer lines so that their inverts will conform accurately to the lines, grades, and elevations indicated and/or shown on previously approved cut sheets. Provide mason's lines, batter boards, and supports, and/or other suitable equipment as necessary to insure the installation of the sewer lines to the required lines, grades, and elevations.
 - 2. Handling: provide and use suitable equipment for the safe and convenient handling of piping materials. Unload all piping materials carefully, and lower them carefully into the trenches, piece by piece, in a manner that will prevent damage to the materials and trenches. Do not under any circumstances drop or dump piping materials, either from transportation vehicles, or into trenches. Before laying inspect each length of pipe and each fitting for defects. Promptly remove all defective pipe and defective fittings from the pipe laying area.
 - 3. Laying: begin laying pipe in finished trench at the lowest points, proceeding upgrade without breaks between manholes, with pipe spigots facing down-grade. Lay pipe with the bedding method required to accommodate the conditions encountered, with full length support of the pipe barrel at every point between bell holes, without grooves or bell ends bearing on trench bottom, and with water-tight joints. Dewater trenches during laying and jointing, as specified hereinbefore. Keep trenches water-free and as dry as practicable during bedding, laying, and jointing, and until the work will not be adversely affected by submergence.
- C. Jointing: Before jointing, all mating surfaces of each joint and all joint materials shall be clean and dry. Make up all joints in strict accordance with the pipe and gasket manufacturer's printed directions. Immediately after jointing, secure each previously laid length of pipe in place with tamped backfill on each side of pipe.
 - 1. Joints between different types of pipes: encase each concrete-to-cast iron pipe joint in a concrete collar at least three inches thick at all points and extending at least six inches beyond each side of joint.

3.4 CONCRETE

- A. Concrete shall be 3,000 psi ready mixed type conforming to ASTM Specification C94 composed of Portland cement, sand, and washed coarse aggregate all conforming to ASTM Specifications; mixed with clean water free of oil, acid, alkali, and organic matter; and furnished by an approved ready mix plant's standard for the specified strength, as established and tested by an approved laboratory, in accordance with applicable ASTM Standard Specifications.

3.5 CLEANOUTS

- A. General: The GENERAL locations of wyes and house service pipes shall be as specified below, but the Contractor shall establish their EXACT locations, grades, and elevations.
- B. Provide cleanouts at the following locations.
 - 1. Where indicated on the drawings.
 - 2. On 3 inch and smaller pipes provide cleanouts at 50 foot, maximum spacing and same size as piping.
 - 3. On 4 inch through 6 inch pipe provide 4 inch size cleanouts at 100 foot maximum spacing.
- C. Set each cleanout plug in a concrete pad at least six inches thick and 18 inches square, flush with finished grade or paving (as applicable).

PART 4 METHOD OF MEASUREMENT

4.1 METHOD OF MEASUREMENT

- A. Sewer piping shall be measured by the length of pipe measured from ground elevation by the linear foot.
- B. Clean out shall be measure by the number of cleanouts installed. Pay item to include concrete pad around the clean out.

PART 5 METHOD OF PAYMENT

5.1 METHOD OF PAYMENT

- A. Pay items to include all material and labor to excavate, install and compact backfill for sewer line.
 - 1. Item 02732-5.1 – 6-inch SDR 26 Sewer – per Linear Foot
 - 2. Item 02732-5.2 – Sanitary Sewer Clean out – per each.
 - 3. Item 02732-5.3 – Connect to existing manhole – per each
 - 4. Item 02732-5.4 – Connect to existing sewer main – per each

END OF SECTION

SECTION 22 1316

SANITARY WASTE AND VENT PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. This Section includes the following for soil, waste, and vent piping inside the building:
 - 1. Pipe, tube, and fittings.
 - 2. Special pipe fittings.
 - 3. Encasement for underground metal piping.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 22 for connections to drainage pumps.

1.3 DEFINITIONS

- A. ABS: Acrylonitrile-butadiene-styrene plastic.
- B. EPDM: Ethylene-propylene-diene terpolymer rubber.
- C. LLDPE: Linear, low-density polyethylene plastic.
- D. NBR: Acrylonitrile-butadiene rubber.
- E. PE: Polyethylene plastic.
- F. PVC: Polyvinyl chloride plastic.
- G. TPE: Thermoplastic elastomer.

1.4 PERFORMANCE REQUIREMENTS

- A. Components and installation shall be capable of withstanding the following minimum working pressure, unless otherwise indicated:
 - 1. Soil, Waste, and Vent Piping: 10-foot head of water (30 kPa).
 - 2. Sanitary Sewer, Force-Main Piping: 50 psig (345 kPa).
- B. Seismic Performance: Soil, waste, and vent piping and support and installation shall be capable of withstanding the effects of seismic events.

1.5 SUBMITTALS

- A. Product Data: For pipe, tube, fittings, and couplings.
- B. Shop Drawings:
 - 1. Design Calculations: Signed and sealed by a qualified professional engineer for selecting seismic restraints.
- C. Field quality-control inspection and test reports.

1.6 QUALITY ASSURANCE

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

- B. Comply with NSF 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-dwv" for plastic drain, waste, and vent piping; "NSF-drain" for plastic drain piping; "NSF-tubular" for plastic continuous waste piping; and "NSF-sewer" for plastic sewer piping.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 PIPING MATERIALS

- A. Refer to Part 3 "Piping Applications" Article for applications of pipe, tube, fitting, and joining materials.

2.3 HUB-AND SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings: ASTM A 74, Service class.
- B. Gaskets: ASTM C 564, rubber.

2.4 HUBLESS CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings: ASTM A 888 or CISPI 301.
- B. Shielded Couplings: ASTM C 1277 assembly of metal shield or housing, corrosion-resistant fasteners, and rubber sleeve with integral, center pipe stop.
 - 1. Standard, Shielded, Stainless-Steel Couplings: CISPI 310, with stainless-steel corrugated shield; stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve.
 - a. Manufacturers:
 - (1) ANACO.
 - (2) Fernco, Inc.
 - (3) Mission Rubber Co.
 - (4) Tyler Pipe; Soil Pipe Div.
 - 2. Heavy-Duty, Shielded, Stainless-Steel Couplings: With stainless-steel shield, stainless-steel bands and tightening devices, and ASTM C 564, rubber sleeve.
 - a. Coordinate subparagraph and list below with Part 2 "Manufacturers" Article. Retain "Available" for nonproprietary and delete for semi proprietary specifications.
 - b. Manufacturers:
 - (1) ANACO.
 - (2) Clamp-All Corp.
 - (3) Mission Rubber Co.
 - (4) Tyler Pipe; Soil Pipe Div.

2.5 STEEL PIPE AND FITTINGS

- A. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade A or B, Schedule 40 galvanized. Include ends matching joining method.
- B. Drainage Fittings: ASME B16.12, galvanized, threaded, cast-iron drainage pattern.

C. Pressure Fittings:

1. Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106, Schedule 40, galvanized, seamless steel pipe. Include ends matching joining method.
2. Malleable-Iron Unions: ASME B16.39; Class 150; hexagonal-stock body with ball-and-socket, metal-to-metal, bronze seating surface; and female threaded ends. Gray-Iron, Threaded Fittings: ASME B16.4, Class 125, galvanized, standard pattern.
3. Cast-Iron Flanges: ASME B16.1, Class 125.
4. Cast-Iron, Flanged Fittings: ASME B16.1, Class 125, galvanized

D. Grooved-Joint Systems:

1. Manufacturers:
 - a. Star Pipe Products; Star Fittings Div.
 - b. Victaulic Company.
2. Grooved-End, Steel-Piping Fittings: ASTM A 47/A 47M, galvanized, malleable-iron casting; ASTM A 106, galvanized-steel pipe; or ASTM A 536, galvanized, ductile-iron casting; with dimensions matching steel pipe.
3. Grooved-End, Steel-Piping Couplings: AWWA C606, for steel-pipe dimensions. Include ferrous housing sections, gasket suitable for water, and bolts and nuts.

2.6 COPPER TUBE AND FITTINGS

A. Copper DWV Tube: ASTM B 306, drainage tube, drawn temper.

1. Copper Drainage Fittings: ASME B16.23, cast copper or ASME B16.29, wrought copper, solder-joint fittings.

B. Hard Copper Tube: ASTM B 88, Type L (ASTM B 88M, Type B, water tube, drawn temper.

1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
2. Copper Flanges: ASME B16.24, Class 150, cast copper with solder-joint end.
3. Copper Unions: MSS SP-123, copper-alloy, hexagonal-stock body with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

2.7 PVC PIPE AND FITTINGS

A. Solid-Wall PVC Pipe: ASTM D 2665, drain, waste, and vent.

1. PVC Socket Fittings: ASTM D 2665, socket type, made to ASTM D 3311, drain, waste, and vent patterns.

2.8 SPECIAL PIPE FITTINGS

A. Flexible, Nonpressure Pipe Couplings: Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition pattern. Include shear ring, ends of same sizes as piping to be joined, and corrosion-resistant-metal tension band and tightening mechanism on each end.

1. Manufacturers: Coordinate first subparagraph and list below with Part 2
 - a. Fernco, Inc.
 - b. Mission Rubber Co.
 - c. Plastic Oddities, Inc.
2. Sleeve Materials:
 - a. For Cast-Iron Soil Pipes: ASTM C 564, rubber.
 - b. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
 - c. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

2.9 ENCASEMENT FOR UNDERGROUND METAL PIPING

A. Description: ASTM A 674 or AWWA C105, LLDPE film of 0.008-inch (0.20-mm) minimum thickness.

B. Form: tube.

- C. Color: Black or natural.

PART 3 EXECUTION

3.1 EXCAVATION

- A. Refer to Division 2 for excavating, trenching, and backfilling.

3.2 PIPING APPLICATIONS

- A. Piping in plenum areas shall be metal, no plastic piping will be allowed.
- B. Flanges and unions may be used on aboveground pressure piping, unless otherwise indicated.
- C. Aboveground, soil, waste, and vent piping NPS 4 (DN 100) and smaller shall be any of the following:
 - 1. Hubless cast-iron soil pipe and fittings; standard, shielded, stainless-steel couplings; and hubless-coupling joints.
 - 2. Copper DWV tube, copper drainage fittings, and soldered joints.
- D. Aboveground, soil, waste, and vent piping NPS 5 (DN 125) and larger shall be any of the following:
 - 1. Hubless cast-iron soil pipe and fittings; heavy-duty shielded, stainless-steel couplings; and hubless-coupling joints.
- E. Underground, soil, waste, and vent piping shall be any of the following:
 - 1. Service class, cast-iron soil piping; gaskets; and gasketed joints.
 - 2. Solid wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
- F. Aboveground drainage force mains NPS 1-1/2 and NPS 2 (DN 40 and DN 50) shall be any of the following:
 - 1. Hard copper tube, Type L (Type B); copper pressure fittings; and soldered joints.
 - 2. Steel pipe, pressure fittings, and threaded joints
- G. Aboveground drainage force mains NPS 2-1/2 to NPS 4 (DN 65 to DN 100) shall be any of the following:
 - 1. Hard copper tube, Type L (Type B); copper pressure fittings; and soldered joints.
 - 2. Steel pipe, pressure fittings, and threaded joints.
 - 3. Grooved-end steel pipe, grooved-joint system fittings and couplings, and grooved joints.
- H. Underground drainage force mains NPS 4 (DN 100) and smaller shall be any of the following:
 - 1. Hard copper tube, Type L (Type B); wrought-copper pressure fittings; and soldered joints.
 - 2. Steel pipe, pressure fittings, and threaded joints

3.3 PIPING INSTALLATION

- A. Sanitary sewer piping outside the building is specified in Division 31.
- B. Basic piping installation requirements are specified in Division 22 Section "Basic Plumbing Materials and Methods".
- C. Install seismic restraints on piping.
- D. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers.
- E. Install cleanout fitting with closure plug inside the building in sanitary force-main piping.

- F. Install underground, steel, force-main piping with thrust block supports at vertical and horizontal offsets. Install encasement on piping according to ASTM A 674 or AWWA C105.
- G. Install underground, copper, force-main tubing according to CDA's "Copper Tube Handbook."
 - 1. Install encasement on piping according to ASTM A 674 or AWWA C105.
- H. Install cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight. Sleeves and mechanical sleeve seals are specified in Division 22 Section "Basic Plumbing Materials and Methods".
- I. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
- J. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if 2 fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.
- K. Install piping true to grades and alignment, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.
- L. Install soil and waste drainage and vent piping at the slopes required by Code.
- M. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.
- N. Install PVC soil and waste drainage and vent piping according to ASTM D 2665.
- O. Install underground PVC soil and waste drainage piping according to ASTM D 2321.
- P. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

3.4 JOINT CONSTRUCTION

- A. Basic piping joint construction requirements are specified in Division 22 Section "Basic Plumbing Material and Methods".
- B. Join hub-and-spigot, cast-iron soil piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
- C. Join hubless cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-coupling joints.
- D. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.
- E. Grooved Joints: Assemble joint with keyed coupling, gasket, lubricant, and bolts according to coupling and fitting manufacturer's written instructions.
- F. PVC Nonpressure Piping Joints: Join piping according to ASTM D 2665.

3.5 VALVE INSTALLATION

- A. General valve installation requirements are specified in Division 22 Section "Plumbing Valves".
- B. Shutoff Valves: Install shutoff valve on each sewage pump discharge.
 - 1. Install full-port ball valve for piping NPS 3 (DN 75) and smaller.
 - 2. Install gate valve for piping NPS 4 (DN 100) and larger.
- C. Check Valves: Install swing check valve, between pump and shutoff valve, on each sewage pump discharge.
- D. Backwater Valves: Install backwater valves in piping subject to sewage backflow.
 - 1. Horizontal Piping: Horizontal backwater valves. Use normally closed type, unless otherwise indicated.
 - 2. Floor Drains: Drain outlet backwater valves, unless drain has integral backwater valve.
 - 3. Install backwater valves in accessible locations.
 - 4. Backwater valve are specified in Division 22 Section "Plumbing Specialties".

3.6 HANGER AND SUPPORT INSTALLATION

- A. Seismic-restraint devices are specified in Division 22 Section "Plumbing Vibration Controls and Seismic Restraints".
- B. Pipe hangers and supports are specified in Division 22 Section "Plumbing Hangers and Supports". Install the following:
 - 1. Vertical Piping: MSS Type 8 or Type 42, clamps.
 - 2. Install individual, straight, horizontal piping runs according to the following:
 - a. 100 Feet (30 m) and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet (30 m): MSS Type 43, adjustable roller hangers.
 - 3. Multiple, Straight, Horizontal Piping Runs 100 Feet (30 m) or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
- C. Install supports according to Division 22 Section "Plumbing Hangers and Supports".
- D. Support vertical piping and tubing at base and at each floor.
- E. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch (10-mm) minimum rods.
- F. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1-1/2 and NPS 2 (DN 40 and DN 50): 60 inches (1500 mm) with 3/8-inch (10-mm) rod.
 - 2. NPS 3 (DN 80): 60 inches (1500 mm) with 1/2-inch (13-mm) rod.
 - 3. NPS 4 and NPS 5 (DN 100 and DN 125): 60 inches (1500 mm) with 5/8-inch (16-mm) rod.
 - 4. NPS 6 (DN 150): 60 inches (1500 mm) with 3/4-inch (19-mm) rod.
 - 5. NPS 8 to NPS 12 (DN 200 to DN 300): 60 inches (1500 mm) with 7/8-inch (22-mm) rod.
- G. Install supports for vertical cast-iron soil piping every 15 feet (4.5 m).
- H. Install hangers for steel piping with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1-1/4 (DN 32): 84 inches (2100 mm) with 3/8-inch (10-mm) rod.
 - 2. NPS 1-1/2 (DN 40): 108 inches (2700 mm) with 3/8-inch (10-mm) rod.
 - 3. NPS 2 (DN 50): 10 feet (3 m) with 3/8-inch (10-mm) rod.
 - 4. NPS 2-1/2 (DN 65): 11 feet (3.4 m) with 1/2-inch (13-mm) rod.
 - 5. NPS 3 (DN 80): 12 feet (3.7 m) with 1/2-inch (13-mm) rod.

- 6. NPS 4 (DN 100): 12 feet (3.7 m) with 5/8-inch (16-mm) rod.
 - I. Install supports for vertical steel piping every 15 feet (4.5 m).
 - J. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1-1/4 (DN 32): 72 inches (1800 mm) with 3/8-inch (10-mm) rod.
 - 2. NPS 1-1/2 and NPS 2 (DN 40 and DN 50): 96 inches (2400 mm) with 3/8-inch (10-mm) rod.
 - 3. NPS 2-1/2 (DN 65): 108 inches (2700 mm) with 1/2-inch (13-mm) rod.
 - 4. NPS 3 to NPS 5 (DN 80 to DN 125): 10 feet (3 m) with 1/2-inch (13-mm) rod.
 - 5. NPS 6 (DN 150): 10 feet (3 m) with 5/8-inch (16-mm) rod.
 - 6. NPS 8 (DN 200): 10 feet (3 m) with 3/4-inch (19-mm) rod
 - K. Install supports for vertical copper tubing every 10 feet (3 m).
 - L. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.
- 3.7 CONNECTIONS
- A. Drawings indicate general arrangement of piping, fittings, and specialties.
 - B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.
 - C. Connect drainage and vent piping to the following:
 - 1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.
 - 2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
 - 3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code.
 - 4. Equipment: Connect drainage piping as indicated. Provide shutoff valve, if indicated, and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 (DN 65) and larger.
 - D. Connect force-main piping to the following:
 - 1. Drainage Pumps: To pump discharge

3.8 FIELD QUALITY CONTROL

- A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
 - 1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 - 2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
- B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
- C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- D. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
 - 1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.

2. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping, except outside leaders, on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water (30 kPa). From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.
 4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg (250 Pa). Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.
 5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
 6. Prepare reports for tests and required corrective action.
- E. Test force-main piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
1. Leave uncovered and unconcealed new, altered, extended, or replaced force-main piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 2. Cap and subject piping to static-water pressure of 50 psig (345 kPa) above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
 3. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
 4. Prepare reports for tests and required corrective action.
- 3.9 CLEANING
- A. Clean interior of piping. Remove dirt and debris as work progresses.
 - B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
 - C. Place plugs in ends of uncompleted piping at end of day and when work stops.
- 3.10 PROTECTION
- A. Exposed PVC Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.

END OF SECTION

SECTION 22 1413

STORM DRAINAGE PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. This Section includes the following storm drainage piping inside the building:
 - 1. Pipe, tube, and fittings.
 - 2. Special pipe fittings.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.3 DEFINITIONS

- A. ABS: Acrylonitrile-butadiene-styrene plastic.
- B. LLDPE: Linear, low-density polyethylene plastic.
- C. PE: Polyethylene plastic.
- D. PVC: Polyvinyl chloride plastic.
- E. TPE: Thermoplastic elastomer.

1.4 PERFORMANCE REQUIREMENTS

- A. Components and installation shall be capable of withstanding the following minimum working-pressure, unless otherwise indicated:
 - 1. Storm Drainage Piping: 10-foot head of water (30 kPa).
- B. Seismic Performance: Storm drainage piping and support and installation shall be capable of withstanding the effects of seismic events.

1.5 SUBMITTALS

- A. Product Data: For pipe, tube, fittings, and couplings.
- B. Shop Drawings:
 - 1. Design Calculations: Signed and sealed by a qualified professional engineer for selecting seismic restraints.
- C. Field quality-control inspection and test reports.

1.6 QUALITY ASSURANCE

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with NSF 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-drain" for plastic drain piping and "NSF-sewer" for plastic sewer piping.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 PIPING MATERIALS

- A. Refer to Part 3 "Piping Applications" Article for applications of pipe, tube, fitting, and joining materials.

2.3 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings: ASTM A 74, Service class.
- B. Gaskets: ASTM C 564, rubber.

2.4 HUBLESS CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings: ASTM A 888 or CISPI 301.
- B. Shielded Couplings: ASTM C 1277 assembly of metal shield or housing, corrosion-resistant fasteners, and rubber sleeve with integral, center pipe stop.
 - 1. Standard, Shielded, Stainless-Steel Couplings: CISPI 310, with stainless-steel corrugated shield; stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve.
 - a. Manufacturers:
 - (1) ANACO.
 - (2) Fernco, Inc.
 - (3) Mission Rubber Co.

2.5 PVC PIPE AND FITTINGS

- A. Solid-Wall PVC Pipe: ASTM D 2665, drain, waste, and vent.

2.6 SPECIAL PIPE FITTINGS

- A. Flexible, Nonpressure Pipe Couplings: Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition pattern. Include shear ring, ends of same sizes as piping to be joined, and corrosion-resistant-metal tension band and tightening mechanism on each end.
 - 1. Manufacturers:
 - a. Fernco, Inc.
 - b. Mission Rubber Co.
 - c. Plastic Oddities, Inc.
 - 2. Sleeve Materials:
 - a. For Cast-Iron Soil Pipes: ASTM C 564, rubber.
 - b. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
 - c. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.
- B. Expansion Joints: Two or three-piece, ductile-iron assembly consisting of telescoping sleeve(s) with gaskets and restrained-type, ductile-iron, hubless end sections complying with AWWA C110 or AWWA C153. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.
 - 1. Manufacturers:
 - a. J.R. Smith.

- b. Wade.
- c. Zurn.

PART 3 EXECUTION

3.1 EXCAVATION

- A. Refer to Division 31 for excavating, trenching, and backfilling.

3.2 PIPING APPLICATIONS

- A. Flanges and unions may be used on aboveground pressure piping, unless otherwise indicated.
- B. Aboveground storm drainage piping shall be the following:
 - 1. Hubless cast-iron soil pipe and fittings; standard, shielded, stainless-steel couplings; and coupled joints.
- C. Underground storm drainage piping shall be the following:
 - 1. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.

3.3 PIPING INSTALLATION

- A. Storm sewer and drainage piping outside the building are specified in Division 31.
- B. Basic piping installation requirements are specified in Division 22 Section "Basic Plumbing Materials and Methods."
- C. Install seismic restraints on piping. Seismic-restraint devices are specified in Division 22 Section "Plumbing Vibration and Seismic Controls."
- D. Install cleanouts at grade and extend to where building storm drains connect to building storm sewers. Cleanouts are specified in Division 220 Section "Plumbing Specialties."
- E. Install cleanout fitting with closure plug inside the building in storm drainage force-main piping.
- F. Install cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight. Sleeves and mechanical sleeve seals are specified in Division 22 Section "Basic Plumbing Materials and Methods."
- G. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
- H. Make changes in direction for storm piping using appropriate branches, bends, and long-sweep bends. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.
- I. Install piping true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.
- J. Install storm drainage piping at 1 percent minimum slope downward in direction of flow, unless otherwise indicated.

- K. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.
- L. Install PVC storm drainage piping according to ASTM D 2665.
- M. Install underground PVC storm drainage piping according to ASTM D 2321.
- N. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

3.4 JOINT CONSTRUCTION

- A. Basic piping joint construction requirements are specified in Division 22 Section "Basic Plumbing Materials and Methods."
- B. Hub-and-Spigot, Cast-Iron Soil Piping Gasketed Joints: Join according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
- C. Hubless Cast-Iron Soil Piping Coupled Joints: Join according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-coupling joints.
- D. Grooved Joints: Cut groove ends of pipe and assemble grooved ends of pipes, grooved-end fittings, and grooved-end-piping couplings according to AWWA C606.
- E. PVC Nonpressure Piping Joints: Join piping according to ASTM D 2665.

3.5 VALVE INSTALLATION

- A. General valve installation requirements are specified in Division 22 Section "Plumbing Valves."
- B. Shutoff Valves: Install shutoff valve on each sump pump discharge.
 - 1. Install full-port ball valve.
- C. Check Valves: Install swing check valve, between pump and shutoff valve, on each sump pump discharge.
- D. Backwater Valves: Install backwater valves in piping subject to backflow.
 - 1. Horizontal Piping: Horizontal backwater valves. Use normally closed type, unless otherwise indicated.
 - 2. Install backwater valves in accessible locations.
 - 3. Backwater valve are specified in Division 22 Section "Plumbing Specialties."

3.6 HANGER AND SUPPORT INSTALLATION

- A. Seismic-restraint devices are specified in Division 22 Section "Plumbing Vibration Controls and Seismic Restraints."
- B. Pipe hangers and supports are specified in Division 22 Section "Plumbing Hangers and Supports." Install the following:
 - 1. Vertical Piping: MSS Type 8 or Type 42, clamps.
 - 2. Individual, Straight, Horizontal Piping Runs: According to the following:
 - a. 100 Feet (30 m) and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet (30 m): MSS Type 43, adjustable roller hangers.
 - 3. Multiple, Straight, Horizontal Piping Runs 100 Feet (30 m) or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
- C. Install supports according to Division 22 Section "Plumbing Hangers and Supports."

- D. Support vertical piping and tubing at base and at each floor.
- E. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch (10-mm) minimum rods.
- F. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters.
 - 1. NPS 1-1/2 and NPS 2 (DN 40 and DN 50): 60 inches (1500 mm) with 3/8-inch (10-mm) rod.
 - 2. NPS 3 (DN 80): 60 inches (1500 mm) with 1/2-inch (13-mm) rod.
 - 3. NPS 4 and NPS 5 (DN 100 and DN 125): 60 inches (1500 mm) with 5/8-inch (16-mm) rod.
 - 4. NPS 6 (DN 150): 60 inches (1500 mm) with 3/4-inch (19-mm) rod.
 - 5. NPS 8 to NPS 12 (DN 200 to DN 300): 60 inches (1500 mm) with 7/8-inch (22-mm) rod.
 - 6. Spacing for 10-foot (3-m) lengths may be increased to 10 feet (3 m). Spacing for fittings is limited to 60 inches (1500 mm).
- G. Install supports for vertical cast-iron soil piping every 15 feet (4.5 m).
- H. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.7 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect interior storm drainage piping to exterior storm drainage piping. Use transition fitting to join dissimilar piping materials.
- C. Connect storm drainage piping to roof drains and storm drainage specialties.

3.8 FIELD QUALITY CONTROL

- A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
 - 1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in.
 - 2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
- B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
- C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- D. Test storm drainage piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
 - 1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
 - 2. Leave uncovered and unconcealed new, altered, extended, or replaced storm drainage piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 - 3. Test Procedure: Test storm drainage piping, except outside leaders, on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water (30 kPa). From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.

4. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
5. Prepare reports for tests and required corrective action.

3.9 CLEANING

- A. Clean interior of piping. Remove dirt and debris as work progresses.
- B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- C. Place plugs in ends of uncompleted piping at end of day and when work stops.

END OF SECTION

SECTION 22 1515
COMPRESSED AIR PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Compressed air piping system.

1.2 RELATED SECTIONS

- A. Section 22 0529 - PLUMBING HANGERS AND SUPPORTS.
- B. Section 221005 - PLUMBING SPECIALTIES.
- C. Section 230100 - GENERAL PROVISIONS, MECHANICAL.
- D. Section 230548 - NOISE AND VIBRATION CONTROL, MECHANICAL.
- E. DIVISION 26 - ELECTRICAL.

1.3 SUBMITTALS

- A. Submit under provisions of Section 013300.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Pipe, fittings and joints: Schedule 40 black steel pipe conforming to ASTM A120 or A53; 150 pound black malleable iron threaded fittings conforming to ANSI B16.3, or Schedule 40 black steel butt welding fittings conforming to ANSI B16.9, or Victaulic or Gustin-Bacon black malleable iron grooved-end fittings, as applicable. Use threaded, welded, or grooved joints as applicable.
- B. Flanges: 125 black cast iron threaded conforming to ANSI B16.1, or 150 pound black steel threaded, welding neck, or slip-on, as applicable, conforming to ANSI B16.5; standard steel bolts and nuts; plain rubber gaskets.

PART 3 EXECUTION

3.1 INSTALLATION

- A. General:
 - 1. Install piping with ample flexibility to permit free expansion and contraction of pipework without putting on the pipework, supports, fixtures, and equipment any stress which could cause damage or breakage.
 - 2. Branch connections to mains, risers, and laterals shall be swing type, except where length and arrangement of branch will provide sufficient flexibility.
- B. Threaded Joints:
 - 1. Use suitable non-hardening pipe joint compound on male threads only or use Teflon pipe joint tape.

- C. Mechanical and Slip-on Joints:
1. Make these in accordance with pipe and fitting manufacturer's printed directions.
 2. Use suitable lubricant on gaskets.

END OF SECTION

SECTION 26 0100

GENERAL PROVISIONS, ELECTRICAL

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Basic Electrical requirements specifically applicable to Division 16 Sections, in addition to Division 1 - General Requirements.
- B. General and procedural requirements for work specified under Sections of Division 16 shall be as required herein.

1.2 RELATED SECTIONS

- A. DIVISION 3 - CONCRETE.
- B. Section 072700 - FIRESTOPPING.
- C. DIVISION 09 - FINISHES.
- D. DIVISION 26 - ELECTRICAL.
- E. Section 26 0500 - BASIC MATERIALS AND METHODS, ELECTRICAL.

1.3 CONTRACTOR'S RESPONSIBILITY

- A. Contractor agrees to assume responsibility for liability, workmanship, and quality of materials concerning work sublet to others. Before contract is sublet, submit in writing the names of proposed subcontractor and obtain written approval therefor.

1.4 CODES AND FEES

- A. All work shall be installed in accordance with the applicable provisions of the local codes, the National Electrical Code, and the National Electrical Safety Code.
- B. All electrical materials shall have Underwriters' approval where applicable, and shall be so labeled where UL labeling is customary.
- C. All electrical equipment shall conform to applicable NEMA Standards whether specified hereinafter or not, and to other applicable Standards which may be specified hereinafter.
- D. Make all arrangements with electric utility company for their services and metering work, PAY ALL CHARGES THEREFOR, AND INCLUDE THE COST THEREOF IN CONTRACT PRICE.
- E. The Contractor shall be responsible for obtaining local permits, payment of fees and notification for inspection by code authorities consistent with the schedule of work.

1.5 ACCURACY OF DATA AND DRAWINGS

- A. Drawings and Data: Electrical drawings are generally diagrammatic, and where not dimensioned or detailed, indicate approximate locations and general arrangements of electrical work. All electrical work offsets, rises, and fittings are not necessarily shown; however, provide these as required by the conditions involved.
- B. Building and structure dimensions: TAKE THESE FROM ARCHITECTURAL AND STRUCTURAL DRAWINGS: AND FROM ACTUAL MEASUREMENTS MADE BY ELECTRICAL SECTION OF EACH EXISTING BUILDING AND EACH EXISTING STRUCTURE INVOLVED.

- C. Equipment NOT furnished by Electrical Section but requiring electrical connections: from other Sections and others furnishing this equipment, determine exact electrical connection requirements therefor; locations and arrangements of electrical connections indicated for this equipment are APPROXIMATE ONLY.

1.6 EQUIPMENT LISTS, SHOP DRAWINGS, SAMPLES AND SUBMITTALS

- A. Submit under provisions of Section 013300 and General Conditions.
- B. Submit to the Architect for approval, within 30 days after receipt of Notice to Proceed with the work, a complete list of materials, equipment and accessories proposed for use, including complete descriptions and specifications of any proposed substitutions, manufacturer's shop drawings, and roughing-in work. Submit five (5) copies of all items for approval and furnish additional copies if required for installation purposes.
- C. Submission material and all shop drawings for the various items of equipment shall be marked with the respective mark number or identification of the equipment shown on the drawings or specified. The shop drawings shall list all ratings, capacities, accessories, and other pertinent data to show that the proposed item is as called for and as specified.
- D. Shop drawings shall show sizes and details of required concrete and steel machine foundation, locations of anchor bolts, physical dimensions of equipment, capacity characteristics of equipment, and all other work pertinent to details. Concrete foundations are specified under "Concrete Work" section, but steel racks or stands for mechanical apparatus shall be furnished and installed as part of the mechanical work.

1.7 QUALITY CONTROL

- A. Comply with Section 007200 GENERAL CONDITIONS.
- B. Qualifications: Where specific qualifications are specified in individual specification section, provide required data with Subcontractor list.

1.8 GUARANTEE

- A. Comply with Section 007200 GENERAL CONDITIONS.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 EQUIPMENT INSTALLATION

- A. Install all equipment in accordance with applicable manufacturer's drawings and recommendations.
- B. Identification of circuits and equipment: Identification designations shall correspond to those indicated on electrical drawings and as specified in corresponding articles describing the equipment.

3.2 TEMPORARY LIGHTS AND POWER

- A. Provide temporary lights and power. Lights shall be one pigtail socket and 150W lamp for each 500 sf building space, minimum one per room. Power outlets shall be provided as coordinated with construction. Temporary electricity charges shall be paid by the Contractor.

3.3 TEST, INSPECTIONS, ADJUSTMENTS, AND CLEANUP

- A. Wiring, 600 volts and less: Make insulation tests with a "Megger", demonstrate that neither short circuits nor ground faults exist, and that wiring complies with NEC.
- B. Furnish suitable testing equipment, give the Engineer and all applicable authorities ample advance notice of all proposed tests and readiness of work for inspections, and conduct each test in their presence, as approved. Do not conceal electrical work until all necessary inspections have been made and all required tests have been approved by the Owner's Representative and all applicable authorities.
- C. Put entire electrical system in operation, test all equipment, remedy all defects, and make all necessary adjustments. Demonstrate that the entire system functions satisfactorily, as specified, as indicated, and as approved.
- D. After electrical system has been tested and before any field painting is commenced, clean up all electrical work thoroughly. Remove all foreign matter which has accumulated in all fixtures, equipment, and enclosures. Clean all fixture glassware and reflectors, and clean and polish all other surfaces that are not to be painted so that they present a new and acceptable appearance.

3.4 PROTECTION AND CLEANING

- A. Work shall be protected at all times. Conduit openings shall be closed with caps or plugs until permanent connections are made. Fixtures and equipment shall be covered, if necessary, to protect against dirt, water, chemical or mechanical damage or defacement. The installation of fixtures liable to damage shall be coordinated with installing UL fire protective barriers and ceiling systems.
- B. Electrical equipment rooms shall be cleaned up prior to energizing equipment and shall not be used for storage or other purposes after power is applied to the electrical equipments.

3.2 OPERATING INSTRUCTIONS

- A. Furnish the services of a competent man (or men) to instruct the Owner's personnel in the proper operation and maintenance of all equipment, for a period of not less than five working days.
- B. Furnish and deliver to the Owner three sets of operating instructions for all equipment installed under this contract, including shop drawings, piping diagrams, wiring diagrams, maintenance recommendations and information concerning replacement parts.

END OF SECTION

SECTION 26 0500

BASIC MATERIALS AND METHODS, ELECTRICAL

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Equipment and materials used in the work shall be in accordance with the contract documents; of the best quality and grade for the use intended; shall be new and unused; and shall be the manufacturer's latest standard or current model for which replacement parts are readily available.
- B. Work shall be installed under the constant supervision of a qualified superintendent and by skilled and qualified electricians.
- C. All apparatus and equipment shall be installed and connected in accordance with the best engineering practices and in accordance with the manufacturer's recommendations. All auxiliary wiring, relays, contactors, controllers, and electrical connections of any description recommended by the manufacturer and required for the proper operation of all items of equipment furnished under this contract shall be furnished and installed complete.
- D. Basic Electrical Requirements specifically applicable to Division 16 Sections, in addition to Division 1 - General Requirements.

1.2 RELATED SECTIONS

- A. DIVISION 23 - MECHANICAL.
- B. DIVISION 26 - ELECTRICAL.
- C. Section 26 0100 - GENERAL PROVISIONS, ELECTRICAL.

1.3 SUBMITTALS

- A. Submit under provisions of Section 013300.

1.4 ELECTRICAL WIRING FOR EQUIPMENT OF OTHER SECTIONS

- A. General:
 - 1. All electrical wiring of every description required to operate all equipment furnished by other Sections shall be done by the Electrical Section, except as otherwise specified hereinafter. Read carefully all other Sections in which electrically operated equipment is specified, and include in the electrical work all electric wiring required for the proper operation of the equipment, whether indicated on the electrical drawings or not. Coordinate the Electrical section work with that of all other Sections that furnish equipment requiring electrical connections.
 - 2. All control devices required to operate the equipment shall be furnished by the Section that furnishes the equipment, unless otherwise specified. All control devices which are not factory mounted on the equipment and require electrical connections ONLY shall be installed by the Electrical Section. All control devices which are not factory mounted on the equipment and require piping, linkage, remote bulb, or other mechanical connections as well as electrical connections shall be installed by the Section that furnishes the equipment involved, ready for electrical connections.
 - 3. Outlet locations indicated on the electrical drawings for motors, controls, and other electrically operated items of other Sections are APPROXIMATE ONLY, as the actual wiring requirements are not necessarily identical for the various makes of each item of equipment involved. However, the Electrical Section shall locate all outlets and arrange all wiring to properly serve the equipment ACTUALLY INSTALLED, generally as indicated on the

electrical drawings, but EXACTLY in accordance with rough-in sheets and/or wiring diagrams furnished by the other Sections involved.

4. The necessary wiring diagrams shall be furnished by the Section that furnishes the equipment involved, and after these are approved, do all wiring accordingly.
- B. Wiring NOT Included: Wiring which is factory installed on equipment.
- C. Wiring Included: Generally equipment of other Sections requiring wiring, includes but shall not be limited to the following items:
1. Plumbing: water heater.
 2. Door installation: automatic door equipment.
 3. Food service: equipment connections.
 4. Special construction: equipment connections.
 5. Special type wire (other than type MTW): If any of this is required for other Divisions, that wire shall be furnished by the other Divisions and installed under this Division.

PART 2- PRODUCTS

2.1 HANGERS, SUPPORTS, AND SLEEVES

- A. Securely attach all hangers, supports, and devices to the building structure with anchors suitable for the types of building construction involved. Provide all necessary pipe, angle iron, "Unistrut", "Kindorf", or other suitable steel auxiliary supports for the electrical work.
- B. Hangers or supports for conduits and raceways shall be standard conduit or raceway straps, or other suitable clamping devices. Trapeze hangers may be used for groups of suspended horizontal conduits, with each conduit clamped to each trapeze bar. Perforated strap iron hangers will not be permitted.
- C. Maximum hanger or support spacings for all conduits shall be as required by the Codes. Support non-concrete encased underground conduits by laying with full length bearing on firm trench bottoms. Support each riser conduit at each building floor level within one foot of floor and boxes, ten feet for vertical and horizontal runs; each shall have at least one support.
- D. Adequately support all boxes, gutters, panelboards, switches, starters, fixtures, and other devices, and equipment. Where supporting method is indicated or detailed, provide supports accordingly; OTHERWISE, supports shall be as required by the Codes, and as approved.
- E. Provide all necessary sleeves for conduits and other electrical items passing through concrete and masonry construction, where electrical items are not installed prior to concrete placing and masonry laying. Sleeves through concrete walls, concrete columns, and concrete beams shall be IPS steel pipe or rigid steel conduit, flush with finished concrete surfaces. Sleeves for all exposed conduits passing through floors (except slabs on ground) where water on floor can pass through the opening shall be galvanized IPS pipe or galvanized rigid steel conduit extending two inches above finished floor, and flush with slab below. Other sleeves may be sheet metal or plastic.

2.2 CONDUIT AND FITTINGS, EXCEPT UNDERGROUND DUCTS

- A. Conduits: These shall be zinc coated rigid steel, zinc coated steel electrical metallic tubing (hereinafter referred to as "thin wall conduit"), ANSI Specification C80.5 rigid aluminum, Carlon Schedule 40 Certainfeed PVC Schedule 40 or Cantex PVC Schedule 40 as approved UL listed heavy wall rigid PVC, as applicable. In each case where the conduit type is indicated, specified, or required by the Codes, install only the indicated, specified, or Code required type; OTHERWISE, conduit usage shall be as follows:
 1. Embedded in concrete: rigid steel coated with bituminous compound or PVC coated.
 2. In contact with ground: rigid steel coated with bituminous compound or PVC Schedule 40 conduit.

3. For supporting fixture, outlet boxes, and other devices and equipment which are not directly anchored to the building structure: rigid steel or rigid aluminum conduit, with all joints and connections threaded.
 4. Flexible connections: flexible steel conduit ("Greenfield"), in short lengths only, at each motor connection and other location requiring flexibility; of liquid tight type where exposed to weather or excessive moisture.
 5. PVC conduit shall not be used in return air ceilings or plenums.
 6. Rigid metal conduit shall be used for service conductors entering and inside building.
 7. Rigid metal conduit shall be used for fire pump service wiring and all runs between controller and pump and other equipment. All conduit within a fire pump room shall be rigid metal conduit except flexible connections to motors may be liquid tight type flexible steel conduit.
 8. All other locations: thin wall, rigid steel, or rigid aluminum, as applicable.
 9. DO NOT INSTALL ALUMINUM CONDUIT UNDERGROUND, IN CONTACT WITH GROUND, OR EMBEDDED IN CONCRETE.
 10. MC Cable is **not** acceptable.
- B. Conduit Fittings: For metallic conduit, fittings shall be zinc coated steel, cast aluminum, or cast zinc. For PVC conduit, fittings shall be of the same materials and make as those of the conduit. All fittings exposed to weather shall be weatherproof type.
- C. Installation:
1. General: ream ends of all conduits after cutting. Prior to wire pulling, keep all open conduit ends plugged, and swab out all trapped conduits in which water or moisture has collected. Where conduits are concealed in walls, install these conduits so that the exposed wall faces will not be marred.
 2. PVC conduits: solvent weld all joints between PVC materials, with cement furnished by the conduit manufacturer. Provide suitable adapters where PVC conduits are coupled to metallic conduits. Provide a rigid steel elbow at the base of each exposed riser from below ground and below floor to above ground and above floor.
 3. Conduit routing, general: see TYPE OF SYSTEM, METHOD OF WIRING hereinbefore for locations where concealed and exposed conduits are required and/or permitted. Where conduit routings are detailed or dimensioned install conduits accordingly; OTHERWISE, install concealed conduits with the shortest practicable path, and install all exposed conduits in straight, level, and plumb lines, parallel with or at right angles with beams, walls, ceilings, and other building lines.
 4. Branch circuit conduit routings: except where detailed or dimensioned, the indicated branch circuit conduit routings are generally diagrammatic, and are intended to show the required circuitry from panelboards to outlets. However, if necessitated by job conditions, deviations from the indicated routings may be made, provided that regardless of the actual installed arrangement of the conduits: each outlet marked with the same circuit number is connected to the same corresponding numbered circuit; outlets are switched and controlled as indicated; and no home run is brought into any switch box unless otherwise indicated.
 5. Thin wall conduit: Use compression type fittings with proper tools for all joints and terminations. Point screw type fittings are not permitted.

2.3 PULL BOXES, JUNCTION BOXES, AND WIRING GUTTERS

- A. General: Pull boxes, junction boxes, and wiring gutters shall be of the types and minimum sizes indicated, or as required for the conditions involved where types and sizes are not indicated. Before installation, check proposed locations of boxes and gutters with the architectural, structural, and mechanical drawings, and locate each box and gutter so that it will be accessible in the finished project.
- B. Underground Boxes: As indicated on drawings.
- C. Above Ground Boxes and Gutters: These shall be galvanized steel of at least Code gauge for each size involved, and of weatherproof construction where exposed to weather.
1. Where indicated, boxes for under ground conduits shall be above ground and encased in concrete pedestals, as detailed.

2.4 OUTLET BOXES

- A. General: Outlet boxes and covers therefor shall be steel or cast ferrous metal with zinc or other suitable metallic rustproof coating, or cast aluminum, all of the proper sizes and types to accommodate the conduits, conductors, connections, devices, fixtures, architectural conditions, and structural conditions involved.
- B. Special Box Requirements:
 - 1. Exposed-to-weather outlet boxes shall be cast metal, with threaded hubs and gasketed covers, all strictly weatherproof.
 - 2. Floor boxes for floor outlet devices shall be Steel City Series 663, with floor adjusting rings and appropriate type floor plates for attaching the outlet devices thereto.
 - 3. Floor boxes for extensions from under floor conduits up to equipment connections and outlets above floor shall be Steel City Series 88, with floor adjusting rings and Series P90 floor plates; instead of stubbing conduits directly up above floor.
- C. Installation:
 - 1. Before installation, check proposed location of each outlet box with the architectural, structural, and mechanical drawings, and locate each outlet box so that it will be accessible and interference free in the finished project.
 - 2. Set each concealed box flush with finished surfaces, and so that exposed finished surfaces will not be marred.
 - 3. Install each wall switch on the knob side of the door involved. Before placing each wall switch box, verify the applicable door swing with the architectural drawings, and locate the wall switch box accordingly.
 - 4. Where equipment is served by exposed flexible cords, locate the outlet box as near as practicable to the equipment connection point, to minimize flexible cord length.

2.5 WIRE, JOINTS, AND SPLICES, 600 VOLTS AND LESS

- A. Lighting and power wire shall be copper only: Types shall be as follows:
 - 1. Where type is indicated: indicated type only.
 - 2. High temperature and other special conditions: types NEC approved for the conditions involved.
 - 3. Exposed flexible cords: Type S, with grounding conductor.
 - 4. Direct earth burial: Type USE, with neoprene jacket.
 - 5. All other lighting and power wire: No. 8 and larger, Type THWN stranded; No. 10 and smaller, Type THWN/THHN solid.
- B. Control wire shall be Type MTW copper, stranded.
- C. Signaling, sound, communications, alarm, indicating, and other special system wire shall be copper, of the types specified hereinafter with the equipment, or as indicated, or as recommended by the equipment manufacturers if neither indicated nor specified.
- D. Wire Sizes: Where sizes are neither indicated nor otherwise specified wire sizes shall be:
 - 1. Branch circuit wire: No. 12.
 - 2. Control wire: No. 14, or as recommended by the control manufacturer.
 - 3. Special system wire: as recommended by the manufacturer of the equipment involved.
- E. Identification:
 - 1. General: All wires shall be identified as required by NEC.
 - 2. Control and special systems wire: these shall be color coded throughout, or identified at each terminal and junction point with a suitable permanently attached tag or label.
- F. Joints and Splices: Make these with suitable solderless connectors, in the various boxes, gutters, and similar locations, but not in any conduit. Leave enough wire slack to permit at least one splice or joint to be remade in case of fault.

1. Branch circuit, control, and special system wire joints: use Ideal, Buchanan, 3M, or similar tool-applied to twist-on type connectors.
2. All other wire joints: use IlSCO tin plated aluminum type pressure connectors, or suitable brass, bronze, or copper pressure type connectors.
3. Insulate all joints and splices with suitable insulating sleeves or caps integral with the connectors or separate therefrom, or with vinyl plastic insulating tape.

2.6 FUSES

- A. General: Provide fuses of the indicated types and sizes, in place, for each device requiring fuses. Unless otherwise indicated, fuses shall be dual element non-renewable delay type. Fuses shall be Bussman, Littlefuse, General Electric.
 1. Spare Fuses: Furnish three spare fuses of each size and type required for the electrical system, deliver these to the Owner's representative in a suitable clearly labeled box, obtain signed receipt for delivery.

2.7 DISCONNECT SWITCHES, MOTOR STARTERS, AND SEPARATE CIRCUIT BREAKERS

- A. General: Except as otherwise specified below, Electrical Section shall provide disconnect switches, circuit breakers, and motor starters for all motors and other electrically operated equipment, regardless of who furnishes and/or installs that equipment. Types and locations of these devices shall be as indicated, or as required where types and/or locations are not indicated.
 1. These devices which are located on other equipment shall be as specified under the corresponding headings; these devices NOT located on other equipment shall be as specified below, and shall be separately mounted.
 2. Separately mounted disconnect switches, circuit breakers, and motor starters shall be Eaton Cutler Hammer or Square D. Enclosure shall be: NEMA 3R for devices exposed to weather; NEC required type for devices in other special locations; and NEMA 1 type for devices in other locations. Each circuit breaker and each disconnect switch, including those integral with motor starters, shall have padlocking means.
 3. All terminals for disconnect switches, circuit breakers and motor starters shall be rated and marked for 75 degrees C terminations.
- B. Disconnect Switches: These shall be: non-fused heavy duty type safety switches where overcurrent protection is not required; and fused heavy duty type safety switches or circuit breakers (as indicated) where overcurrent protection is required; except that other suitable properly rated switches may be used for fractional hp motors and other small loads.
- C. Circuit Breakers: These shall be molded case type. Breakers shall be quick make, quick break type with trip indications shown and with common trip handle on all multipole breaker.
- D. Manual Motor Starters: These shall have neon motor running pilot lights and proper sized overload protective devices for the motors involved; and shall be surface mounted in equipment rooms and unfinished areas, and flush mounted in finished area. Where manual motor starters are not indicated, small manually controlled motors shall be controlled directly by the panelboard circuit breakers.
- E. Magnetic Motor Starter: Each motor of 1/8 hp or larger shall be provided with thermal overload protection. Polyphase motors shall have overload protection in each ungrounded conductor. The overload-protection device shall be provided either integral with the motor or controller, unless otherwise specified, the protective device shall be of the manually reset type. Magnetic starters shall be NEMA size and type including the NEMA withstand ratings, with the automatic-control device actuating the pilot-control circuit. Each magnetic starter shall have a built in control circuit transformer to supply 120 volts to the control circuit. Each magnetic starter shall be provided with a three-position selector switch marked MANUAL-OFF-AUTOMATIC. Connections to the selector switch shall be such that only the normal automatic regulatory control devices will be bypassed when the switch is in the Manual position; all safety control devices, such as low or high-pressure cutouts, high-temperature cutouts, and motor-overload protective devices, shall be connected in the motor-control circuit in both the Manual and the Automatic positions of the

selector switch. Two auxiliary contacts shall be a part of the starters. Control circuit connections to any MANUAL-OFF-AUTOMATIC switch or to more than one automatic regulatory control device shall be made in accordance with approved wiring diagram. All controls shall be 120 volts or less unless otherwise indicated. All motors with a rating of 50 hp and above shall have autotransformer reduced voltage starters; motors less than 50 hp shall be line voltage starters.

- F. Identification of Separately Enclosed Devices: Identify each separately enclosed circuit breaker, disconnect switch, magnetic motor starter, and manual motor starter, by attaching to the device cover a metal or plastic nameplate clearly and permanently lettered with the description and location of the equipment controlled by the device.
- G. Devices Furnished by Other Sections or Others:
 - 1. 3/4 hp and small single phase roof mounted fans: If the disconnect switches for these are furnished with and factory mounted on the equipment; Electrical Section shall connect to fan motors and/or switches, as required. Verify that disconnects are furnished by others.

2.8 DEVICES

- A. General:
 - 1. Wiring devices shall be Bryant, Hubbell, Arrow-Hart, Leviton, Eagle Specification Line, or other makes as approved or as specified below. Type of wiring devices required for this project shall be as indicated on the drawings, or suitable for the application involved if type is not indicated; qualities, ratings, and other requirements of wiring devices shall be as specified below. All wiring device types specified below may not necessarily be required for this project. Disregard specifications for devices which are neither indicated nor required for this project.
 - 2. Receptacle configurations shall conform to NEMA standards.
 - 3. Exposed finish shall be: with stainless steel plates. Isolated ground receptacles and emergency devices shall be marked by symbol on the face.
- B. Devices: Qualities, ratings, and other requirements shall be:
 - 1. Wall switches: 20A 120-277VAC, single or double pole, 3 or 4 way, as applicable; Bryant 4901 series; Hubbell 1221 series; A-H 1991 series. Where indicated as WEATHERPROOF, the above specified switch, with Bryant 7420, Hubbell 7420, or A-H 7420 spring door cover.
 - 2. Wall switches with pilot lights: 15A 120-277VAC switch with neon pilot light; Bryant 4901 PLR series; A-H 1991 PL Series; Hubbell 1221 - PL Series.
 - 3. Momentary contact switches: 20A 120-277 volt, SPDT, three position with center off; Hubbell 1557 series, Bryant 4921 series, or Arrow-Hart 1995 series.
 - 4. Door switches: 6A, 125 volt single pole; Arrow-Hart No. 4029 or 4030 as required Bryant 2968 or 2969.
 - 5. Duplex receptacles: (Commercial) 20A 125 volt, 2 pole, 3 wire grounding; Bryant 5362; Hubbell 5362; A-H 5362. Where indicated as WEATHERPROOF the above specified duplex receptacle with Bryant 868, Hubbell 5206WO, A-H 4500 FS double lift spring door cover.
 - 6. Isolated ground receptacles: 20A, 125 volt, 2 pole, 3 wire duplex isolated ground type; Hubbell No. IG 5362; Bryant 5362-IG; A-H IG 5362.
 - 7. Ground fault circuit interrupter receptacles: (Commercial) 20A 125 volt feed through duplex 5ma sensitivity type with test and reset buttons; A-H GF 5342, Bryant GFR53FT, Hubbell GF5362. Where indicated as WEATHERPROOF, the above specified receptacle with Bryant GFRWPH, Hubbell CWP26H, A-H 4501 or approved equal spring door cover.
 - 8. Single Receptacle: (Commercial) 20A 125 volt, 2 pole, 3 wire grounding; Bryant 5361, A-H 5361, Hubbell 5361 or approved equal. Single receptacles: 30A, 125 volt, 2 pole, 3 wire grounding; Hubbell No. 9308 A-H 5716N, Bryant 9530-FR.
 - 9. Single receptacles: 20A, 250 volt, 2 pole 3 wire grounding; Bryant 5461; Hubbell 5461; A-H 5461.
 - 10. Heavy duty receptacles: 250 volt, 2 pole, 3 wire grounding, 30A or 50A as required; Bryant 9630FR and 9650FR; Hubbell 9330 and 9367; A-H 5700 and 5709.
 - 11. Flush floor receptacles: 20A 125 volt, 2 pole, 3 wire grounding; above specified single receptacle with Steel City 889 and P-90-2 receptacle and floor plates.

12. Standing floor receptacles: 20A 125 volt, 2 pole, 3 wire grounding; above specified duplex receptacle in Steel City SFH-40 or equal outlet fitting.
 13. Other devices not specified above; as indicated on the drawings.
- C. Device Plates: Unless otherwise specified or inapplicable to the devices involved, plates shall be: emergency circuit devices as selected by Architect, plastic; isolated ground receptacles, as selected by Architect. In finished areas device plate colors shall be as selected by Architect, and unfinished areas, brown plastic for flush devices, and zinc coated steel for surface devices.
1. Identification of Emergency System Receptacles: Emergency system receptacles shall be red in color.
 2. All receptacles shall be labeled with a stick on label indicating the panel and circuit number. The label shall have black 1/8" high lettering on a transparent base. In addition, the Contractor shall label the same panel and circuit number information on the inside of the device plate with a permanent marker.
 3. Identification of Isolated Ground Receptacles: These shall be engraved or hot stamped "Isolated Ground".
 4. Identification of Data Processing Equipment Receptacles: These shall be engraved or hot stamped "Data Processing Equipment Only".

PART 3- EXECUTION

3.1 INSTALLATION

- A. Run exposed conduit, trays, and other wireways parallel to the principal parts of the building. Wireways shall be run concealed when provisions are made in floors, walls, ceilings, and chases through all finished areas. Fire stop all openings around conduit which penetrates floors and walls with approved non-combustible materials, slabs on grade are excepted.
- B. Conduits and other raceways shall be kept as close as possible to ceilings, walls, columns, etc., and shall be installed in such an orderly manner as to take up a minimum of space and allow a maximum of headroom.
- C. Circuiting: Circuit numbers shown on drawings indicate specific panelboard to which each branch circuit shall be connected, and specific outlets which shall be connected to each branch circuit, and unless otherwise indicated these circuit numbers do not necessarily indicate actual number of circuit breaker in each panel to which each branch circuit shall be connected. Connect each outlet marked with same circuit number to same numbered branch circuit and connect each branch circuit to indicated panelboard. In each individual panelboard:
 1. Balance active circuits on panelboard busses and leave spare circuit breakers equally divided among panelboard busses, as nearly as practicable.
 2. Connect each ungrounded wire of each 3 and 4 wire common neutral circuit to a different panelboard bus.
 3. Group conveniently at top of panelboard all breakers used for switching lights not having wall or other switches, and neatly paint handles of all such breakers with white durable quick drying automobile touch up or other similar type lacquer for each identification as light switches. This does not apply to any panelboard in which ALL circuit breakers serve as lighting switches.
- D. Provide templates, layouts drawings, and supervision to ensure correct placement of anchors and conduit projecting in concrete.
- E. Painting shall be done to repair scratches to surfaces, electrical equipment nameplates shall be protected from paint.
- F. Qualifications: Where specific qualifications are specified in individual specification section, provide required data with Subcontractor list.

3.2 TYPE OF SYSTEM, WIRING METHOD

- A. Electrical system characteristics: These shall be as indicated. In addition, whether indicated or not, provide low voltage (less than 120 volts) wiring for controls and other purposes, as required for the complete electrical system.
- B. Enclosures: Regardless of voltage or use, install wiring in conduits and metal or other enclosures, unless otherwise indicated or otherwise specified.
- C. Finished Areas: Conceal conduits below floors, within slabs, within walls, within pipe chases, above suspended ceilings, and within other building construction, in offices, rest rooms, and other finished areas, unless otherwise indicated.
- D. Unfinished Areas: Install above-floor conduits exposed in areas where pipe chases or suspended ceilings are not indicated or concealing is otherwise impractical, in mechanical and electrical equipment rooms, manufacturing areas, warehouse or storage areas, and other unfinished areas.
- E. Flexible Cords: Exposed flexible cords approved for the purpose involved shall be used to connect equipment where indicated or specified, and where equipment is factory furnished with or factory arranged for flexible cord connections only. However, in each such case, install the supply outlet as near as practical to the equipment served thereby, and use the shortest practical length of exposed flexible cord between the equipment and the outlet. If a receptacle is used as an outlet, the receptacle and the cord plug shall be 3 or 4 wire (as applicable) grounding twist-lock type.

3.3 GROUNDING

- A. Ground electrical equipment and conductors as required by NEC and other applicable electrical codes.
 - 1. Panelboards served by individual transformers: ground panelboard neutral busses to building grounding system.
 - 2. All metallic cable sheaths, cable shields, metal conduit, transformer cases, cabinets and pedestals shall be made electrically secure to form a continuous system and shall be grounded.
 - 3. The neutral shall only be grounded at the panelboard or service grounding device. Grounding conductors shall be continuous between the service and the driven grounding electrode or other grounding electrode as permitted in Part H of NEC Article 250.
 - 4. All conduits shall have code sized green equipment grounding conductors with diameter based on the largest circuit in each conduit.

3.4 EXCAVATION AND BACKFILL

- A. Excavate and backfill as required for the electrical work. Cut bottoms of trenches to the proper lines and grades to provide firm and continuous support for the underground electrical work, and to provide 24 inch MINIMUM depth from finished grade to tops of all exterior underground electrical work. Sheet and brace excavations as required to protect personnel and adjacent structures.
- B. After the underground electrical work has been installed and approved, place all backfill in 8 inch maximum thickness loose layers, and compact each layer to at least the density of the adjacent undisturbed site soil, using pneumatic or other suitable power tampers. Mass backfilling (backfilling without tamping) is prohibited.
- C. Warning tape for buried electrical work: install detectable warning tape directly over every device by burying tape as close to the surface as possible but no less than six inches beneath finished grade. Tape shall be Reef Industries, Inc., "Terra Tape D", or equal as approved, composition metallized foil-plastic film laminate bearing imprint describing the type of buried electrical work. All materials shall be specifically formulated for prolonged use underground.

3.5 FIRE WALL PENETRATIONS (SEE SECTION 07270 - FIRESTOPPING)

- A. Four hour fire walls shall not be penetrated with conduit runs. Conduit runs shall be routed under the floor in these areas. UL listed approved fire stops shall be provided for all two hour wall penetrations.

3.6 FEEDER, STARTER, SWITCH, PROTECTIVE DEVICE, AND OTHER ELECTRICAL DEVICE SIZES

- A. Capacities of feeders, motor starters, circuit breakers, switches, protective devices, and other electrical devices indicated to be furnished and installed by Electrical Section for electrically operated equipment, regardless of who furnishes and/or installs that equipment, are based upon the average horsepower and/or electrical ratings. HORSEPOWER AND/OR ELECTRICAL RATINGS OF ELECTRICALLY OPERATED EQUIPMENT INDICATED ON ELECTRICAL DRAWINGS SHALL NOT LIMIT SIZES OF THE ELECTRICALLY OPERATED EQUIPMENT AND CAPACITY OF THE ELECTRICAL WORK THEREFOR.
 - 1. Before commencing electrical work for electrically operated equipment, Electrical section shall: check horsepower and/or electrical rating of each individual electrically operated equipment items, regardless of who furnishes and/or installs that equipment; and adjust sizes of all applicable feeders, motor starters, circuit breakers, switches, protective devices, and other electrical devices furnished by Electrical Section, as required to provide proper protection and satisfactory operation of the electrically operated equipment actually installed. This includes increasing to next larger size, or decreasing to next smaller size, all feeders, circuit breakers, starters, switches, protective devices, and other electrical devices involved, as required to match capacities of corresponding electrically operated equipment actually installed, except that no sizes shall be decreased without approval.
- B. Switches, circuit breakers, motor starters, protective devices, and other electrical devices furnished by other Sections and by others for installation and/or wiring by Electrical Section, are specified elsewhere to have adequate capacities to serve the electrically operated equipment for which they are furnished. However, BEFORE installing and/or wiring each of these devices, Electrical Section shall check each individual device's electrical rating with the horsepower and/or electrical rating of the corresponding electrically operated equipment actually installed, regardless of who furnishes and/or installs the devices and equipment. Electrical Section shall not install and/or wire any device that is found to be the incorrect size, and shall see to it that correctly sized devices are furnished by the applicable Section and other applicable persons in all cases.
- C. The intent and requirement of the above is to obtain a coordinated electrical system and all of the above shall be done by Electrical Section as part of the contract, at no extra cost to the Owner.

END OF SECTION

SECTION 26 0526

GROUNDING AND BONDING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. SECTION INCLUDES: Materials, equipment, fabrication, installation and tests in conformity with applicable codes and authorities having jurisdiction for the following:
 - 1. Grounding cables.
 - 2. Installation of grounding system.
 - 3. Field testing of grounding electrodes.

1.2 RELATED SECTIONS

- A. Section 26 0100 - GENERAL PROVISIONS, ELECTRICAL.
- B. Section 26 0500 - BASIC MATERIALS AND METHODS, ELECTRICAL.
- C. Section 25 0543 - UNDERGROUND ELECTRIC SERVICE.

1.3 SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Submit shop drawings for final approval.
- C. Clearly detail shapes, general construction, and installation details.
- D. Submit manufacturer's installation instructions.
- E. Submit samples of the following for final approval.

PART 2 - PRODUCTS

2.1 GROUNDING CABLES

- A. Materials:
 - 1. Grounding conductors shall be tinned soft drawn annealed copper, size and type as follows:
 - a. Grounding for stress relief cones and splices shall be No. 4 AWG, solid, soft drawn annealed.
 - b. All other grounding required minimum No. 4 AWG solid soft drawn annealed unless otherwise specified.
 - 2. Grounding conductors shall be tinned soft drawn annealed copper, size and types as follows:
 - a. From primary riser pole to 3-phase transformer No. 2 AWG bare stranded.
- B. Joints and splices: Make these with suitable copper compression connectors, in manholes and pull boxes, but not in any conduit. Leave enough wire slack to permit at least one splice or joint to be remade in case of damage.

2.2 INSTALLATION OF GROUNDING SYSTEM

- A. Underground Distribution:
 - 1. Ground:
 - a. On site, outdoor electrical equipment to driven ground rods.
 - b. Interrupted metallic raceways, with ground conductors connected to metallic raceway at

each end.

c. Transformer and secondary neutral; to driven ground rods including:

- (1) Cable shielding.
- (2) Metallic raceways.
- (3) Hardware.
- (4) Grounding conductors.

B. Pull Boxes and Manholes:

1. Ground:

a. On site pull boxes and manholes to the grounding system including:

- (1) Cable shielding.
- (2) Metallic raceways.
- (3) Hardware.
- (4) Ground conductors.

b. Interrupted metallic raceways, with ground conductor connected to metallic raceways at each end.

PART 3- EXECUTION

3.1 FIELD TESTING OF GROUNDING ELECTRODE

- A. The ground rod electrode in the transformer pad shall have a resistance to ground test performed. The test shall be made with a self-contained direct reading meter such as "Vibroground" or "Groundohmer".
- B. The maximum resistance to ground shall not exceed 25 ohms with all grounding leads disconnected from the electrode at temperatures above 32 degrees Fahrenheit and soil moisture content above 20 percent.
- C. If the resistance to ground of the existing electrode exceeds 25 ohms install additional grounding electrodes as necessary to obtain the specified resistance. Additional electrodes shall be minimum 3/4 inch diameter by eight foot in length, copper-clad steel.
- D. Where rock is encountered and the electrodes cannot be vertically driven their full length install a grounding trench system consisting of an 18 inch minimum depth trench and place within the trench a single conductor No. 2/0 AWG stranded bare copper wire connected to the electrode. The length of wire shall be such that the specified resistance can be obtained and the minimum length shall be 100 feet.
- E. The grounding trench shall be located in an area and position such that surface activities will not disturb the system. Location of the trench shall be approved by the Engineer.

END OF SECTION

SECTION 26 0543

UNDERGROUND ELECTRICAL SERVICE

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. The work required under this Section includes all work necessary to provide a complete electrical system.
- B. The work of this Section is subject to the requirements of Sections 16010 and 16050.

1.2 RELATED SECTIONS

- A. DIVISION 03 - CONCRETE.
- B. Section 26 0100 - GENERAL PROVISIONS, ELECTRICAL.
- C. Section 26 0500 - BASIC MATERIALS AND METHODS, ELECTRICAL
- D. Section 26 0526 - GROUNDING AND BONDING.

PART 2- PRODUCTS

2.1 GENERAL SERVICE AND METERING

- A. The Electric Utility Company will:
 - 1. Furnish and install pad mounted service transformer.
 - 2. Provide metering equipment for building service.
 - 3. Provide high voltage (primary) service, from line side of service transformer to their electrical distribution system.
 - 4. Connect both sets of the low voltage secondary building service conductors to load side of service transformer.
 - 5. Provide the concrete transformer pad.
- B. DIVISION 26 shall:
 - 1. Provide underground building service from each buildings service equipment to and up through service transformer concrete pad into service transformer load side compartment.
 - 2. Leave free line ends on building service conductors in service transformer load side compartment, as directed by Electric Utility Company.
 - 3. Provide empty underground high voltage service conduits, from service transformer line side compartment to point underground as indicated and as directed by Electric Utility Company. Provide (2) spare conduits (empty).
 - 4. Provide underground conduit from service transformer to building wall for meter connections, unless otherwise indicated.
 - 5. Make arrangements with Electric Utility Company for their service and metering work, PAY ALL CHARGES THEREFOR, AND INCLUDE COST THEREOF IN CONTRACT PRICE.
 - 6. Coordinate work of DIVISION 16 with that of Electric Utility Company – EPB.

PART 3- EXECUTION

3.1 INSTALLATION

- A. Install equipment as indicated, in accordance with equipment manufacturer's written instructions, and with recognized industry practices, to ensure that service-entrance equipment fulfills requirements. Comply with applicable installation requirements of NEC and NEMA standards.
- B. Coordinate with other electrical work, including utility company wiring, as necessary to interface installation of service entrance equipment work with other work.
- C. Install fuses and or circuit breakers in equipment as indicated.
- D. Install ground fault protection devices complying with electrical winding polarities indicated.
- E. Set field adjustable GFP devices and circuit breakers for pickup and time-current sensitivity ranges as indicated, subsequent to installation of devices and CB's.

3.2 GROUNDING AND BONDING

- A. Provide equipment bonding and grounding connectors, sufficiently tight to assure a permanent and effective ground, for equipment and wiring/cablings as indicated.

3.3 ADJUST AND CLEAN

- A. Adjust operating mechanisms for free mechanical movement.
- B. Touch-up scratched or marred enclosure surfaces to match original finishes.

3.4 FIELD QUALITY CONTROL

- A. Upon completion of installation of equipment and electrical circuitry, energized circuitry and demonstrate capability and compliance with requirements. Where possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units, and retest.

END OF SECTION

SECTION 26 0923

LIGHTING CONTROLS - LUTRON VIVE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Single space wireless lighting control systems and associated components:
 - 1. Wireless occupancy/vacancy sensors.
 - 2. Wired load control modules with wireless communication inputs.
 - 3. Wired receptacles with wireless communication inputs.
 - 4. Wired wall dimmers and switches with wireless communication inputs.
 - 5. Wired wallbox occupancy sensors with wireless communication inputs.
 - 6. Wireless control stations.
 - 7. LED Drivers.
 - 8. Power interfaces.
- B. Wireless hub(s) for centralized control, monitoring, and system integration.
- C. Software data and analytics dashboard, including server requirements.

1.02 RELATED SECTIONS

- A. Section 16050 – Basic Materials Methods Electrical.
 - 1. Finish requirements for wall controls specified in this section.
 - 2. Accessory receptacles and wall plates, to match lighting controls specified in this section.
- B. Section 26 5000 - Lighting

1.03 REFERENCE STANDARDS

- A. 47 CFR 15 - Radio Frequency Devices; *current edition*.
- B. ANSI/ESD S20.20 - Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices); *2014*.
- C. ASTM D4674 - Standard Practice for Accelerated Testing for Color Stability of Plastics Exposed to Indoor Office Environments; *2002a (Reapproved 2010)*.
- D. CSA C22.2 No. 223 – Power Supplies with Extra-low-voltage Class 2 Outputs; *2015*.
- E. IEC 61000-4-2 - Electromagnetic Compatibility (EMC) - Part 4-2: Testing and Measurement Techniques - Electrostatic Discharge Immunity Test; *2008*.
- F. IEEE 1789 - Recommended Practice for Modulating Current in High-Brightness LEDs for Mitigating Health Risks to Viewers; *2015*.
- G. IEEE C62.41.2 - Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits; *2002 (Cor 1, 2012)*.
- H. ISO 9001 - Quality Management Systems-Requirements; *2008*.
- I. NECA 1 - Standard for Good Workmanship in Electrical Construction; *2015*.
- J. NECA 130 - Standard for Installing and Maintaining Wiring Devices; National Electrical Contractors Association; *2010*.
- K. NEMA 410 - Performance Testing for Lighting Controls and Switching Devices with Electronic Drivers and Discharge Ballasts; National Electrical Manufacturers Association; *2015*.
- L. NEMA SSL 7A – Phase Cut Dimming for Solid State Lighting: Basic Compatibility; National Electrical Manufacturers Association; *2015*.
- M. NEMA WD 1 - General Color Requirements for Wiring Devices; National Electrical Manufacturers Association; *1999 (R 2015)*.
- N. NFPA 70 - National Electrical Code; National Fire Protection Association; *Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements*.

- O. UL 20 - General-Use Snap Switches; *Current Edition, Including All Revisions.*
- P. UL 508 - Industrial Control Equipment; Underwriters Laboratories Inc.; *Current Edition, Including All Revisions.*
- Q. UL 924 – Emergency Lighting and Power Equipment; *Current Edition, Including All Revisions.*
- R. Lighting and Power Equipment; *Current Edition, Including All Revisions.*
- S. UL 1310 – Class 2 Power Units; *Current Edition, Including All Revisions.*
- T. UL 1472 - Solid-State Dimming Controls; *Current Edition, Including All Revisions.*
- U. UL 1598C - Light-Emitting Diode (LED) Retrofit Luminaire Conversion Kits; *Current Edition, Including All Revisions.*
- V. UL 2043 - Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces; *Current Edition, Including All Revisions.*
- W. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products; *Current Edition, Including All Revisions.*

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the placement of sensors and wall controls with millwork, furniture, equipment, etc. installed under other sections or by others.
 - 2. Coordinate the placement of wall controls with actual installed door swings.
 - 3. Coordinate the placement of daylight sensors with windows, skylights, and luminaires to achieve optimum operation. Coordinate placement with ductwork, piping, equipment, or other potential obstructions to light level measurement installed under other sections or by others.
 - 4. Coordinate the work to provide luminaires and lamps compatible with the lighting controls to be installed.
 - 5. Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.
- B. Pre-Wire Meeting: Include as part of the base bid additional costs for Lighting Control Manufacturer to conduct on-site meeting prior to commencing work. Manufacturer to review with installer:
 - 1. Low voltage wiring requirements.
 - 2. Separation of power and low voltage/data wiring.
 - 3. Wire labeling.
 - 4. Wireless hub locations and installation.
 - 5. Control locations.
 - 6. Load circuit wiring.
 - 7. Network wiring requirements.
 - 8. Connections to other equipment.
 - 9. Installer responsibilities.
- C. Sequencing:
 - 1. Do not install sensors and wall controls until final surface finishes and painting are complete.

1.05 SUBMITTALS

- A. See Section 01 3300 - *Administrative Requirements* for submittal procedures.
- B. Product Data: Include ratings, configurations, standard wiring diagrams, dimensions, colors, service condition requirements, and installed features.
 - 1. Occupancy/Vacancy Sensors: Include detailed basic motion detection coverage range diagrams.
 - 2. Wall Dimmers: Include derating information for ganged multiple devices.

- C. Manufacturer's Installation Instructions: Include application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- D. Project Record Documents: Record actual installed locations and settings for lighting control system components.
- E. Operation and Maintenance Data: Include detailed information on lighting control system operation, equipment programming and setup, replacement parts, and recommended maintenance procedures and intervals.
- F. Warranty: Submit sample of manufacturer's Warranty or Enhanced Warranty as specified in Part 1 under "WARRANTY". Submit documentation of final executed warranty completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Manufacturer Qualifications:
 - 1. Company with not less than ten years of experience manufacturing lighting control products using wireless communication between devices.
 - 2. Registered to ISO 9001, including in-house engineering for product design activities.
 - 3. Provides factory direct technical support hotline available 24 hours per day, 7 days per week.
 - 4. Qualified to supply specified products and to honor claims against product presented in accordance with warranty.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Store products in a clean, dry space in original manufacturer's packaging in accordance with manufacturer's written instructions until ready for installation.

1.08 FIELD CONDITIONS

- A. Maintain field conditions within manufacturer's required service conditions during and after installation.
 - 1. Basis of Design System Requirements, Unless Otherwise Indicated:
 - a. Ambient Temperature:
 - 1) Lighting Control System Components, Except Fluorescent Electronic Dimming Ballasts: Between 32 and 104 degrees F (0 and 40 degrees C).
 - b. Relative Humidity: Less than 90 percent, non-condensing.
 - c. Protect lighting controls from dust.

1.09 WARRANTY

- A. See *Section 01 7800 - Closeout Submittals*, for additional warranty requirements.
- B. Manufacturer's Standard Warranty, Without Manufacturer Full-Scope Start-Up:
 - 1. Manufacturer Lighting Control System Components, Except Wireless Sensors, Ballasts/Drivers and Ballast Modules: One year 100 percent parts coverage, no manufacturer labor coverage.
 - 2. Wireless Sensors: Five years 100 percent parts coverage, no manufacturer labor coverage.

3. Ballasts/Drivers and Ballast Modules: Three years 100 percent parts coverage, no manufacturer labor coverage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design Manufacturer: *Lutron Electronics Company, Inc; Vive; www.lutron.com.*
- B. Substitutions:
 1. All proposed substitutions (clearly delineated as such) must be submitted in writing for approval by Architect a minimum of 10 working days prior to the bid date and must be made available to all bidders. Proposed substitutes must be accompanied by a review of the specification noting compliance on a line-by-line basis.
 2. Any proposed substitutions to be reviewed by Architect at Contractor's expense at a rate of \$200 per hour.
 3. By using pre-approved substitutions, Contractor accepts responsibility and associated costs for all required modifications to related equipment and wiring. Provide complete engineered shop drawings (including power wiring) with deviations from the original design highlighted in an alternate color for review and approval by Architect prior to rough-in.
- C. Source Limitations: Furnish products produced by a single manufacturer and obtained from a single supplier.

2.02 LIGHTING CONTROLS - GENERAL REQUIREMENTS

- A. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) as suitable for the purpose indicated.
- B. Unless specifically indicated to be excluded, provide all required equipment, conduit, boxes, wiring, connectors, hardware, supports, accessories, programming, etc. as necessary for a complete operating system that provides the control intent indicated.
- C. Design lighting control equipment for 10 year operational life while operating continually at any temperature in an ambient temperature range of 32 degrees F (0 degrees C) to 104 degrees F (40 degrees C) and 90 percent non-condensing relative humidity.
- D. Electrostatic Discharge Tolerance: Design and test equipment to withstand electrostatic discharges without impairment when tested according to IEC 61000-4-2.
- E. Power Failure Recovery: When power is interrupted and subsequently restored, lights to automatically return to same levels (dimmed setting, full on, or full off) as prior to power interruption.
- F. Wireless Devices:
 1. Wireless device family includes area or fixture level sensors, area or fixture level load controls for dimming or switching, and load controls that can be mounted in a wallbox, on a junction box, or at the fixture.
 2. Wireless devices including sensors, load controls, and wireless remotes or wall stations, can be set up using simple button press programming without needing any other equipment (e.g. central hub, processor, computer, or other smart device).
 3. Wireless hub adds the ability to set up the system using any smart device with a web browser (e.g. smartphone, tablet, PC, or laptop).
 4. System does not require a factory technician to set up or program the system.
 5. Capable of diagnosing system communications.
 6. Capable of having addresses automatically assigned to them.
 7. Receives signals from other wireless devices and provides feedback to user.

8. Capable of determining which devices have been addressed.
9. RF Range: 60 feet (18 m) line-of-sight or 30 feet (9 m) through typical construction materials between RF transmitting devices and compatible RF receiving devices.
10. Electromagnetic Interference/Radio Frequency Interference (EMI/RFI) Limits: Comply with FCC requirements of CFR, Title 47, Part 15, for Class B application.

G. Wireless Network:

1. RF Frequency: 434 MHz; operate in FCC governed frequency spectrum for periodic operation; continuous transmission spectrum is not permitted.
 - a. Wireless sensors, wireless wall stations and wireless load control devices do not operate in the noisy 2.4 GHz frequency band where high potential for RF interference exists.
 - b. Wireless devices operate in an uncongested frequency band providing reliable operation.
 - c. Fixed network architecture ensures all associated lights and load controls respond in a simultaneous and coordinated fashion from a button press, sensor signal, or command from the wireless hub (i.e. no popcorning).
2. Distributed Architecture: Local room devices communicate directly with each other. If the wireless hub is removed or damaged, local control, sensing, and operation continues to function without interruption.
3. Local room devices communicate directly with each other (and not through a central hub or processor) to ensure:
 - a. Reliability of system performance.
 - b. Fast response time to events in the space (e.g. button presses or sensor signals).
 - c. Independent operation in the event of the wireless hub being removed or damaged.

H. Device Finishes:

1. Wall Controls: Match finishes for Wiring Devices in Section 26 2726, unless otherwise indicated.
2. Wall Controls: To be selected by Architect
3. Standard Colors: Comply with NEMA WD1 where applicable.
4. Color Variation in Same Product Family: Maximum delta E of 1, CIE L*a*b color units.
5. Visible Parts: Exhibit ultraviolet color stability when tested with multiple actinic light sources as defined in ASTM D4674. Provide proof of testing upon request.

I. Interface with building automation system as shown in contract documents.

J. PROVIDE THE FOLLOWING FOR PHOTOCELL CONTROL:

1. *LUTRON WIRED SENSOR TO WIRELESS SYSTEM INTERFACE: #WLCU301-CPN6814*
2. *Lutron daylight control package: Lutron #GRX-CESO-xxx Pkg.*

2.03 WIRELESS SENSORS

A. General Requirements:

1. Operational life of 10 years without the need to replace batteries when installed per manufacturer's instructions.
2. Communicates directly to compatible RF receiving devices through use of a radio frequency communications link.
3. Does not require external power packs, power wiring, or communication wiring.
4. Capable of being placed in test mode to verify correct operation from the face of the unit.

B. Wireless Occupancy/Vacancy Sensors:

1. General Requirements:

- a. Provides a clearly visible method of indication to verify that motion is being detected during testing and that the unit is communicating to compatible RF receiving devices.
- b. Utilize multiple segmented lens, with internal grooves to eliminate dust and residue build-up.
- c. Sensing Mechanism: Passive infrared coupled with technology for sensing fine motions. Signal processing technology detects fine-motion passive infrared (PIR) signals without the need to change the sensor's sensitivity threshold.
- d. Provide optional, readily accessible, user-adjustable controls for timeout, automatic/manual-on, and sensitivity.
- e. Turns off lighting after reasonable and adjustable time delay once the last person to occupy the space vacates a room or area. Provide adjustable timeout settings of 1, 5, 15, and 30 minutes.
- f. Capable of turning dimmer's lighting load on to an optional locked preset level selectable by the user. Locked preset range to be selectable on the dimmer from 1 percent to 100 percent.
- g. Color: White.
- h. Provide all necessary mounting hardware and instructions for both temporary and permanent mounting.
- i. Provide temporary mounting means for drop ceilings to allow user to check proper performance and relocate as needed before permanently mounting sensor. Temporary mounting method to be design for easy, damage-free removal.
- j. Sensor lens to illuminate during test mode when motion is detected to allow installer to place sensor in ideal location and to verify coverage prior to permanent mounting.
- k. Ceiling-Mounted Sensors:
 - 1) Provide surface mounting bracket compatible with drywall, plaster, wood, concrete, and compressed fiber ceilings.
 - 2) Provide recessed mounting bracket compatible with drywall and compressed fiber ceilings.
- l. Wall-Mounted Sensors: Provide wall or corner mounting brackets compatible with drywall and plaster walls.
- 2. Wireless Combination Occupancy/Vacancy Sensors:
 - a. Ceiling-Mounted Sensors: Programmable to operate as an occupancy sensor (automatic-on and automatic-off), an occupancy sensor with low light feature (automatic-on when less than one footcandle of ambient light available and automatic-off), or a vacancy sensor (manual-on and automatic-off).
 - b. Wall-Mounted Sensors: Programmable to operate as an occupancy sensor (automatic-on and automatic-off), or a vacancy sensor (manual-on and automatic-off).
 - c. Product(s):
 - 1) Ceiling-Mounted Occupancy/Vacancy Sensor: Coverage from 324 square feet (30.2 sq m) to 676 square feet (62.4 sq m) depending on ceiling height from 8 to 12 feet (2.4 to 3.7 m); 360 degree field of view.
- C. Wireless Daylight Sensors:
 - 1. Product: *Lutron Radio Powr Savr Series, Model LFR2-DCRB-WH.*
 - 2. Open-loop basis for daylight sensor control scheme.
 - 3. Stable output over temperature from 32 degrees F (0 degrees C) to 104 degrees F (40 degrees C).
 - 4. Partially shielded for accurate detection of available daylight to prevent fixture lighting and horizontal light component from skewing sensor detection.
 - 5. Provide linear response from 2 to 150 footcandles.
 - 6. Color: White.
 - 7. Mounting:

- a. Provide surface mounting bracket compatible with drywall, plaster, wood, concrete, and compressed fiber ceilings.
- b. Provide all necessary mounting hardware and instructions for both temporary and permanent mounting.
- c. Provide temporary mounting means for drop ceilings to allow user to check proper performance and relocate as needed before permanently mounting sensor. Temporary mounting method to be design for easy, damage-free removal.

2.04 LOAD CONTROL MODULES

- A. Provide wireless load control modules as indicated or as required to control the loads as indicated.
- B. Junction Box-Mounted Modules:
 - 1. Plenum rated.
 - 2. 0-10 V Dimming Modules:
 - a. Product(s):
 - 1) 8 A dimming module with 0-10V control, without emergency mode.
 - 2) 8 A dimming module with 0-10V control, with emergency mode.
 - b. Communicates via radio frequency with up to ten compatible occupancy/vacancy sensors, ten wireless control stations, and one daylight sensor.
 - c. Single low voltage dimming module with Class 1 or Class 2 isolated 0-10V output signal conforming to IEC 60929 Annex E.2; source or sink automatically configures.
 - d. Selectable minimum light level.
 - e. Configurable high- and low-end trim.
 - f. Relay: Rated for 0-10 V ballasts, LED drivers, or fixtures that conform with NEMA 410.
 - g. Dimming Modules with Emergency Mode:
 - 1) Operation With Wireless Hub: Upon loss of power, dimming module enters and remains in emergency mode as long as wireless hub is de-energized; upon restoration of power to wireless hub, dimming module returns to normal mode and lights automatically return to same levels (dimmed setting, full on, or full off) as prior to power interruption.
 - 2) Operation Without Wireless Hub: Upon loss of power, dimming module enters and remains in emergency mode for 90 minutes, during which time local unit buttons and wireless controls are disabled.
 - 3) Used with emergency lighting interface to achieve total system UL 924 Lutron's PowPak® relay module with Softswitch® is a radio frequency (RF) device that uses Lutron patented Softswitch® technology to control up to 16 A of general-purpose load (16 A and 5 A models available) based on input from Pico® wireless controls and Radio Powr Savr™ wireless occupancy/vacancy sensors and wireless daylight sensors. An optional low-voltage dry contact closure output is available to communicate occupancy status to 3rd-party systems such as HVAC controllers. PowPak® modules communicate with compatible Lutron sensors using Clear Connect® RF Technology, which ensures smooth, consistent performance. Lutron's patented Softswitch® circuit eliminates relay arcing at mechanical contacts, extending relay life to an average of 1 million cycles.
 - 3. Relay Modules:
 - a. Product(s):
 - 1) 16 A relay module, without emergency mode, without contact closure output.

- 2) 16 A relay module, with emergency mode, without contact closure output.
- 3) 16 A relay module, without emergency mode, with contact closure output.
- 4) 5 A relay module, without emergency mode, without contact closure output.
- 5) 5 A relay module, without emergency mode, with contact closure output.
- b. Communicates via radio frequency with up to ten compatible occupancy/vacancy sensors, ten wireless control stations, and one daylight sensor.
- c. Relay:
 - 1) Rated Life of Relay: Typical of 1,000,000 cycles at fully rated 16 A for all lighting loads.
 - 2) Load switched in manner that prevents arcing at mechanical contacts when power is applied to and removed from load circuits.
 - 3) Fully rated output continuous duty for inductive, capacitive, and resistive loads.
- d. Contact Closure Output:
 - 1) Single contact closure output with normally open and normally closed dry maintained contacts suitable for connection to third party equipment (e.g. building management system, HVAC system, etc.).
 - 2) Contact Ratings: Resistive load; 1 A at 0-24 VDC, 0.5 A at 0-24 VAC.
 - 3) Controlled by associated occupancy/vacancy sensors and wall controls.
- e. Relay Modules With Emergency Mode:
 - 1) Operation With Wireless Hub: Upon loss of power, relay module enters and remains in emergency mode as long as wireless hub is de-energized; upon restoration of power to wireless hub, relay module returns to normal mode and lights automatically return to same levels (dimmed setting, full on, or full off) as prior to power interruption.
 - 2) Operation Without Wireless Hub: Upon loss of power, relay module enters and remains in emergency mode for 90 minutes, during which time local unit buttons and wireless controls are disabled.
 - 3) Used with emergency lighting interface to achieve total system UL 924 listing.

2.05 WIRED WALLBOX OCCUPANCY SENSORS WITH WIRELESS COMMUNICATION INPUTS

- A. 0-10 V Wall Dimmer/Switch Combination Occupancy/Vacancy Sensors with Wireless Communication Inputs:
 - 1. Communicates via radio frequency with up to ten compatible wireless occupancy/vacancy sensors, ten wireless control stations, and one wireless daylight sensor.
 - 2. Compatible with sourcing electronic 0-10 V ballasts/drivers, as per IEC 60929 Annex E.2 0-10 V protocol.
 - 3. Selectable option to enable low light feature (automatic-on when ambient light is below threshold). Ambient light threshold to be selectable as either adaptive utilizing occupant feedback or as fixed (high, medium, low, and minimum presets).
 - 4. Occupancy/Vacancy Sensors:
 - a. Utilize multiple segmented lens, with internal grooves to eliminate dust and residue build-up.
 - b. Sensing Mechanism: Passive infrared coupled with technology for sensing fine motions. Signal processing technology detects fine-motion passive infrared (PIR) signals without the need to change the sensor's sensitivity threshold.
 - c. Programmable to operate as an occupancy sensor (automatic-on and automatic-off) or a vacancy sensor (manual-on and automatic-off).

- d. Turns off lighting after reasonable and adjustable time delay once the last person to occupy the space vacates a room or area; adjustable timeout settings (1, 5, 15, or 30 minutes).
- e. Adjustable sensitivity (high, medium, low, and minimum presets).
- f. Selectable option to inhibit automatic turn-on of lights after manual-off operation while room is occupied for applications such as presentation viewing in conference rooms and classrooms; when room is vacated, returns to normal automatic-on operation after time delay period.
- g. Selectable walk-through mode to override selected timeout and automatically turn off lights if no motion is detected within 3 minutes after initial occupancy for applications where space may be briefly occupied.
- 5. Dimmer Features:
 - a. Adjustable high/low end trims.
 - b. Selectable dimming curve (linear or switched).
 - c. Selectable fade on/fade off times (15, 5, 2.5, or 0.75 sec).
 - d. Adjustable auto-on light level (fully adjustable from one to 100 percent).
- 6. Dimmer Control: Multi-function tap switch with small, raised rocker for dimmer adjustment.
 - a. Rocker raises/lowers light level, with new level becoming the current preset level.
 - b. Switch single tap raises lights to preset level or fades lights to off.
 - c. Switch double tap raises light to full on level.
- 7. Switch Control: Switch single tap turns lights on/off.
- 8. Product(s):
 - a. Passive Infrared 0-10 V Wall Dimmer Occupancy/Vacancy Sensor: 0-10 V control for 0-10 V fluorescent ballasts/LED drivers (8 A load at 120-277 V, 50 mA max control current); coverage of 900 square feet (81 sq m) with mounting height of 4 feet (1.2 m); 180 degree field of view; multi-location capability using wireless control stations with wallbox mounting adapter.
 - 1) Sensor dimmer; occupancy/vacancy.
 - 2) Sensor switch; occupancy/vacancy.

2.06 WIRELESS CONTROL STATIONS

- A. Product(s):
 - 1. 2-Button Control.
 - a. Button Marking: As indicated on drawings
 - 2. 3-Button with Raise/Lower Control.
 - a. Button Marking: As indicated on drawings
 - 3. 4-Button.
 - a. Button Marking: As indicated on drawings
 - 4. Screw Mounting Kit.
 - 5. Wallbox Adapter.
- B. Quantity: As indicated on drawings
- C. Communicates directly to compatible RF receiving devices through use of a radio frequency communications link.
- D. Does not require external power packs, power or communication wiring.
- E. Allows for easy reprogramming without replacing unit.
- F. Button Programming:
 - 1. Single action.
 - 2. Toggle action.
- G. Includes LED to indicate button press or programming mode status.
- H. Mounting:

1. Capable of being mounted with a table stand or directly to a wall under a faceplate.
 2. Faceplates: Provide concealed mounting hardware.
- I. Power: Battery-operated with minimum ten-year battery life (3-year battery life for night light models).
- J. Finish: As selected by Architect

2.07 WIRED RECEPTACLES WITH WIRELESS COMMUNICATION INPUTS

- A. Communicates via radio frequency with up to ten compatible occupancy/vacancy sensors and ten wireless control stations.
- B. Relay:
1. Load switched in manner that prevents arcing at mechanical contacts when power is applied to and removed from load circuits.
 2. Rated for switching of general purpose loads.
 3. Motor rating of 0.5 HP at 120 V for 15 A receptacles, and 1 HP at 120 V for 20 A receptacles.
- C. Finish: White
- D. Product(s):
1. Half switched duplex receptacle, 20A, 125V, NEMA 5-15R; *Lutron Wireless Receptacle with Clear Connect Technology; Model CAR2S-20-STR.*

2.08 WIRELESS HUBS

- A. Product(s):
1. Wireless hub without BACnet.
 - a. Flush-mount wireless hub; supports up to 70 total paired devices.
 - b. Flush-mount wireless hub; supports up to 700 total paired devices.
 - c. Surface-mount wireless hub; supports up to 700 total paired devices.
- B. Integrated multicolor LED provides feedback on what mode the hub is in for simple identification and diagnosis.
- C. Integrated processor and web server allows hub to set up and operate the system without any external connections to outside processors, servers, or the internet.
- D. Utilizes Ethernet connection for:
1. Networking up to 64 hubs together to create a larger system.
 2. Integration with Building Management System (BMS) via native BACnet; does not require interface (wireless hub with BACnet only).
 3. Remote connectivity capabilities, including maintaining system date/time and receiving periodic firmware updates (requires internet connection).
- E. A single hub or network of hubs can operate on either a dedicated lighting control only network or can be integrated with an existing building network as a VLAN.
- F. Communicates directly to compatible RF devices through use radio frequency communications link; does not require communication wiring; RF range of 71 feet (23 m) through walls to cover an area of 15836 square feet (1471 sq m) (device and hub must be on the same floor).
- G. Communicates directly to mobile device (smartphone or tablet) or computer using built-in Wi-Fi, 2.4 GHz 802.11b/g; wireless range of 71 feet (23 m) through walls (device and hub must be on the same floor).
1. Does not require external Wi-Fi router for connecting to the hub.

- H. Allows for system setup, control, and monitoring from mobile device or computer using web-based software:
1. Supports paired devices up to maximum number indicated including compatible wireless sensors, wireless control stations, and wireless load devices.
 2. Allows for timeclock scheduling of events, both time of day and astronomic (sunrise and sunset).
 - a. Timeclock is integrated into the unit and does not require a constant internet connection.
 - b. Retains time and programming information after a power loss.
 - c. 365-day schedulable timeclock allows for:
 - 1) Scheduling of events years in advance.
 - 2) Setting of recurring events with exceptions on holidays.
 - d. Time clock events can be scheduled to:
 - 1) Send lights to a desired level and select the fade rate desired to reach that level.
 - 2) Adjust level lights go to when occupied.
 - 3) Adjust level lights go to when unoccupied.
 - 4) Enable/disable occupancy.
 - 5) Adjust timeout of sensors (requires wired fixture sensor or wireless fixture control dongle with integral sensing capabilities).
 - 6) Control individual devices, areas, or groups of areas. When connected to server, only areas or groups of areas can be controlled with timeclock events.
 3. Allows for control, monitoring, and adjustment from anywhere in the world (wireless hub internet connection required).
 4. Uses RF signal strength detection to find nearby devices for quick association and programming without having to climb ladders.
 - a. Association and setup does not require a factory technician to perform.
 5. System using wireless hub(s) can operate with or without connection to the internet.
 6. Supports energy reporting.
 - a. Reports measured energy data for fixture control modules at accuracy of plus/minus 2 percent or 0.5 W (whichever is higher).
 - b. Reports calculated energy data for junction box mounted modules at accuracy of 10 percent.
 7. Supports automatic demand response for load shedding via:
 - a. Local contact closure without need for separate interface.
 - b. OpenADR® 2.0b compliant utility command.
 - c. BACnet (wireless hub with BACnet only).
 8. Support automatic generation of alerts in web-based application for designated events/triggers, including:
 - a. Low-battery condition in battery-operated sensors and controls; alert cleared when battery is replaced.
 - b. Missing device (e.g., control or sensor); alert cleared when device is detected by system.
 9. Wireless hub can be firmware upgraded to provide new software features and system updates.
 - a. Firmware update can be done either locally using a wired Ethernet connection or Wi-Fi connection, or remotely if the wireless hub is connected to the internet.
- I. Web-Based Application:
1. Accessibility and Platform Support:
 - a. Web-based; runs on most HTML5 compatible browsers (including Safari and Chrome).
 - b. Supports multiple platforms and devices; runs from a tablet, desktop, laptop, or smartphone.
 - c. User interface supports multi-touch gestures such as pinch to zoom, drag to pan, etc.

- d. Utilizes HTTPS (industry-standard certificate-based encryption and authentication for security).
 - e. Multi-level Password Protected Access: Individual password protection on both the integrated Wi-Fi network and web-based software.
 - f. WPA2 security for Wi-Fi communication with wireless hub.
- 2. System Navigation and Status Reporting:
 - a. Area Tree View: Easy navigation by area name to view status and make programming adjustments through the software.
 - b. Area and device names can be changed in real time.
- 3. Setup app available for iOS and Android that allows for:
 - a. Job registration to extend product warranty.
 - b. Management of setup for multiple projects in different locations.
 - c. Creation of handoff documents that are sent directly to a facility manager via email once setup is complete.
 - d. Backup of wireless hub database to cloud for hub replacement.
 - e. Access to native help and instructions to assist user with system setup.
- J. Scenes:
 - 1. Support programmable scenes to control individual devices, areas, or groups of areas on demand.
 - 2. Scenes may be activated via:
 - a. Contact closure input.
 - b. API integration.
 - c. Manual activation in app.
- K. Emergency Mode:
 - a. Support emergency mode to, when triggered, send lights to defined levels and lock out controls for load control modules equipped with emergency mode.
 - 2. Emergency mode may be activated via:
 - a. Contact closure input.
 - b. API integration.
 - c. Manual activation in app.
- L. Contact Closure Interface: Provide two contact closure inputs; accepts both momentary and maintained contact closures that can be used for automatic demand response.
- M. Rated for use in air-handling spaces as defined in UL 2043.
- N. Provide Ethernet switch(es) as required for inter-hub network wiring per manufacturer's instructions; do not exceed manufacturer's required maximum wiring segment lengths.
 - 1. Product(s):
 - a. 16 port.
 - b. 24 port.
 - c. 24 port, 1 multi-mode fiber.
 - d. 24 port, 2 multi-mode fiber.
 - e. 24 port, 1 single-mode fiber.
 - f. 24 port, 2 single-mode fiber.

2.09 SOFTWARE DATA AND ANALYTICS DASHBOARD

- A. Control and Monitor Software:
 - 1. General Requirements:
 - a. Web-based; runs on most HTML5 compatible browsers (including Internet Explorer, Chrome, and Safari).
 - b. Supports multiple platforms and devices; runs from a tablet, desktop, laptop, or smartphone; optimized for displays of 1024 by 768 pixels or higher.
 - c. User interface supports multi-touch gestures such as pinch to zoom, drag to pan, etc.

- d. Utilizes HTTPS (industry-standard certificate-based encryption and authentication for security).
 - e. All functionality listed below must be available via a single application.
- 2. System Navigation and Status Reporting:
 - a. Performed using graphical floor plan view or a generic system layout.
 - b. Graphical Floor Plan View: Utilizes customized CAD based drawing of the building. Pan and zoom feature allows for easy navigation; dynamically adjusts the details presented based on zoom level.
- 3. Control of Lights:
 - a. Control and monitor zone/area lights.
 - 1) Area lights can be monitored for on/off status from a graphical floor plan or generic system layout.
 - 2) All lights in an area can be turned on/off (dimnable lights can also be dimmed up/down from current level).
- 4. Occupancy:
 - a. Area occupancy can be monitored.
 - 1) Can be monitored graphically if a graphical floor plan has been created.
 - 2) Can be monitored historically in space utilization reports.
 - b. Scheduled events can be created to change occupancy parameters as described under "Scheduling" below.
- 5. Load Shedding: View current load shed status (active/inactive) for each wireless hub and enable/disable load shed for the entire building/system.
- 6. Scheduling: Schedule time of day and astronomic time clock events to automate functions.
 - a. Scheduled events can control the following:
 - 1) Area light levels for all dimmable lights in an area.
 - 2) On/off status of all switched lights and contact-closure outputs in an area.
 - 3) On/off status of all switched receptacles in an area.
 - b. Scheduled events can be created to change the following occupancy parameters:
 - 1) Enable/disable sensors.
 - 2) Change occupancy mode (auto-on/auto-off versus manual-on/auto-off).
 - 3) Adjust occupied and/or unoccupied level.
 - 4) For compatible individual fixture sensors, sensor timeout can be adjusted.
 - c. Easily monitor and adjust scheduled events using a weekly calendar view.
- 7. Reporting: Provide reporting capability that allows the building manager to gather real-time and historical information about the system as follows:
 - a. Energy Reports: Show a comparison of cumulative energy used over a period of time for one or more areas.
 - b. Power Reports: Show power usage trend over a period of time for one or more areas.
 - c. Space Utilization/Occupancy Reports: Show historical occupancy over a period of time for one or more areas using a graphical floor plan, generic system layout, and graphs and charts.
- 8. Administration:
 - a. Users: Allows new user accounts to be created and existing user accounts to be edited.
 - 1) Supports Active Directory (LDAP) tying user accounts to network accounts.
 - b. Area and feature access can be restricted based on login credentials.
 - c. Supports up to 20 concurrent users and 10,000 user accounts.
- 9. Devices/Settings Adjustment:
 - a. Users with appropriate permissions can navigate to the wireless hub setup screens in order to view and/or adjust specific settings for areas or devices

- (including load shed settings, daylighting settings, device associations and programming, occupancy settings, high-end/low-end trim settings, etc).
10. Control and Monitor for Multiple Systems:
 - a. Allows user to view aggregate data from multiple connected systems spanning multiple buildings through a single user account:
 - 1) Space utilization/occupancy.
 - 2) Energy usage/savings.
 - b. Allows user to view details and adjust settings for any connected system; supports system navigation through campuses and buildings using graphical floor plans.
 - B. Computers:
 1. Server:
 - a. Suitable for 24 hour per day, 7 day per week programming, monitoring, control, and data logging of digital-network lighting controls.
 - b. Suitable to handle client machine request in multi-computer systems.
 - c. Unless otherwise indicated, computer to be provided by others, meeting lighting control system manufacturer's minimum requirements.
 - d. Minimum Hardware Requirements:
 - 1) Processor: Quad Core Intel® Xeon®.
 - 2) 8 GB Ram.
 - 3) 250 GB hard drive (40 GB for application and database).
 - 4) Two 10/100/1000 Ethernet network interfaces - one for communication with lighting management hubs and one for communication with corporate intranet to allow access from system PCs and/or energy saving display terminals. Only one Ethernet network interface is required if all lighting management hubs and client PCs are on the same network.
 - 5) Monitor with 1280 x 1024 resolution.
 - 6) 4 USB 2.0 ports.
 - 7) Dedicated Graphics Card with 256 MB of memory (only required if running client software from the server).
 - e. Minimum Software Requirements:
 - 1) Licensed installation of US English 64-bit Microsoft® Windows® Server 2008 R2, Windows Server 2012 R1, or Windows Server 2012 R2.
 - 2) Microsoft® Internet Information Services (IIS) 7 or later.
 - 3) Microsoft® Internet Explorer 9 or later.
 - 4) Microsoft® .NET Framework 3.5.
 - 5) Microsoft® .NET Framework 4.5.
 2. Computers Provided by Lighting Control System Manufacturer: Computer software to be preinstalled and tested prior to shipping.

2.10 ACCESSORIES

- A. Emergency Lighting Interface:
 1. Provides total system listing to UL 924 when used with lighting control system.
 2. Senses all three phases of building power.
 3. If power on any phase fails provides output to send lights controlled to defined levels. Lights to return to their previous intensities when normal power is restored.
 4. Accepts contact closure input from fire alarm control panel.

2.11 SOURCE QUALITY CONTROL

- A. See Section 01 4000 - *Quality Requirements*, for additional requirements.
- B. Factory Testing:
 1. Perform full-function factory testing on all completed assemblies. Statistical sampling is not acceptable.
 2. Perform full-function factory testing on 100 percent of all ballasts and LED drivers.

3. Perform factory burn-in of 100 percent of all ballasts at 104 degrees F (40 degrees C).

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as shown on the drawings.
- B. Verify that ratings and configurations of system components are consistent with the indicated requirements.
- C. Verify that mounting surfaces are ready to receive system components.
- D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

- A. System and Network Integration Consultation: Include as part of base bid additional costs for Lighting Control Manufacturer to conduct meeting with facility representative and other related equipment manufacturers to discuss equipment and integration procedures.
 1. Coordinate scheduling of visit with Lighting Control Manufacturer. Manufacturer recommends that this visit be scheduled early in construction phase, after system purchase but prior to system installation.

3.03 INSTALLATION

- A. Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130
- B. Install products in accordance with manufacturer's instructions.
- C. Sensor Locations:
 1. Sensor locations indicated are diagrammatic. Within the design intent, reasonably minor adjustments to locations may be made in order to optimize coverage and avoid conflicts or problems affecting coverage, in accordance with manufacturer's recommendations.
- D. LED Light Engine/Array Lead Length: Do not exceed 100 feet (31 m).
- E. Identify system components in accordance with Section 26 0553.

3.04 FIELD QUALITY CONTROL

- A. See Section 01 4000 - *Quality Requirements*, for additional requirements.
- B. Manufacturer's Full-Scope Start-Up Service is required.
- C. Manufacturer's Programming Service:
 1. Product(s):
 - a. On-site programming, 8-hour block.
 - b. On-site programming, 4-hour block.
 - c. Remote programming, 4-hour block.
 2. Furnish unit prices for each available programming time interval.
- D. Manufacturer's Full-Scope Start-Up Service: Provide manufacturer's On-Site Full-Scope Start-Up Service
 1. Remote Full-Scope Start-Up Service: When available in accordance with manufacturer's guidelines, provide access to manufacturer's certified remote

startup technician to provide instruction and guidance for complete system functional test.

2. On-Site Full-Scope Start-Up Service: Manufacturer's authorized Service Representative to conduct site visit upon completion of lighting control system installation to perform system startup and verify proper operation:
 - a. Where Lighting Control Manufacturer Sensor Layout and Tuning service is specified in Part 2 under "LIGHTING CONTROLS - GENERAL REQUIREMENTS", authorized Service Representative to verify sensor locations, in accordance with layout provided by Lighting Control Manufacturer; Lighting Control Manufacturer may direct Contractor regarding sensor relocation should conditions require a deviation from locations indicated.
 - b. Verify connection of power wiring and load circuits.
 - c. Verify connection and location of controls.
 - d. Energize wireless hubs.
 - e. Associate occupancy/vacancy sensors, daylight sensors, wireless remotes, and wall stations to load control devices.
 - f. Provide initial rough calibration of sensors; fine-tuning of sensors is responsibility of Contractor unless provided by Lighting Control Manufacturer as part of Sensor Layout and Tuning service where specified in Part 2 under "LIGHTING CONTROLS - GENERAL REQUIREMENTS".
 - g. Program timeclock schedules per approved sequence of operations.
 - h. Configure load shed parameters per approved sequence of operations.
 - i. Verify system operation control by control.
 - j. Obtain sign-off on system functions.
 - k. Train Owner's representative on system capabilities, operation, and maintenance, as specified in Part 3 under "Closeout Activities".

- E. Correct defective work, adjust for proper operation, and retest until entire system complies with contract documents.

3.05 CLEANING

- A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.06 COMMISSIONING

- A. See Section 01 9113 for commissioning requirements.

3.07 CLOSEOUT ACTIVITIES

- A. See Section 01 7800 - *Closeout Submittals*, for closeout submittals.
- B. See Section 01 7900 - *Demonstration and Training*, for additional requirements.
- C. Demonstration:
 1. Demonstrate proper operation of lighting control devices to Engineer and correct deficiencies or make adjustments as directed.
 2. On-Site Performance-Verification Walkthrough: Include as part of the base bid additional costs for lighting control manufacturer to provide on-site demonstration of system functionality to facility representative.
- D. Training:
 1. Include services of manufacturer's certified service representative to perform on-site training of Owner's personnel on operation, adjustment, and maintenance of lighting control system as part of on-site system start-up services.

- 2. Customer-Site Solution Training Visit: Include as part of base bid additional costs for Lighting Control Manufacturer to provide one day of additional on-site system training.
- E. On-Site Warranty Audit Visit: Where Manufacturer On-Site Full-Scope Start-Up Service is not provided, include services of manufacturer to perform on-site verification that system meets manufacturer's requirements as necessary for validation of specified enhanced warranty.

3.08 MAINTENANCE

- A. See Section 01 7000 – *Execution and Closeout Requirements*, for additional requirements relating to maintenance service.

3.09 PROTECTION

- A. Protect installed products from subsequent construction operations.

END OF SECTION

SECTION 26 0926

PANELBOARDS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. The Contractor shall furnish and install the panelboards as specified and as shown on the contract drawings.

1.2 REFERENCES

- A. The panelboards and all components shall be designed, manufactured and tested in accordance with the latest applicable standards of NEMA and UL as follows:
 - 1. UL 67 - Panelboards
 - 2. UL 50 - Cabinets and boxes
 - 3. NEMA PB1
 - 4. Fed. Spec. W-P-115C
 - 5. Circuit breaker - Type I class I
 - 6. Fusible switch - Type II class I

1.3 SUBMITTAL - FOR REVIEW/APPROVAL

- A. The following information shall be submitted to the Engineer:
 - 1. Breaker layout drawing with dimensions indicated and nameplate designation.
 - 2. Component list
 - 3. Conduit entry/exit locations
 - 4. Assembly ratings including:
 - a. Short-circuit rating
 - b. Voltage
 - c. Continuous current
 - 5. Cable terminal sizes
 - 6. Product data sheets
- B. Where applicable, the following additional information shall be submitted to the Engineer:
 - 1. Key interlock scheme drawing and sequence of operations.

1.4 SUBMITTAL FOR CONSTRUCTION

- A. The following information shall be submitted for record purposes:
 - 1. Final as-built drawings and information for items listed in Paragraph 1.04, and shall incorporate all changes made during the manufacturing process
 - 2. Installation information
 - 3. Seismic certification and equipment anchorage details as specified

1.5 QUALIFICATIONS

- A. The manufacturer of the assembly shall be the manufacturer of the major components within the assembly.
- B. For the equipment specified herein, the manufacturer shall be ISO 9001 or 9002 certified.
- C. The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of five (5) years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

- D. Provide Seismic tested equipment as follows:
 - 1. The equipment and major components shall be suitable for and certified to meet all applicable seismic requirements of the International Building Code (IBC) for Zone 2A application. Guidelines for the installation consistent with these requirements shall be provided by the switchgear manufacturer and be based upon testing of representative equipment. The test response spectrum shall be based upon a 5% minimum damping factor, IBC: a peak of 2.45g's (3.2-11 Hz), and a ZPA of 0.98g's applied at the base of the equipment. The tests shall fully envelop this response spectrum for all equipment natural frequencies up to at least 35 Hz.

1.6 REGULATORY REQUIREMENTS

- A. The panelboards shall be UL labeled.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Equipment shall be handled and stored in accordance with manufacturer's instructions. One (1) copy of these instructions shall be included with the equipment at time of shipment.

1.8 OPERATION AND MAINTENANCE MANUALS

- A. Equipment operation and maintenance manuals shall be provided with each assembly shipped and shall include instruction leaflets, instruction bulletins and renewal parts lists where applicable, for the complete assembly and each major component.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Eaton / Cutler-Hammer products
- B. Square D.

2.2 RATINGS

- A. Panelboards rated 240 Vac or less shall have short-circuit ratings as shown on the drawings or as herein scheduled, but not less than 10,000 amperes RMS symmetrical.
- B. Panelboards shall be labeled with a UL short-circuit rating. When series ratings are applied with integral or remote upstream devices, a label or manual shall be provided. It shall state the conditions of the UL series ratings including:
 - 1. Size and type of upstream device
 - 2. Branch devices that can be used
 - 3. UL series short-circuit rating

2.3 CONSTRUCTION

- A. Interiors shall be completely factory assembled. They shall be designed such that switching and protective devices can be replaced without disturbing adjacent units and without removing the main bus connectors.
- B. Trims for branch circuit panelboards shall be supplied with a hinged door over all circuit breaker handles. Doors in panelboard trims shall not uncover any live parts. Doors shall have a semi flush cylinder lock and catch assembly. Door-in-door trim shall be provided. Both hinged trim and trim door shall utilize three point latching. No tools shall be required to install or remove trim. Trim shall be equipped with a door-actuated trim locking tab. Equip locking tab with provision for a screw such that removal of trim requires a tool, at the owners option. Installation shall be tamper resistant with no exposed hardware on the panelboard trim.

- C. Distribution panelboard trims shall cover all live parts. Switching device handles shall be accessible.
- D. Surface trims shall be same height and width as box. Flush trims shall overlap the box by 3/4 of an inch on all sides.
- E. A directory card with a clear plastic cover shall be supplied and mounted on the inside of each door.
- F. All locks shall be keyed alike.

2.4 BUS

- A. Main bus bars shall be copper sized in accordance with UL standards to limit temperature rise on any current carrying part to a maximum of 65 degrees C above an ambient of 40 degrees C maximum.
- B. A system ground bus shall be included in all panels.
- C. Full-size (100%-rated) insulated neutral bars shall be included for panelboards shown with neutral. Bus bar taps for panels with single-pole branches shall be arranged for sequence phasing of the branch circuit devices. Neutral busing shall have a suitable lug for each outgoing feeder requiring a neutral connection. 200%-rated neutrals shall be supplied for panels designated on drawings with oversized neutral conductors.

2.5 BRANCH CIRCUIT PANELBOARDS

- A. The minimum short-circuit rating for branch circuit panelboards shall be as specified herein or as indicated on the drawings. Panelboards shall be fully rated series rated. Panelboards shall be square D QO or approved equivalent.
- B. Bolt-on type, heavy-duty, quick-make, quick-break, single- and multi-pole circuit breakers of the types specified herein, shall be provided for each circuit with toggle handles that indicate when unit has tripped.
- C. Circuit breakers shall be thermal-magnetic type with common type handle for all multiple pole circuit breakers. Circuit breakers shall be minimum 100-ampere frame and through 100-ampere trip sizes shall take up the same pole spacing. Circuit breakers shall be UL listed as type SWD for lighting circuits.
 - 1. Circuit breaker handle locks shall be provided for all circuits that supply exit signs, emergency lights, energy management, and control system (EMCS) panels and fire alarm panels.
- D. Circuit breakers shall have a minimum interrupting rating of 10,000 amperes symmetrical at 240 volts, unless otherwise noted on the drawings.

2.6 DISTRIBUTION PANELBOARDS - CIRCUIT BREAKER TYPE

- A. Distribution panelboards with bolt-on devices contained therein shall have interrupting ratings as specified herein or indicated on the drawings. Panelboards shall be fully rated. Panelboards shall be square D I-Line. Panelboards shall have molded case circuit breakers as indicated below.
- B. Where indicated, provide circuit breakers UL listed for application at 100% of their continuous ampere rating in their intended enclosure.
- C. Provide shunt trips, bell alarms, and auxiliary switches as shown on the contract drawings.

2.7 SURGE PROTECTIVE DEVICE

- A. Provide transient voltage surge protection as specified in Section 16671. Panels indicated on drawings.

2.8 ENCLOSURE

- A. Enclosures shall be at least 20 inches wide made from galvanized steel. Provide minimum gutter space in accordance with the National Electrical Code. Where feeder cables supplying the mains of a panel are carried through its box to supply other electrical equipment, the box shall be sized to include the additional required wiring space. At least four interior mounting studs with adjustable nuts shall be provided.
- B. Enclosures shall be provided with blank ends.
- C. Where indicated on the drawings, branch circuit panelboards shall be column width type.

2.9 NAMEPLATES

- A. Provide an engraved nameplate for each panel section.

2.10 FINISH

- A. Surfaces of the trim assembly shall be properly cleaned, primed, and a finish coat of gray ANSI 61 paint applied.

PART 3 - EXECUTION

3.1 FACTORY TESTING

- A. The following standard factory tests shall be performed on the equipment provided under this section. All tests shall be in accordance with the latest version of NEMA and UL standards.

3.2 INSTALLATION

- A. The Contractors shall install all equipment per the manufacturer's recommendations and the contract drawings.

END OF SECTION

SECTION 26 4113

LIGHTNING PROTECTION SYSTEM

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Lightning Protection System.

1.2 RELATED SECTIONS

- A. DIVISION 07 - THERMAL AND MOISTURE PROTECTION.
- B. DIVISION 13 - SPECIAL CONSTRUCTION.
- C. DIVISION 23 - MECHANICAL.
- D. DIVISION 26 - ELECTRICAL.
- E. Section 26 0100 - GENERAL PROVISIONS, ELECTRICAL.
- F. Section 26 0500 - BASIC MATERIALS AND METHODS.

1.3 SUBMITTALS

- A. Submit under provisions of Division 1.
- B. Submit shop drawings for final approval.
- C. Clearly detail shapes, types, size and location of equipment, grounds, cable routes, general construction, and installation details.
- D. Submit manufacturer's installation instructions.
- E. Submit samples and pertinent catalog data for final approval.
- F. Submit intended method and listing for certification.

1.4 SYSTEM DESCRIPTION

- A. The work covered by this section of the specifications consists of furnishing all labor, materials and items of service required for the completion of a functional and unobtrusive lightning protection system, as approved by the Architect, and Engineer, and in strict accordance with this section of the specifications and the applicable contract drawings.
- B. If any departure from the contract drawings or submittal drawings covered below is deemed necessary, details of such departures and reasons therefore shall be submitted as soon as practicable to the architect and engineer for approval. No such departures shall be made without the prior written approval of the architect and engineer.
- C. The following specifications and standards of the latest issue form a part of this specification: (A) Lightning Protection Institute Installation Code LPI 175; (B) National Fire Protection Code NFPA 78 (1980 ed.). (C) Underwriters Laboratories UL 96A.

1.5 QUALITY ASSURANCE

- A. The lightning protection system shall conform to NFPA Standards for Lightning Protection

Systems. The LPI System Certification, including Forms LPI 175A, 175B, and 175C or UL Master Label Application and Completed Certificate including third party inspection shall be furnished and submitted.

- B. The system to be furnished under this specification shall be the standard product of a manufacturer regularly engaged in the production of lightning protection systems and shall be the manufacturer's latest approved design. The equipment manufacturer shall also be an UL listed and approved manufacturer or a fully certified manufacturer member in good standing of the Lightning Protection Institute.

PART 2- PRODUCTS

2.1 MANUFACTURERS

- A. The manufacturer specified is intended to indicate the standard of quality of materials in this section; other manufacturers will be acceptable. Submit for approval.

2.2 STANDARD

- A. All equipment used in this installation shall be UL listed for application in lightning protection, approved and properly labeled.
- B. All equipment shall be new, the product of a single manufacturer as outlined above, and of a design and construction to suit the application where it is used in accordance with accepted industry standards UL, LPI, and NFPA Code requirements.

2.3 EQUIPMENT

- A. All materials shall be copper or bronze and of the size, weight, and construction for use on steel framed buildings in accordance with LPI and NFPA Code requirements for Class II structures and as per manufacturer recommendations.
- B. All main conductors shall be copper, of 28 strands 14 gauge minimum.
- C. Air terminals shall be solid, round copper bar of 1/2 inch minimum diameter and shall project ten inch minimum above the object to be protected. Locate and space according to LPI and NFPA requirements.
- D. Air terminal bases shall be of cast bronze with bolt pressure cable connections and shall be securely mounted with stainless steel screws or bolts as required. Bases on built-up tar and gravel roofs shall be secured with a proper adhesive and shall have a minimum surface contact area of 18.5 square inches. Cat. No. 688. Crimp type connectors at bases are not acceptable.
- E. Ground rods shall be a minimum of 5/8 inch in diameter and 10'-0" long. They shall be connected to the system with a two-bolt cast bronze clamp having a minimum length of 1-1/2 inch and employing S.S. cap screws.
- F. Cable fasteners shall be substantial in construction, electrostatically compatible with the conductor and mounting surface and shall be spaced according to LPI and NFPA Code requirements.
- G. Bonding devices, cable splicers, and miscellaneous connectors shall be of cast bronze with bolt pressure connections to cable. Cast or stamped crimp fittings are not acceptable.
- H. Equipment on exhaust fan hoods, etc. shall be in accordance with LPI and NFPA requirements.
- I. All miscellaneous bolts, nuts and screws shall be brass, bronze or stainless steel. Connections to structural steel shall be made with bonding plates of cast bronze with bolt tension cable clamps.

PART 3- EXECUTION

3.1 INSTALLATION

- A. The installation shall be accomplished by an experienced installer who is a Certified Master Installer of the LPI or who has provided UL Master Label certified installation within the last 2 years. (Submit certificate copies).
- B. All equipment shall be installed in a neat workmanlike manner in the most inconspicuous manner possible.
- C. The electrically continuous steel frame of the building shall serve as the down conductors for the lightning protection system. The number, size, type, and location of grounds and connections to steel at roof and grade level shall be as required by NFPA and LPI or UL Codes. A complete cable system with related air terminals, splices, and bonds, etc., shall be used on the roof.
- D. Downlead cables to steel frame from the cable roof system shall not be brought directly through the roof. Thru-roof connectors with solid rods or conduit through pitch pockets shall be utilized for this purpose.
- E. Copper equipment shall not be connected to aluminum surfaces except by means of an UL approved bimetal transition fitting. Lead coating is not to be accepted as a bimetal transition.

3.2 COORDINATION

- A. The lightning protection installer will work with other trades to insure a correct, neat, and unobtrusive installation.

3.3 COMPLETION

- A. Where third party inspection is required to obtain certification, the Contractor shall arrange for the inspection by a factory representative who is not employed by his firm. Notify the Owner five working days prior to inspection.
- B. The lightning protection installer shall secure and deliver the agreed upon System Certification to the owner's representative upon completion of the installation. The Contractor shall also submit copies of as-built shop drawings. Furnish LPI Forms 175A, B, and C along with the LPI Certified System Application or Master Label Certification and Certificate of Acceptance by UL for Master Label System.

END OF SECTION

SECTION 26 4123

SURGE PROTECTION DEVICE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. SPDs for electrical power service at the Main Switchboard and Branch Circuit Panels.

1.2 SUBMITTALS

- A. Submit under provisions of Division 26.
- B. Submit shop drawings of catalog data with complete description of materials and performance data.
- C. Submit a single impulse surge current test report issued by a nationally recognized testing facility & an ANSI/IEEE Category C3 (20KV, 10KA) life cycle test report. The test reports should demonstrate that each SPD unit can withstand, in its installed configuration, the specified values (up to 200K transient amps per mode) without failure of any internal component (MOVs, wiring, printed circuit board, fusing and disconnect).
- D. Substitutions are permitted as long as they meet the specification requirements.

1.3 COMPLIANCE REQUIREMENTS

- A. UL 1449, 3rd Edition listing as a Type 1 SPD with a 20KA nominal discharge current.
- B. UL 1283 listing for EMI/RFI filters

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Raceway and Fittings: Rigid steel conduit as specified in other sections.
- B. Wire & Cable: Single conductor Type THHN, stranded copper, as specified in other sections.
- C. SPD for Main Switchboard (>1200 amps): SPD shall protect in all seven modes for a wye configuration (L-N, L-G, all phases & N-G). Tested surge current capacity of 200,000 amps per protection mode (L-N & L-G). SPD shall be a Current Technology Model SL3-200. If a 100-amp breaker is not specified in the panel for connection to the bus, use the integral disconnect in the SPD.
- D. SPD for Main Switchboard (400A – 1200A): SPD shall protect in all seven modes for a wye configuration (L-N, L-G, all phases & N-G). Tested surge current capacity of 150,000 amps per protection mode (L-N & L-G). SPD shall be a Current Technology Model SL3-125. Use a 100-amp breaker in the panel for connection to the bus.
- E. SPD for Main Switchboard (<400A): SPD shall protect in all seven modes for a wye configuration (L-N, L-G, all phases & N-G). Tested surge current capacity of 100,000 amps per protection mode (L-N & L-G). SPD shall be a Current Technology Model SL3-80. Use a 100-amp breaker in the panel for connection to the bus.
- F. SPD for Branch Circuit Panels: SPD shall protect in all seven modes for a wye configuration (L-N, L-G, all phases & N-G). Tested surge current rating of 50,000 amps per protection mode (L-N & L-G). SPD shall be a Current Technology Model PX3-50. Use a 60 amp breaker in the panel for connection to the bus.

- G. Each SPD unit shall be capable of surviving at least the following Category C3 (20KV, 10KA) impulses without failing or degrading the UL 1449 surge suppression rating more than 10%:

Main Switchboard (>1200A)	15,000 impulses
Main Switchboard (400A - 1200A)	14,000 impulses
Main Switchboard (<400A)	12,000 impulses
Branch Circuit Panels	5,000 impulses
Emergency Panels	3,500 impulses
Branch Circuit Panels	3,250 impulses

- H. Main Switchboard SPD shall be capable of protecting the loads from the damaging effects of temporary over-voltages and voltage swells as defined by ANSI/IEEE Standard 1100-2005 (the Emerald Book) at 160% rated nominal voltage and a 1,000 amps for 30 cycles.
- I. Declared Maximum Continuous Operating Voltage (MCOV) shall be greater than 115 percent of the nominal system operating voltage and in compliance with test and evaluation procedures outlined in the nominal discharge surge current test of UL1449 3rd Edition, section 37.7.3. MCOV values claimed based on the component's value or on the 30-minute 115% operational voltage test, section 38 in UL1449 will not be accepted.
- J. Diagnostic Monitoring System: Each SPD shall include an audible alarm system, Form C Contacts, and phase indicator smart lights which change color based upon percentage of protection remaining.
- K. If the funds are not available to fund the project as specified, the only SPD product allowed as a VE item for the Current Technology Model SL3 product specified is the Current Technology Model TG3 product with the same tested single impulse surge current values at each panel location as the Current Technology Model SL3 product specified.

2.2 WARRANTY

- A. The SPD system shall have a TWENTY YEAR limited product warranty from date of shipment against transient failure, when installed in compliance with applicable national/local electrical codes and manufacturer's installation manual.

PART 3 EXECUTION.

3.1 INSTALLATION

- A. Install in strict accordance with the manufacturer's printed instructions.
- B. Have a factory-authorized representative inspect installation and verify that the SPD system is working to factory specifications before building final inspection.
- C. The contractor shall fire seal all raceway openings between each SPD and the electrical gear it is protecting to prevent any air born particles from migrating to the electrical gear.
- D. Do not perform insulation resistance tests of the distribution wiring equipment with the TVSS installed. Disconnect before conducting insulation resistance tests, and reconnect immediately after the testing is over.

END OF SECTION

SECTION 26 5000

LED LIGHTING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Section includes the following types of LED luminaires:

1. Cylinder.
2. Downlight
3. Highbay, linear.
4. Highbay, nonlinear.
5. Linear industrial.
6. Lowbay.
7. Parking garage.
8. Recessed, linear.
9. Strip light.
10. Surface mount, linear.
11. Surface mount, nonlinear.
12. Suspended, linear.
13. Suspended, nonlinear.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Section 260923 "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.
- C. Section 260926 "Lighting Control Panelboards" for panelboards used for lighting control.
- D. Section 260933 "Central Dimming Controls" or Section 260936 "Modular Dimming Controls" for architectural dimming systems and for fluorescent dimming controls with dimming ballasts specified in interior lighting Sections.
- E. Section 260943.16 "Addressable-Luminaire Lighting Controls" and Section 260943.23 "Relay-Based Lighting Controls" for manual or programmable control systems with low-voltage control wiring or data communication circuits.

1.3 DEFINITIONS

- A. CCT: Correlated color temperature.
- B. CRI: Color Rendering Index.
- C. Fixture: See "Luminaire."
- D. IP: International Protection or Ingress Protection Rating.
- E. LED: Light-emitting diode.
- F. Lumen: Measured output of lamp and luminaire, or both.
- G. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Arrange in order of luminaire designation.
 - 2. Include data on features, accessories, and finishes.
 - 3. Include physical description and dimensions of luminaires.
 - 4. Include emergency lighting units, including batteries and chargers.
 - 5. Include life, output (lumens, CCT, and CRI), and energy-efficiency data.
 - 6. Photometric data and adjustment factors based on laboratory tests
 - 7. Retain or "Manufacturers' Certified Data" or "Testing Agency Certified Data" Subparagraph below. Retain first subparagraph if photometric data, based on testing by accredited manufacturers' laboratories, is considered adequate for luminaires in this Project. Retain second subparagraph if photometric data for one or more luminaires are based on independent laboratory tests; coordinate with the Interior Lighting Fixture Schedule on Drawings to indicate which units shall meet this requirement. See the Evaluations.
 - (a) Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.
 - (b) Testing Agency Certified Data: For indicated luminaires, photometric data certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.
- B. Shop Drawings: For nonstandard or custom luminaires.
 - 1. Include plans, elevations, sections, and mounting and attachment details.
 - 2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include diagrams for power, signal, and control wiring.
- C. Samples: For each luminaire and for each color and texture with standard factory-applied finish.
- D. Samples for Initial Selection: For each type of luminaire with custom factory-applied finishes.
 - 1. Include Samples of luminaires and accessories involving color and finish selection.
- E. Samples for Verification: For each type of luminaire.
 - 1. Include Samples of luminaires and accessories to verify finish selection.
- F. Product Schedule: For luminaires and lamps.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Luminaires.
 - 2. Suspended ceiling components.
 - 3. Partitions and millwork that penetrate the ceiling or extend to within **12 inches (300 mm)** of the plane of the luminaires.
 - 4. Structural members to which luminaires will be attached.
 - 5. Initial access modules for acoustical tile, including size and locations.
 - 6. Items penetrating finished ceiling, including the following:
 - a. Other luminaires.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Sprinklers.
 - e. Access panels.
 - f. Ceiling-mounted projectors.
- B. Qualification Data: For testing laboratory providing photometric data for luminaires.

- C. Seismic Qualification Data: For luminaires, accessories, and components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
 - D. Product Certificates: For each type of luminaire.
 - E. Product Test Reports: For each type of luminaire, for tests performed by **[manufacturer and witnessed by a qualified testing agency] [a qualified testing agency]**.
 - F. Sample warranty.
- 1.6 CLOSEOUT SUBMITTALS
- A. Operation and Maintenance Data: For luminaires and lighting systems to include in operation and maintenance manuals.
 - 1. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.
- 1.7 QUALITY ASSURANCE
- A. Luminaire Photometric Data Testing Laboratory Qualifications: Luminaire manufacturer's laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.
 - B. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7, accredited under the NVLAP for Energy Efficient Lighting Products, and complying with the applicable IES testing standards
 - C. Provide luminaires from a single manufacturer for each luminaire type.
 - D. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.
 - E. Mockups: For interior luminaires in room or module mockups, complete with power and control connections.
 - 1. Obtain Architect's approval of luminaires in mockups before starting installations.
 - 2. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- 1.8 DELIVERY, STORAGE, AND HANDLING
- A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.
- 1.9 WARRANTY
- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
 - B. Warranty Period: 5 years from date of Substantial Completion.

PART 2– PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Luminaires shall withstand the effects of earthquake motions determined according to ASCE/SEI 7
- B. Seismic Performance: Luminaires and lamps shall be labeled vibration and shock resistant.
 - 1. The term "withstand" means "the luminaire will remain in place without separation of any parts when subjected to the seismic forces specified and the luminaire will be fully operational during and after the seismic event."
- C. Ambient Temperature: 41 to 104 deg F
 - 1. Relative Humidity: 40 to 95 percent.
- D. Altitude: Sea level to 683 feet.

2.2 LUMINAIRE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.
 - 1. Label shall include the following lamp characteristics:
 - a. "USE ONLY" and include specific lamp type.
 - b. Lamp diameter, shape, size, wattage, and coating.
 - c. CCT and CRI.
- C. Recessed luminaires shall comply with NEMA LE 4.
- D. NRTL Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by an NRTL.
- E. FM Global Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM Global.
- F. Nominal Operating Voltage: **120 V ac**

2.3 MATERIALS

- A. Metal Parts:
 - 1. Free of burrs and sharp corners and edges.
 - 2. Sheet metal components shall be steel unless otherwise indicated.
 - 3. Form and support to prevent warping and sagging.
- B. Steel:
 - 1. ASTM A 36/A 36M for carbon structural steel.
 - 2. ASTM A 568/A 568M for sheet steel.
- C. Stainless Steel:
 - 1. Manufacturer's standard grade.
 - 2. Manufacturer's standard type, ASTM A 240/240 M.
- D. Galvanized Steel: ASTM A 653/A 653M.

- E. Aluminum: ASTM B 209.

2.4 METAL FINISHES

- A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

2.5 LUMINAIRE SUPPORT

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.
- B. Single-Stem Hangers: 1/2-inch (13-mm) steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.
- C. Wires: ASTM A 641/A 641 M, Class 3, soft temper, zinc-coated steel, 12 gage (2.68 mm).
- D. Rod Hangers: 3/16-inch (5-mm) minimum diameter, cadmium-plated, threaded steel rod.
- E. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

PART 3– EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before luminaire installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 TEMPORARY LIGHTING

- A. If approved by the Architect, use selected permanent luminaires for temporary lighting. When construction is sufficiently complete, clean luminaires used for temporary lighting and install new lamps.

3.3 INSTALLATION

- A. Comply with NECA 1.
- B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
- C. Install lamps in each luminaire.
- D. Supports:
 1. Sized and rated for luminaire weight.
 2. Able to maintain luminaire position after cleaning and relamping.
 3. Provide support for luminaire without causing deflection of ceiling or wall.
 4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.
- E. Flush-Mounted Luminaires:

1. Secured to outlet box.
 2. Attached to ceiling structural members at four points equally spaced around circumference of luminaire.
 3. Trim ring flush with finished surface.
- F. Wall-Mounted Luminaires:
1. **[Attached to structural members in walls] [Attached to a minimum 20 gauge backing plate attached to wall structural members] [Attached using through bolts and backing plates on either side of wall] <Insert means of attachment>.**
 2. Do not attach luminaires directly to gypsum board.
- G. Suspended Luminaires:
1. Ceiling Mount:
 - (a) 5/32-inch diameter aircraft cable supports **adjustable to 10 feet in length**
 - (b) **Pendant mount** with **5/32-inch-** diameter aircraft cable supports.
 - (c) Hook mount.
 2. Pendants and Rods: Where longer than 48 inches (1200 mm), brace to limit swinging.
 3. Stem-Mounted, Single-Unit Luminaires: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of luminaire oscillations. Support outlet box vertically to building structure using approved devices.
 4. Continuous Rows of Luminaires: Use tubing or stem for wiring at one point and **[wire support]** for suspension for each unit length of luminaire chassis, including one at each end.
 5. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.
- H. Ceiling-Grid-Mounted Luminaires:
1. Secure to any required outlet box
 2. Secure luminaire to the luminaire opening using approved fasteners in a minimum of four locations, spaced near corners of luminaire
 3. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.
- I. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.
- 3.4 IDENTIFICATION
- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification.
- 3.5 FIELD QUALITY CONTROL
- A. Perform the following tests and inspections:
1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
 2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.
- B. Luminaire will be considered defective if it does not pass operation tests and inspections.
- C. Prepare test and inspection reports.

END OF SECTION

SECTION 27 1000

TELECOMMUNICATIONS CABLING SYSTEM

PART 1 GENERAL

1.1 DESCRIPTION

The intent of this document is to provide a standard specification that will be used for all Customer facilities requiring cabling installation. This document provides the minimum performance criteria for the components and sub-systems comprising a complete cabling system that shall accommodate the Owner's requirements in excess of ten years.

Product specifications, general design considerations, and installation guidelines are provided in this written document. Quantities of telecommunications outlets, typical installation details, cable routing and outlet types for a specific Customer facility will be provided as an attachment to this document. If the bid documents are in conflict, the written specification shall take precedence. The successful vendor shall meet or exceed all requirements for the cabling system described in this document.

The Customer's Cable Infrastructure Project requires an AMP NETCONNECT Systems structured cabling system, or equivalent single-manufacturer solution. The 10 GbE portion of the cabling system shall comply with the channel performance requirements of Draft 3 of ANSI/TIA/EIA 568-B.2-10 "Transmission Performance Specifications for 4-pair 100 Ω Augmented Category 6 Cabling" and IEEE 802.3an requirements for 10G-BASE-T. The cabling system shall be backed by a Tyco Electronics, or equivalent, 25-Year System Warranty. The system warranty shall be facilitated by the Contractor and be established between the Customer and the cabling system Manufacturer.

The successful Contractor is required to furnish all labor, supervision, tooling, miscellaneous mounting hardware and consumables for each cabling system installed. The Contractor shall maintain current status with the warranting manufacturer, including all training requirements, for the duration of the Cable Infrastructure Project. The Contractor shall staff each installation crew with the appropriate number of trained personnel, in accordance with their manufacturer/warranty contract agreement, to support the 25-Year System Warranty requirements. After installation, the Contractor shall submit all documentation to support the warranty in accordance with the manufacturer's warranty requirements, including test results, and to apply for said warranty on behalf of the customer. The system warranty will cover the components and labor associated with the repair/replacement of any failed link as a result of a defective product when a valid warranty claim is submitted within the warranty period.

1.2 SCOPE

This document defines the cabling system and subsystem components to include cable, termination hardware, supporting hardware, and miscellany that Contractor will furnish to install a complete telecommunications system supporting voice, access control, cctv, catv, and data. The intent of this document is to provide all pertinent information to allow the vendor to bid the labor, supervision, tooling, and miscellaneous mounting hardware and consumables to install a complete system. However, it is the responsibility of the vendor to propose any and all items required for a complete system if not identified in the BOM attached to this specification.

1.3 APPLICABLE DOCUMENTS

The cabling system described in this specification is derived in part from the recommendations made in industry standard documents. The documents below are incorporated by reference.

- 1) This Technical Specification and Associated Drawings
- 2) ANSI/TIA/EIA-568-B, *Commercial Building Telecommunications Cabling Standard*

- 3) ANSI/TIA/EIA 568-B.2-10, *Transmission Performance Specification for 4-Pair 100 Ω Augmented Category 6 Cabling*
- 4) TIA/TSB-140, *Additional Guidelines For Field-Testing Length, Loss And Polarity Of Optical Fiber Cabling Systems*
- 5) ANSI/TIA/EIA-569-A, *Commercial Building Standard for Telecommunications Pathways and Spaces*
- 6) ANSI/TIA/EIA-606-A, *Administration Standard for the Telecommunications Infrastructure of Commercial Buildings*
- 7) ANSI/J-STD-607-A, *Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications*
- 8) Building Industries Consulting Services International (BICSI) *Telecommunications Distribution Methods Manual (TDMM)* – 10th edition
- 9) National Fire Protection Agency (NFPA) – NFPA 70, *National Electrical Code (NEC)* - 2004
- 10) AMP NETCONNECT Design and Installation Contractor Agreement (current)

If a conflict exists between applicable documents, then the order in the list above shall dictate the order of precedence in resolving conflicts. This order of precedence shall be maintained unless a lesser order document has been adopted as code by a local, state or federal entity, and is therefore enforceable as law by a local, state or federal inspection agency.

If this document and any of the documents listed above are in conflict, then the more stringent requirement shall apply. All documents listed are believed to be the most current releases of the documents; the vendor is responsible to determine and adhere to the most recent release when developing the proposal for installation.

1.4 QUALITY ASSURANCE

Acceptable Contractor Qualifications:

Be in business a minimum of five (5) years.

Possess those licenses/permits required to perform telecommunications installations in the specified jurisdiction.

Personnel knowledgeable in local, state, province and national codes and regulations. All work shall comply with the latest revision of the codes or regulations. When conflict exists between local or national codes or regulations, the most stringent codes or regulations shall be followed.

A copy of current liability insurance certificates must be included in bid.

A RCDD must on full time staff.

PART 2 PRODUCTS

2.1 TELECOMMUNICATIONS SYSTEM REQUIREMENTS

Facilities Description

Contractor shall deploy multiple data circuits to each user outlet. The data circuit is provided via one AMP NETCONNECT XG STP cable to correspond to the numeric value at each outlet. Horizontal data cables shall be terminated on rack-mounted Shielded patch panels. Horizontal data circuits shall be connected to LAN electronics within each Telecommunications Room (TR). See BOM for cable colors.

Contractor shall deploy Cable Television (CATV). At each CATV location two AMP NETCONNECT XG STP cable to shall be installed. See BOM for cable colors.

Customer shall deploy Access Control. At each Access Control location two AMP NETCONNECT XG STP cable to shall be installed. Access Control cables shall be terminated on their own rack-mounted Shielded patch panels. Horizontal Access Control circuits shall be connected to LAN electronics within each Telecommunications Room (TR). See BOM for cable colors.

Where applicable an AMP NETCONNECT XG IEEE 802.3ae compliant 24 Strand optical fiber cable containing 850nm laser optimized 50/125µm multimode fiber optic backbone and a 12 Strand single mode fiber optic backbone cable shall be employed between the data Main Cross-Connect (MC) and each TR for data connectivity. Within the data MC and the each TR, backbone fiber strands shall be terminated and housed in rack-mount fiber optic enclosures.

2.2 HORIZONTAL DISTRIBUTION SUBSYSTEM

Telecommunications Outlets

Each outlet location, unless otherwise noted, shall be provided with AMP NETCONNECT XG STP cable. Each XG STP cable shall be terminated on an 8-position, 8-conductor XG Shielded modular jack to the T568B wiring code. The Outlets faceplates, unless otherwise noted, shall be mounted to single gang boxes, box eliminators, surface mount boxes and/or floor monuments (provided by a 3rd party) as required.

Product Specifications

Modular Jacks for Data Circuits

Modular jacks shall be unkeyed, shielded, 4-pair, RJ-45, and shall fit in a .790" X .582" opening. Modular jacks shall terminate using 110-style pc board connectors, color-coded for both T568A and T568B wiring. Each modular jack shall be wired to T568A. The 110-style insulation displacement connectors shall be capable of terminating 22-24 AWG solid or 24 AWG stranded conductors. The insulation displacement contacts shall be paired with additional space between pairs to improve crosstalk performance. Modular jacks shall utilize a secondary PC board separate from the signal path for crosstalk compensation. Each modular jack shall meet the TIA/EIA-568-B.2-10 performance standards. Modular jacks shall be compatible with the AMP NETCONNECT SL Series Modular Jack Termination Tool part number 1725150-1. Each jack shall incorporate an integral, hinged dust cover. Modular jacks shall be UL Listed under file number E81956. Modular jacks shall be comparable to AMP NETCONNECT part number 1375188-1.

Wall Faceplates

Work area wall outlets shall be constructed utilizing 110Connect single gang 4-Port Angled faceplates. Data/voice outlets shall be loaded with modular jacks as described in 3.1. The 110Connect faceplates shall contain one laser generated label designating drop location and multiple color icons designating drop id. The 110Connect faceplates shall be AMP NETCONNECT part number 406185-X (X denotes color).

Telecommunications Outlet Installation

All outlets shall be installed in the following manner: Cables shall be coiled in the in-wall or surface-mount boxes if adequate space is present to house the cable coil without exceeding the manufacturer's bend radius

In hollow wall installations where box-eliminators are used, excess wire can be stored in the wall

No more than 12" of slack shall be stored in an in-wall box, modular furniture raceway, or insulated walls

Excess slack may be neatly coiled and stored in the ceiling above each drop location when there is not enough space present in the outlet box to store slack cable

In addition, each cable type shall be terminated as indicated below.

- Cables shall be dressed and terminated in accordance with the recommendations made in the ANSI/TIA/EIA-568-B document, manufacturer's recommendations and/or best industry practices
- Pair untwist at the termination shall not exceed 0.25 inch for connecting hardware
- Bend radius of the cable in the termination area shall not be less than 4 times the outside diameter of the cable
- The cable jacket shall be maintained as close as possible to the termination point
- Voice jacks, unless otherwise noted in drawings, shall be located in the bottom position(s) of each faceplate
- Voice jacks in horizontally oriented faceplates shall occupy the right-most position(s).
- Modem jacks shall be considered the last voice jack in the sequence
- Data jacks shall occupy the top position(s) on the faceplate
- Data jacks in horizontally oriented faceplates shall occupy the left-most position(s)

2.3 HORIZONTAL DISTRIBUTION CABLE

Product Specifications

Horizontal Cabling for All Circuits

Horizontal cabling shall be 23 AWG, 4-pair STP, NEC/NFPA CMP rated and be independently verified for compliance to TIA/EIA-568B.2-10. Cable shall exceed all TIA/EIA and ISO Category 6/Class E requirements until such time that the component specification defined in TIA/EIA-568B.2-10, Augmented Category 6 has stabilized.

The horizontal channel performance for the cabling shall be independently verified for compliance to TIA/EIA-568B.2-10 Augmented Category 6 performance standards and meet the requirements listed in Table 8-A and 8-B.

Frequency	Insertion Loss		NEXT		PSNEXT		Return Loss	
	Cat 6A	ETL	Cat 6A	ETL	Cat 6A	ETL	Cat 6A	ETL
1	2.2	1.9	65.0	86.7	62.0	85.2	19.0	26.3
4	4.1	3.8	63.0	77.3	60.5	74.2	19.0	26.6
8	5.7	5.2	58.2	74.5	55.6	64.1	19.0	35.7
10	6.4	5.8	56.6	68.9	54.0	67.8	19.0	29.6
16	8.1	7.3	53.2	64.2	50.6	63.0	18.0	25.1
20	9.1	8.1	51.6	64.3	49.0	60.4	17.5	32.2
25	10.2	9.1	50.0	61.6	47.3	58.8	17.0	28.7
31.25	11.4	10.2	48.4	60.5	45.7	58.6	16.5	27.3
62.5	16.3	14.5	43.4	57.2	40.6	58.7	14.0	27.3
100	20.8	18.4	39.9	53.5	37.1	51.3	12.0	27.3
200	30.0	26.6	36.9	44.8	31.9	49.4	9.0	22.6
250	33.8	30.4	35.3	44.6	30.2	42.2	8.0	17.9
300	37.3	33.6	34.0	44.3	28.8	40.7	7.2	14.2
400	42.6	39.9	29.9	38.0	25.8	35.0	6.0	18.2
500	49.3	46.4	26.7	32.1	23.2	29.5	6.0	11.4

Table 8-A
Horizontal Data Cabling Channel Performance

Frequency	FEXT		ELFEXT		PSELFEXT		PSANEXT	
	Cat 6A	ETL	Cat 6A	ETL	Cat 6A	ETL	Cat 6A	ETL
1	63.3	78.6	63.3	76.7	60.3	75.3	67.0	89.9
4	51.2	69.3	51.2	65.6	48.2	64.5	67.0	93.5
8	45.2	65.5	45.2	60.3	42.2	59.7	67.0	93.8
10	43.3	64.5	43.3	58.7	40.3	58.4	67.0	90.3
16	39.2	62.6	39.2	55.2	36.2	54.9	67.0	84.0
20	37.2	61.5	37.2	53.4	34.2	53.1	67.0	83.9
25	35.3	60.4	35.3	51.4	32.3	50.4	66.0	84.6
31.25	33.4	60.3	33.4	50.1	30.4	48.4	65.1	85.2
62.5	27.3	62.9	27.3	48.4	24.3	45.8	62.0	86.4
100	23.3	64.1	23.3	46.4	20.3	43.8	60.0	85.3
200	17.2	58.3	17.2	31.8	14.2	30.8	55.5	83.2
250	15.3	60.3	15.3	30.2	12.3	29.4	54.0	81.8
300	13.7	63.8	13.4	30.5	10.7	29.5	52.8	81.3
400	11.2	69.0	11.2	29.8	8.2	27.7	51.0	79.6
500	9.3	68.1	9.3	24.0	6.3	21.6	49.5	78.5

Table 8-B
Horizontal Data Cabling Performance

Cable jacketing shall be as follows Data/ blue, WAP/green, CATV/Violet, Access Control/neon green and CCTV/white; and shall be lead-free. Cable shall be supplied in a reel-in-box or on wooden reels. Independent verification for flammability compliance shall be to NEC article 800 and NFPA 70; [CMP (NFPA 262, UL 910. Horizontal cable shall be AMP NETCONNECT part number 4-1499416-X.

Horizontal Distribution Cable Installation

- Cable shall be installed in accordance with manufacturer's recommendations and best industry practices
- Cable raceways shall not be filled greater than the NEC maximum fill for the particular raceway type
- As an aid, AMP NETCONNECT will provide the recommended data due to cable sizes becoming extremely large
- Cables shall be installed in continuous lengths from origin to destination (no splices) unless specifically addressed in this document
- Where cable splices are allowed, they shall be in accessible locations and housed in an enclosure intended and suitable for the purpose
- The cable's minimum bend radius of 4 times the cable diameter and maximum pulling tension of 25 lbs shall not be exceeded
- Cable shall be installed in cable tray for the main feed and from there in 1 ¼" conduits to their destinations with a 5square box with single gang reducer plate for termination location.
- Horizontal distribution cables shall be bundled in groups of not greater than 40 cables (cable bundle quantities in excess of 40 cables may cause deformation of the bottom cables within the bundle)
- Cable shall be installed above fire-sprinkler and systems and shall not be attached to the system or any ancillary equipment or hardware
- The cabling system and support hardware shall be installed so that it does not obscure any valves, fire alarm conduit, boxes, or other control devices
- Cables shall not be attached to ceiling grid or lighting support wires
- Where light support for drop cable legs is required, the Contractor shall install clips to support the cabling
- Any cable damaged or exceeding recommended installation parameters during installation shall be replaced by the Contractor prior to final acceptance at no cost to the Owner
- Cables shall be identified by a self-adhesive label in accordance with the System Documentation Section of this specification
- The cable label shall be applied to the cable behind the faceplate on a section of cable that can be accessed by removing the cover plate
- Unshielded twisted pair cable shall be installed so that there are no bends less than four times the cables outside diameter (4 X cable O.D.) at any point in the run
- Pulling tension on 4-pair UTP cables shall not exceed 25-pounds for a single cable or cable bundle

2.4 HORIZONTAL CROSS-CONNECT TERMINATION HARDWARE

Horizontal Cross-Connect for Data Circuits

Horizontal cross-connect shall consist of Shielded patch panels, which shall be 2U or 3U high and provide 24 or 48 modular jack ports, wired to either T568A or T568B. Patch panels shall be configured with individually replaceable jacks. Modular jacks shall be compatible with AMP NETCONNECT SL Series Modular Jack Termination Tool part number 1725150-1. Each modular jack shall be bagged separately from the patch panel and terminated with the SL Series Modular Jack Termination Tool. Each port shall be capable of accepting an icon to indicate its function. Patch panels shall terminate the building cabling on 110-style insulation displacement connectors. Cross-connects shall meet the performance characteristics listed in Table 12.

Frequency MHz	Insertion Loss dB		Return Loss dB		NEXT dB		FEXT dB	
	Standard	Max.	Standard	Min.	Standard	Min.	Standard	Min.
1	0.10	0.02	30	52.4	75.0	84.8	75.0	83.7
4	0.10	0.02	30	53.7	75.0	80.3	71.1	74.8
8	0.10	0.02	30	55.3	75.0	77.4	65.0	69.4
10	0.10	0.03	30	56.1	74.0	76.4	63.1	67.5
16	0.10	0.03	30	57.6	69.9	72.0	59.0	62.9
20	0.10	0.04	30	59.3	68.0	71.9	57.1	61.7
25	0.10	0.04	30	59.4	66.0	69.1	55.1	59.8
31.25	0.11	0.05	30	56.8	64.1	67.7	53.2	58.2
62.5	0.16	0.06	28	42.3	58.1	61.5	47.2	52.6
100	0.20	0.06	24	33.2	54.0	57.7	43.1	48.7
200	0.28	0.06	18	21.2	48.0	52.5	37.1	42.2
250	0.32	0.10	16	17.4	46.0	47.9	35.1	40.1

Table 12
Horizontal Data Cross-Connect Performance Characteristics
(exceed TIA/EIA-568-B.2-10 Augmented Category 6 and ISO/IEC 11801 Class E)

The horizontal data cross-connect shall be contained in 19" x 7' rack(s). All equipment racks shall be augmented with horizontal and vertical cable management hardware, both front and rear, to properly dress horizontal cables and patch cords. Each patch panel shall be separated vertically on the rack by a 2U for 2U patch panels or two 2U for 3U patch panels horizontal finger duct cable management panel. Patch panels must be UL Listed under file number E81956. Patch panels shall be AMP NETCONNECT part number(s) 336526-1, (24-port standard), 557431-2, (48-port 3U)], cable management panels shall be AMP NETCONNECT part number(s) [1375160-1 or 1375158-1, 1375257-1 or 1375259-1].

Description	Port Count	Rack Mount Units	Part Numbers
Standard XG Shielded Multimedia Patch Panel	24	1U	336526-1
110Connect Modular Jack Patch Panel	48	3U	557431-2
Horizontal Finger Duct Cable Management Panel, double Sided	-	1U 2U	1375160-1 1375158-1
Vertical Finger Duct Cable Management Panels, double Sided, Side Mount	-	-	1375257-1
Vertical Finger Duct Cable Management Panels, double Sided, Center Mount	-	-	1375259-1

Table 13
Horizontal Data Patch Panel Part Numbers

Modular Jack Termination Tooling

Termination of individual modular jacks ports for each patch panel shall be completed using a hand tool which employs a fully repeatable, self centering, non-impact mechanical termination process. This process shall simultaneously cut and terminate all 8 conductors to the modular jack. The pair untwist will be maintained at .25". This hand tool shall be AMP NETCONNECT part number 1725150-1.

Description	Part Numbers
SL Series Modular Jack Termination Tool	1725150-1

Table 14
SL Series Modular Jack Termination Tool Part Numbers

Horizontal Cross-Connect Installation

Copper termination and management hardware shall be installed in the following manner.

- Cables shall be dressed and terminated in accordance with the recommendations made in the TIA/EIA-568-B document, manufacturer's recommendations and/or best industry practices
- Pair untwist at the termination shall not exceed 0.25 inch for connecting hardware
- Bend radius of the cable in the termination area shall not exceed 4 times the outside diameter of the cable
- Cables shall be neatly bundled and dressed to their respective panels or blocks
- Each panel or block shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack or frame
- The cable jacket shall be maintained as close as possible to the termination point
- Each cable shall be clearly labeled on the cable jacket behind the patch panel at a location that can be viewed without removing the bundle support ties
- Cable labels shall not be obscured from view

2.5 BACKBONE DISTRIBUTION SUBSYSTEM

Main Cross-Connect and Telecommunications Rooms

The MC and each TR, unless otherwise noted, shall house both voice and data backbone cabling and active equipment to support networking requirements. The MC shall be the main point of entry for outside services as well as main distribution point for all backbone cabling. Each TR will receive both voice and data cabling from the MC. The data backbone shall consist of AMP NETCONNECT IEEE802.3ae compliant XG 850nm laser optimized 50/125µm multimode cable and connectivity housed in rack-mount fiber optic enclosures.

Product Specifications

Backbone Cross-Connect for Data Circuits – SC

Each fiber optic cable shall be terminated with SC connectors in the Data MC and each TR in [1U, 2U, 3U or 4U] rack-mount enclosures providing protection for the terminated fibers. Each SC connector shall accept one 900 µm buffered 850nm laser-optimized 50/125µm ("XG") multimode fiber. Each SC connector shall be field-installable, requiring no epoxy, no polishing, and no bench tool. Each SC connector shall meet the intermateability requirements of TIA/EIA-604-3. SC connector performance requirements are listed in Table-19. LightCrimp Plus SC Simplex XG (850 nm Laser Optimized 50 µm) Multimode connectors shall be AMP NETCONNECT part number 1588291-1 (see Table 19).

Test Description	FOTP	Requirement (dB)
Visual and Mechanical Inspection	13	TIA/EIA-604-3 Intermateability
Attenuation	34	$\leq \square 0.75$
Return Loss	107	$\leq \square -20$
Low Temperature (00C for 4 days)	188	$\leq \square 0.3$ change
Temperature Life (550C for 14 days)	7	$\leq \square 0.3$ change
Humidity (90 to 95% @ 400C for 4 days)	5	$\leq \square 0.3$ change

Table 19
Backbone Data performance Characteristics

Each SC connector shall be held by an SC duplex coupler snap-in adapter plate which in turn shall be installed into a rack-mount fiber optic enclosure. SC duplex snap-in adapter plates shall be AMP NETCONNECT part number 559596-1 or 559558-1.

The backbone data cross-connect shall be contained in 19" x 7' rack(s). Fiber optic enclosures shall be capable of containing [36, 48, 96 or 144] SC simplex connectors. Fiber optic enclosures shall be AMP NETCONNECT part number(s) [1348876-4, 1435040-1, 559542-2, 559614-2, 559552-2] (see Table-20). Each fiber patch enclosure shall be separated vertically on the rack by a 2U rack-mount fiber management enclosure. Fiber management enclosures shall be AMP NETCONNECT part number 1435808-1. Fiber service loops shall be contained in 2U rack-mount fiber management enclosures.

All equipment racks shall be augmented with vertical cable management hardware, both front and rear, to properly dress backbone cables and patch cords. Vertical cable management panels shall be AMP NETCONNECT part number(s) [1375257-1 or 1375259-1] (see Table 20).

Description	Fiber Count	Port Count	Rack Units	Part Numbers
LightCrimp Plus SC Simplex XG (850 nm LO 50/125 μ m) Multimode Connector	1	1	-	1588291-1
Snap-in adapter Plate, SC Duplex, 6-Fiber, Multimode	6	3	-	559558-1
Snap-in adapter Plate, SC Duplex, 12-Fiber, Multimode	12	6	-	559596-1
LightCrimp Plus SC Duplex XG (850 nm LO 50/125 μ m) Multimode Connector	2	2	-	1588291-1
Rack Mount Patch Enclosure (RMPE)	36	18	1U	1348876-4
RMPE with Swappable Front Panel	36	18	1U	1435040-1
	48	24	2U	559542-2
Rack Mount Enclosure	96	48	3U	559614-2
	144	72	4U	559552-2
Rack Mount Fiber Management Enclosure	-	-	2U	1435808-1
Vertical Finger Duct Cable Management Panels, Double-sided, Side Mount	-	-	-	1375257-1
Vertical Finger Duct Cable Management Panels, Double-sided, Center Mount	-	-	-	1375259-1
Horizontal Finger Duct Cable Management Panel, Double-sided	-	-	1U	1375160-1
			2U	1375158-1

Table 20
Backbone Data Cross-Connect Part Numbers

Backbone Cross-Connect Installation

Fiber optic termination hardware shall be installed in the following manner.

- Fiber slack shall be neatly coiled within the fiber termination enclosures or in rack-mount fiber management enclosures
- No slack loops shall be allowed external to the fiber enclosure(s)
- Each cable shall be individually attached to the respective termination panel by mechanical means
- The cable strength member(s) shall be securely attached the cable strain relief bracket in the panel
- Each fiber cable shall be stripped upon entering the termination panel and the individual fibers routed in the termination panel
- Each cable shall be clearly labeled at the entrance to the termination panel
- Cable labels shall not be obscured from view
- Dust caps shall be installed on the connectors and couplings at all times unless physically connected

2.6 BACKBONE CABLING

Product Specifications

Backbone Cabling for Data Circuits

Backbone data cable shall be all-dielectric and shall consist of 900µm tight-buffered AMP NETCONNECT IEEE802.3ae compliant XG 850nm laser optimized 50/125µm fibers surrounded by aramid strength members and a PVC outer jacket. Cable shall be tested to comply with TIA/EIA-568-B, Telcordia GR-409-Core, IEC 793-1, IEC 794-1 and ISO/IEC 11801 requirements. The minimum bandwidth of the cable shall meet the requirements of table 25. The maximum cable attenuation shall be as listed in Table 26. The fibers shall be guaranteed to support Gigabit Ethernet to a minimum distance as listed in Table 25. Cables with fiber counts more than 12 shall have two or more subunits and may have a central member. The cable shall have a UL rating of Outdoor. See BOM for Fiber Part Numbers

Fiber Type	OFL Bandwidth 850nm (MHz·km)	OFL Bandwidth 1300nm (MHz·km)	Laser Bandwidth 850nm (MHz·km)
Single-mode	N/A	N/A	N/A
XG (850nm laser- optimized 50/125µm)	1500	500	2000
50/125µm	500	500	N/A

Table 25:
Minimum Fiber Cable Bandwidth

Fiber Type	Attenuation 850nm (db/km)	Attenuation 1300nm (db/km)	Attenuation 1550nm (db/km)
Single-mode	N/A	1.0	1.0
XG (850nm laser- optimized 50/125µm)	3.5	1.5	N/A
50/125µm	3.5	1.5	N/A

Table 26

Maximum Fiber Cable Attenuation

	Single-mode	XG	50/125μm
1000BASE-SX	2-5000m	2-900m	2-600m
1000BASE-LX	2-5000m	2-550m	2-600m
10GBASE-SR	NST	2-300m	2-82m
10GBASE-LX4	2-10000m	2-300m	2-300m

Table 27
Gigabit & 10 Gigabit Ethernet Supported Distances

Backbone Data Cable Mechanical Specifications

Backbone Cable Installation

All backbone cables shall be installed in the following manner.

- Backbone cables shall be installed separately from horizontal distribution cables
- Where cables are housed in conduits, the backbone and horizontal cables shall be installed in separate conduits or in separate innerduct(s) within conduits
- Where cables are installed in an air return plenum, the cable shall be installed in conduit, or plenum cable shall be installed in a plenum innerduct to provide protection to the cable
- Where backbone cables and distribution cables are installed in a cable tray or wire-way, backbone cables shall be installed first and bundled separately from the horizontal distribution cables

2.7 WORK AREA AND CROSS-CONNECT CABLE ASSEMBLIES

Cable Assemblies

Data cable assemblies used for horizontal cross-connect and at the workstation shall be 4-pair XG shielded assemblies. Twisted pair data cable assemblies shall be factory-assembled by the manufacturer of the cabling system. Each TR shall require 8-, 10-, and/or 12-foot cable assemblies to cross-connect between the horizontal data patch panels and network equipment. The total quantity of cable assemblies required in each TR shall be equally divided between the three assembly lengths. Each workstation shall require one 10-foot XG shielded cable assembly. One patch cord per user outlet shall be provided.

In the MC and in each TR, fiber optic cable assemblies shall be provided to cross-connect between the backbone data fiber enclosures and network equipment. Optical fiber cable assemblies shall be 1 meter in length. SC Duplex to LC duplex fiber optic cable assemblies shall be provided depending upon LAN electronic interface.

Product Specifications

Cable Assemblies for Horizontal Data Circuits

Workstation data cable assemblies shall be XG shielded patch cable assemblies, constructed using modular plugs with 50μm gold-plated contacts, and shall be wired to the T568A wiring pattern. Data cable assemblies shall utilize colored cable and "snagless" cable boots that match the color of the cable. Cable assemblies shall be 10ft in length, color matched for the purpose of usage color as per the Horizontal cable color match.

Cable Assemblies for Backbone Data Circuits

Backbone data cable assemblies shall be optical fiber assemblies, factory-terminated using duplex 50/125µm laser optimized multimode cable. The duplex cables shall utilize [MT-RJ plugs, LC connectors, or SC connectors]. Optical fiber patch cables shall be 1m in length and shall be AMP NETCONNECT part number [1278128-1, 1278126-1, 1374647-1, 1754399-1, 1588644-1 or 1278199-1].

Description	Left Connector	Right Connector	Length (m)	Part Number
Optical Fiber Cable Assemblies, MT-RJ, XG (850nm LO 50/125µm) Multimode	MT-RJ	MT-RJ	1	1588572-1
		SC	1	1693414-1
		LC	1	1588719-1
Optical Fiber Cable Assemblies, LC, XG (850 nm LO 50/125 µm) Multimode	LC	LC	1	1754399-1
Optical Fiber Cable Assemblies, XG (850 nm LO 50/125 µm) Multimode	SC	SC	1	1588644-1

TABLE 32
DATA CABLE ASSEMBLIES FOR THE TR AND MC PART NUMBERS

2.8 TELECOMMUNICATIONS SPACES

The telecommunication closets shall house racks, voice termination fields and required cable routing hardware. Racks shall be placed in a manner that will allow a minimum of 3 feet of clearance from the front and rear mounting surfaces and on one side. If one mounting rail of the rack is placed against a wall, the mounting rail shall be no closer than 6" to the wall to allow room for vertical management. Where there is more than one rack, the racks shall be ganged with vertical management hardware to provide interbay management. Ganged rack frames will be placed in a manner that will allow a minimum of 3 feet of clearance from the front and rear mounting surfaces and on one side of the ganged assembly.

Installation Specifications

Racks shall be installed in the following manner.

- Racks shall be securely attached to the concrete floor using 3/8" hardware
- All racks shall be grounded to the telecommunications ground bus bar in accordance with Section 9.0 of this document
- Rack mount screws (#12-24) not used for installing fiber panels and other hardware shall be bagged and left with the rack upon completion of the installation
- Voice termination fields shall be mounted on 4' x 8' x .75" virgin plywood that is mounted vertically at 12" A.F.F.

2.9 CABLING SYSTEM TESTING

All cables and termination hardware shall be 100% tested for defects in installation and to verify cable performance under installed conditions. All conductors and fibers of each installed cable shall be verified useable by the Contractor prior to system acceptance. Any defect in the cabling system installation including but not limited to cable, connectors, feed-through couplers, patch panels, and connector blocks shall be repaired or replaced in order to ensure 100% useable conductors in all installed cables.

All cables shall be tested in accordance with this document, the ND&I Contract agreement, and best industry practices. If any of these are in conflict, the Contractor shall be responsible to bring any discrepancies to the attention of the project team for clarification and/or resolution.

Written documentation of test results must be submitted to the manufacturer and a copy provided to the end user for their records.

2.10 COPPER

Each cable shall be tested for continuity on all pairs and/or conductors. Twisted-pair cables shall be tested for continuity, pair reversals, shorts, and opens plus tests that indicate installed cable performance. These cables shall be tested using a Level III or Level IV cable scanner.

Continuity

Each twisted pair of every installed cable shall be tested using a “green light” test set that shows opens, shorts, polarity and pair-reversals. The test shall be recorded as pass/fail as indicated by the test set in accordance with the manufacturers recommended procedures, and referenced to the appropriate cable identification number and circuit or pair number. Any faults in the wiring shall be corrected and the cable re-tested prior to final acceptance.

Length

Each installed cable shall be tested for installed length using a TDR type device. The cables shall be tested from patch panel to patch panel, block to block, patch panel to outlet or block to outlet as appropriate. The cable length shall conform to the maximum distances set forth in the ANSI/TIA/EIA-568-B Standard. Cable lengths shall be recorded, referencing the cable identification number and circuit or pair number. For multi-pair cables, the longest pair length shall be recorded as the length for the cable.

Performance Verification

Enhanced Category 5 cable shall be performance verified using an automated test set. This test set shall be capable of testing for the continuity and length parameters defined above, and provide results for the following tests:

- Insertion Loss
- Pair-to-Pair Near End Crosstalk (NEXT)
- Power Sum Near End Crosstalk (PSNEXT)
- Equal Level Far End Crosstalk (ELFEXT)
- Power Sum Equal Level Far End Crosstalk (PSELFEXT)
- Return Loss (RL)

All Enhanced Category 5 cable runs shall be tested in accordance with the field test specifications defined in the “Commercial Building Telecommunications Cabling Standard” TIA/EIA-568-B.1. The test equipment shall comply with the accuracy levels defined in TIA/EIA 568-B.1 Section 11 “Cabling Transmission Performance and Test Requirements”.

Test results shall be automatically evaluated by the equipment, using the most up-to-date criteria from the TIA/EIA Standard, and the result shown as pass/fail. Test results shall be printed directly from the test unit or from a download file using an application from the test equipment manufacturer. The printed test results shall include all tests performed, the expected test result and the actual test result achieved.

All XG shielded cable runs shall be tested in accordance with the field test specifications defined in the “*Transmission Performance Specifications for 4-pair 100 Ω Augmented Category 6 Cabling*” by the Telecommunications Industry Association (TIA); ANSI/TIA/EIA-568-B.2.10. This document will be referred to as the Augmented Category 6 Standard. The test equipment shall comply with the accuracy requirements for the level III field testers as defined in the TIA Cat 6 Document. Level IV testers as specified in Draft IEC61935-1 are also permitted.

The Pass or Fail condition for the cabling run under test is determined by the results of the required individual tests. Any Fail or Fail* result yields a Fail for the cabling run under test. In order to achieve an overall Pass condition, the results for each individual test parameter must

be a Pass or Pass*.

A Pass or Tail result for each parameter is determined by comparing the measured values with the specified test limits for that parameter. The test result of a parameter shall be marked with an asterisk (*) when the result is closer to the test limit than the accuracy of the field tester.

XG shielded cabling systems shall be performance verified using an automated test set. This test set shall be capable of testing for the continuity and length parameters defined above, shield continuity, and provide results for the following tests.

- Insertion Loss
- Pair-to-Pair Near End Crosstalk (NEXT)
- Power Sum Near End Crosstalk (PSNEXT)
- Equal Level Far End Crosstalk (ELFEXT)
- Power Sum Equal Level Far End Crosstalk (PSELFEXT)
- Return Loss

Test results shall be printed directly from the test unit or from a download file using an application from the test equipment manufacturer. The printed test results shall include all tests performed, the expected test result and the actual test result achieved.

Although Alien Crosstalk has a significant impact and is a major contributor to network interference, especially with respect 10GbE and other high frequency applications, it cannot be accurately tested by field instruments at this time across all possible cabling combinations. A properly installed shielded cabling infrastructure is recommended to completely eliminate the negative affects of Alien Crosstalk on network performance.

2.11 FIBER OPTIC TESTING

Each fiber strand shall be tested for attenuation with an optical power meter and light source. Cable length shall be verified using sheath markings. If splices are used, splice attenuation shall be verified with an OTDR. The guidelines and procedures established for Tier 1 testing in TIA/TSB-140 shall apply.

Attenuation

Horizontal distribution multimode optical fiber attenuation shall be measured in one direction at either 850 nanometers (nm) or 1300 nm using an LED light source and power meter. This measurement is consistent with the loss which network equipment will see under normal installation and use. Backbone multimode fiber shall be tested at both 850 nm and 1300 nm in one direction. Test set-up and performance shall be conducted in accordance with ANSI/TIA/EIA-526-14 Standard, Method B. The fiber system shall be tested in accordance with the AMP testing procedures established in the *MT-RJ Optical Fiber Systems Testing* white paper (literature #1307540). Test results evaluation for the panel to panel (backbone) or panel to outlet (horizontal) shall be based on the values set forth in ANSI/TIA/EIA-568-B.1.

Attenuation testing shall be performed with a stable launch condition using two-meter jumpers to attach the test equipment to the cable plant. The light source shall be left in place after calibration and the power meter moved to the far end to take measurements. Maximum attenuation for installed cables shall be evaluated based on the following formula: manufacturer's maximum attenuation per kilometer divided by 1000 and then multiplied by the installed cable length in meters (the length based on cable length measurements marked on the jacket is suitable, but if OTDR testing is performed in accordance with 8.2.2, then the actual measured length shall be used). Conversion from metric to US Standard measurement shall use 3.2808 as a constant with the result rounded to the next highest whole number.

The adjusted cable attenuation value shall be added to the manufacturers mean loss per mated pair of connectors multiplied by the number of mated pairs under test (the testing for this project measures the loss over the installed cable plus two jumpers which accounts for

three mated pairs of connectors - subtract one mated pair for the equipment interface to arrive at a total of two mated pairs under test).

The expected results for each cable (or group of cables of the same nominal length) shall be calculated before the start of testing and recorded in a space provided on the Contractor's test matrix. Each strand of fiber in the respective cable shall be evaluated against this target number. Any fibers that exceed this value shall be repaired or replaced at no cost to the Owner.

Where concatenated links are installed to complete a circuit between devices, the Contractor shall test each link from end to end to ensure the performance of the system. After the link performance test has been successfully completed, each link shall be concatenated and tested. The test method shall be the same used for the test described above. The evaluation criteria shall be established between the Owner and the Contractor prior to the start of the test.

Length and Splice Loss

Each cable shall be verified for length using sheath markings, a length-capable power meter or an Optical Time Domain Reflectometer (OTDR). Splices, if used, shall be verified for loss using an OTDR. The OTDR measurements for length, if taken, shall be performed in accordance with ANSI/TIA/EIA-455-60 (FOTP-60). The measurements to determine splice loss shall be performed in accordance with manufacturer's recommendations and best industry practices. Refer to TIA/TSB-140 for additional guidelines. OTDR traces shall be taken if one or more of the following conditions exist.

- OTDR testing is specifically requested by the Owner (refer to Tier 2 testing in TIA/TSB-140)
- Each strand of all outside plant cables
- Each optical fiber splice (fusion or mechanical)
- A representative strand of each fiber cable over 300m in length
- Where abnormal or unexpected results are obtained during attenuation testing
- Where the cable has been subjected to extreme conditions or stresses during installation

2.12 FIRESTOP SYSTEMS

A firestop system is comprised of the item or items penetrating the fire-rated structure, the opening in the structure and the materials and assembly used to seal the penetrated structure. Firestop systems comprise an effective block for fire, heat, vapor and a pressurized water stream.

All penetrations through fire-rated building structures (walls and floors) shall be sealed with an appropriate firestop system. This requirement applies to "through" penetrations (complete penetration) and "membrane" penetrations (through one side of a hollow, fire-rated structure). Any penetrating items (i.e., riser slots and sleeves, cables, conduit, cable tray, raceways, etc.) shall be properly firestopped.

Product Specifications

Firestop systems shall be UL Classified to ASTM E814 (UL 1479) and shall be approved by a qualified Professional Engineer (PE), licensed (actual or reciprocal) in the state where the work is to be performed. A drawing showing the proposed firestopped system, stamped by the cognizant PE, shall be provided to the owner's technical representative prior to installing the firestop system(s).

2.13 FIRESTOP SYSTEM INSTALLATION

All firestop systems shall be installed in accordance with the manufacturer's recommendations and shall be completely installed and available for inspection by the local inspection authorities prior to cabling system acceptance.

Grounding and Bonding

The facility shall be equipped with a Telecommunications Bonding Backbone (TBB). This backbone shall be used to ground all telecommunications cable shields, equipment, racks, cabinets, raceways, and other associated hardware that has the potential for acting as a current-carrying conductor. The TBB shall be installed independently of the building electrical ground and of the building ground and shall be designed in accordance with the recommendations contained in the ANSI/TIA/EIA-607-A Telecommunications Bonding and Grounding Standard.

The main entrance facility/equipment room in each building shall be equipped with a telecommunications main grounding bus bar (TMGB). Each telecommunications closet shall be provided with a telecommunications grounding bus bar (TGB). The TMGB shall be connected to the building electrical entrance grounding facility. The intent of this system is to provide a grounding system that is equal in potential to the building electrical ground system. Therefore, ground loop current potential is minimized between telecommunications equipment and the electrical system to which it is attached.

Additional information on grounding and bonding is available by contacting AMP NETCONNECT

Product Specifications

All racks, metallic backboards, cable sheaths, metallic strength members, splice cases, cable trays, etc. entering or residing in the TC or ER shall be grounded to the respective TGB or TMGB using a minimum #6 AWG stranded copper bonding conductor and compression connectors. Where metallic panels attached to the rack do not have sufficient metal to metal contact to provide an adequate path to ground, they shall be bonded to the rack using a minimum #14 AWG copper conductor. The copper conductor size shall be upgraded based on the largest power conductor feeding any rack-mount equipment. The conductor shall be continuous, attaching all isolated components in a daisy chain fashion from top to bottom and bonded to the rack using an appropriate compression connector.

All wires used for telecommunications grounding purposes shall be identified with green insulation. Non-insulated wires shall be identified at each termination point with a wrap of green tape. All cables and busbars shall be identified and labeled in accordance with the System Documentation Section of this specification.

Ground System Installation

The TBB shall be designed and/or approved by a qualified professional Engineer (PE), licensed (actual or reciprocal) in the state that the work is to be performed. The TBB shall adhere to the recommendations of the ANSI/TIA/EIA-607-A standard, and shall be installed in accordance with best industry practices. Installation and termination of the main bonding conductor to the building service entrance ground, at a minimum, shall be performed by a licensed electrical contractor.

2.14 SYSTEM DOCUMENTATION

The following section describes the installation, administration, testing, and as-built documentation required to be produced and/or maintained by the Contractor during the course of the installation.

Cabling System Labeling

The Contractor shall develop and submit for approval a labeling scheme for the cable installation. Customer will negotiate an appropriate labeling scheme with the successful Contractor. At a minimum, the labeling system shall clearly identify all components of the system: racks, cables, panels and outlets. The labeling system shall designate the cable origin and destination and a unique identifier for each cable within the system. Racks and patch panels shall be labeled to identify the location within the cabling system infrastructure. All labeling information shall be recorded on the as-built drawings and all test documents shall reflect the appropriate labeling scheme.

Product Specifications

The labeling shall be machine-generated and affixed to the cable, faceplate, patch panel, rack or other hardware.

Labeling Software

Labeling software shall be easily useable and run on Microsoft Windows® 95, 98, ME, NT, 2000 and XP operating systems. Labeling software shall be compliant with TIA/EIA-606-A and shall be able to produce complex unique identifiers of up to 12 independent segments. Labeling software shall be capable of inserting symbols as well as use any standard True Type Font as well as capable of saving individual build information and of fine tuning print adjustments. Labeling software shall be compatible with AMP NETCONNECT products and shall be [Microsoft Word®, Microsoft Excel® or purchased directly from Silver Fox, Ltd. at: <http://www.silfox.com/eshop/viewproduct.php?id=149>].

Faceplate Labeling

Labeling for faceplates at each work station shall be white [perforated card stock compatible with inkjet and laser printers or pre-cut self-adhesive polyester compatible with laser printers]. Labels shall be 1.98" x 0.373" in size and be divided 72 labels per sheet with each sheet being 8.5" x 11". Work area outlet labels shall be AMP NETCONNECT part number [1375356-X or 1375357-X (X denotes packaging, see Table 33)].

Description	Labels per Sheet	Sheets per Pack	Labels per Pack	Part Number
Card Stock	72	5	360	1375356-1
	72	100	7200	5- 1375356-1
Self-adhesive Polyester	72	5	360	1375357-1
	72	100	7200	5- 1375357-1

Table 33
Faceplate Label Part Numbers

Patch Panel Labels

Patch Panel labels shall be white perforated card stock compatible with inkjet and laser printers or pre-cut self-adhesive polyester compatible with laser printers. Labels shall be [3.10" x 0.50" (for patch panels without icons) or 3.30" x 0.25" (for patch panels with icons)] in size and be divided [36 or 72] labels per sheet with each sheet being 8.5" x 11". Patch panel labels shall be AMP NETCONNECT part number [1375351-X, 1375352-X or 1375353-X (X denotes packaging, see Table 34)].

Description	Labels per Sheet	Sheets per Pack	Labels per Pack	Part Number
Card Stock	36	5	180	1375351-1
	36	100	3600	5- 1375351-1
	36	5	180	1375352-1
Self-adhesive Polyester	36	100	3600	5- 1375352-1
	72	5	360	1375353-1
	72	100	7200	5- 1375353-1

Table 34
Data Patch Panel Label Part Numbers

Cross-Connect Labels

Cross-connect labels shall be [perforated card stock compatible with inkjet and laser printers or pre-cut self-adhesive polyester compatible with laser printers] [and be color coded per the labeling scheme in paragraph 10 (card stock)]. Labels shall be 7.90" x 0.48" in size and be divided 18 labels per sheet with each sheet being 8.5" x 11". Cross-connect labels shall be AMP NETCONNECT part number [1375354-X or 1375355-X (X denotes color and packaging, see Table 35)].

Description	Labels per Sheet	Sheets per Pack	Labels per Pack	Color	Part Number
Card Stock	18	5	90	White	1375354-1
				Blue	1375354-2
				Green	1375354-3
				Purple	1375354-4
				Red	1375354-5
				Brown	1375354-6
				Yellow	1375354-7
				Orange	1375354-8
				Gray	1375354-9
		100	1800	White	5- 1375354-1
				Blue	5- 1375354-2
				Green	5- 1375354-3
				Purple	5- 1375354-4
				Red	5- 1375354-5
				Brown	5- 1375354-6
				Yellow	5- 1375354-7
				Orange	5- 1375354-8
				Gray	5- 1375354-9
Self-adhesive Polyester	18	5	90	White	1375355-1
		100	1800	White	5- 1375355-1

Table 35
Voice Cross-Connect Label Part Numbers

Cable Labels

Cable labels shall be self-adhesive, self-laminating, pre-cut and laser-printer compatible. Labels shall be used with [4-pair horizontal UTP cable and/or 25-Pair backbone UTP], be [0.984" x 1.496" (4-Pair) and/or 0.984" x 2.480" (25-Pair)] in size and be divided [48 (4-Pair) and/or 24 (25-Pair)] labels per sheet with each sheet being 8.5" x 11". Cable labels shall be AMP NETCONNECT part number [1479002-X and/or 1479003-X (X denotes packaging, see Table 36)].

Description	Labels per Sheet	Sheets per Pack	Labels per Pack	Part Number
Self-adhesive Polyester	48	5	240	1479002-1
		100	4800	5- 1479002-1
	24	5	120	1479003-1
		100	2400	5- 1479003-1

Table 36
Twisted Pair Cable Label Part Numbers

Icons

Icons shall be used to indicate the function of each port on a work area outlet. Icons shall be provided with each faceplate kit and be colored to match the faceplate. If icons are to be used in each TR for horizontal or backbone patch panels and enclosures, AMP NETCONNECT part number [558176-X, 1375092-X, 558198-X, 558199-X or 558821-X (X denotes color, see Table 37)] shall be used.

Part Number	Description				
	4-Data, 4-Blank, 2-Phone, 3-Cat5, 1-Fax, 1-Modem, 1-Printer	4-Blank, 2-Cat 5e, 2-Cat 6, 1-Each: V1, V2, V3, V4, D1, D2, D3, D4	16-Data	16-Phone	16-Blank
Almond	558176-1	1375092-1	558198-1	558199-1	558821-1
Red	558176-2	1375092-2	558198-2	558199-2	558821-2
Green	558176-3	1375092-3	558198-3	558199-3	558821-3
Blue	558176-4	1375092-4	558198-4	558199-4	558821-4
Yellow	558176-5	1375092-5	558198-5	558199-5	558821-5
Black	558176-6	1375092-6	558198-6	558199-6	558821-6
Orange	558176-7	1375092-7	558198-7	558199-7	558821-7
White	558176-8	1375092-8	558198-8	558199-8	558821-8
Violet	558176-9	1375092-9	558198-9	558199-9	558821-9
Gray	1-558176- 0	1-1375092-0	1- 558198-0	1- 558199-0	1- 558821-0
Electrical Ivory	1-558176- 1	1-1375092-1	1- 558198-1	1- 558199-1	1- 558821-1

Table 37
Icon Part Numbers

As-Built Drawings

The installation Contractor will be provided with 2 sets of D or E-size drawings at the start of the project. One set will be designated as the central location to document all as-built information as it occurs throughout the project. The central set will be maintained by the Contractor's foreman on a daily basis, and will be available to the technical representative upon request during the course of the project. Anticipated variations from the build-to drawings may include such things as cable routing and actual outlet placement. No variations will be allowed to the planned termination positions of horizontal and backbone cables or grounding conductors unless approved in writing by the Owner.

The Contractor shall provide the central drawing set to the Owner at the conclusion of the project. The marked up drawing set will accurately depict the as-built status of the system including termination locations, cable routing, and all administration labeling for the cabling system. In addition, a narrative will be provided that describes any areas of difficulty encountered during the installation that could potentially cause problems to the telecommunications system.

Test Documentation

Test documentation shall be provided in a three-ring binder(s) within three weeks after the completion of the project. The binder(s) shall be clearly marked on the outside front cover and spine with the words "Test Results", the project name, and the date of completion (month and year). The binder shall be divided by major heading tabs: Horizontal and Backbone. Each major heading shall be further sectioned by test type. Within the horizontal and backbone sections, scanner test results (Enhanced Category 5 or XG shielded), fiber optic attenuation test results, OTDR traces (if any), and green light test results shall be segregated by tab. Test data within each section shall be presented in the sequence listed in the administration records. The test equipment name, manufacturer, model number and last calibration date will also be provided at the end of the document. The test document shall detail the test method used and the specific settings of the equipment during the test.

Scanner tests shall be printed on 8-1/2" x 11" paper. Hand written test results (attenuation results and green light results) shall be documented on the attached test form (Appendix C). OTDR test results shall be printed or attached and copied on 8-1/2" x 11" paper for inclusion in the test documentation binder.

When repairs and re-tests are performed, the problem and corrective action taken shall be noted, and both the failed and passed test data shall be collocated in the binder.

2.15 WARRANTY AND SERVICES

The Contractor shall provide a system warranty covering the installed cabling system against defects in workmanship, components, and performance, and covering follow-on support after project completion.

Installation Warranty

The Contractor shall warrant the cabling system against defects in workmanship for a period of one year from the date of system acceptance. The warranty shall cover all labor and materials necessary to correct a failed portion of the system and to demonstrate performance within the original installation specifications after repairs are accomplished. This warranty shall be provided at no additional cost to the Owner.

Cabling System Warranty

The Contractor shall facilitate a 25-year system performance warranty between the Manufacturer and the Owner. An extended component warranty shall be provided which warrants functionality of all components used in the system for 25 years from the date of acceptance. The performance warranty shall warrant the installed XG shielded horizontal copper, and both the horizontal and the backbone optical fiber portions of the cabling system. Copper links shall be warranted to the link performance minimum expected results defined in ANSI/TIA/EIA-568-B.2-1 and channel performance minimum expected results defined in IEEE 802.3an. Fiber optic links shall be warranted to the link and segment performance minimum expected results defined in ANSI/TIA/EIA-568-B.1.

Post Installation Maintenance

The Contractor shall furnish an hourly rate with the proposal submittal which shall be valid for a period of one year from the date of acceptance. This rate will be used when cabling support is required to affect moves, adds, and changes (MACs) to the system. MACs shall not void the Contractor's nor Manufacturer's warranty.

Project Management / General

The Contractor shall establish a single point of contact (POC) with the Customer who will be responsible for reporting progress and updating the Customer's technical representative with issues that the Owner must address to facilitate the cabling system installation. The Contractor's POC shall provide [daily, weekly] written reports to the Customer's technical representative detailing progress. Requests for access to limited access or restricted areas shall be made [number of days] prior to the required access. Information critical to the completion of the task or project shall be communicated to the Customer's technical representative as the requirement becomes known. Casual information shall be passed during the scheduled progress report.

The Contractor shall maintain the Customer's facility in a neat and orderly manner during the installation of the communications cabling system. The Customer's facilities shall be maintained in broom clean condition at the completion of work each day. At the completion of work in each area, the Contractor will perform a final cleaning of debris prior to moving the installation crew to the next work area.

2.16 CABLING SYSTEM ACCEPTANCE

The Customer's technical representative will make periodic inspection of the project in progress. One inspection will be performed at the conclusion of cable pulling, prior to closing of the false ceiling, to inspect the method of cable routing and support, and the firestopping of penetrations. A second inspection will be performed at completion of cable termination to validate that cables were dressed and terminated in accordance with ANSI/TIA/EIA specifications for jacket removal and pair untwist, compliance with Manufacturer's minimum bend radius, and that cable ends are dressed neatly and orderly.

Final Inspection

Upon completion of the project, the Customer's technical representative will perform a final inspection of the installed cabling system with the Contractor's project foreman. The final inspection will be performed to validate that all horizontal and backbone cables were installed as defined in the drawing package, and that the installation meets the aesthetic expectations of the Customer.

Test Verification

Upon receipt of the test documentation, the Customer reserves the right to perform spot testing of a representative sample of the cabling system to validate test results provided in the test document. Customer testing will use the same method employed by the Contractor, and minor variations will be allowed to account for differences in test equipment and test variability. If significant discrepancies are found, the Contractor will be notified for resolution.

System Performance

During the three week period between final inspection and delivery of the test and as-built documentation, the Customer will activate the cabling system. The Customer will validate operation of the cabling system during this period.

Final Acceptance

Completion of the installation, in-progress and final inspections, receipt of the test, receipt of the as-built documentation, and successful performance of the system for a two week period will constitute acceptance of the system.

Data Bill of Material

Manufacturer	Part #	Description
AMP	1933309-1	24-Port 1U Multimedia Angled Patch Panel, SL
AMP	1933310-1	48-Port 2U Multimedia Angled Patch Panel, SL
AMP	1499416-5	Cat 6A F/UTP COPPER CABLE , CMP Blue
AMP	1711160-1	SL Series AMP-TWIST 6A Modular Jack with dust cover
AMP	1499826-6	6' Cat 6A Shielded Patch Cord, Blue
AMP	1499826-8	8' Cat 6A Shielded Patch Cord, Blue
AMP	1499826-10	10' Cat 6A Shielded Patch Cord, Blue
AMP	1339118	Single gang Faceplate (up to 6 ports)
AMP	1116406	SL Module, 2 port angled insert, 1.5 Unit
AMP	569916	AFWM Faceplates, 2 port
AMP	1116695	AFWM Faceplates, 4 port
AMP	8-1664191-5	24F Multimode, XG 50/125, Outside Plant cable, Dielectric, black
AMP	0-1664220-5	12F Multimode, Singlemode, Outside Plant cable, Dielectric, black
AMP	559542-2	24/48 port fiber rack mount enclosure - 2U - 4 Adapter Plates, standard cables
AMP	559596-6	SC Duplex Adapter Plate, 12 fiber, 50um XG fiber, Aqua
AMP	559523-1	Blank, Adapter Plate
AMP	5504932-5	Epoxy/Polish SC Simplex, 50um, beige, 900um buffer and 250um coated fiber
AMP	559596-3	SC Duplex Adapter Plate, 12 fiber, Singlemode, APC, Green
AMP	5492123-1	Epoxy/Polish SC Simplex, Singlemode, Blue, 900um buffer and 250um coated fiber
Chatsworth	57004-703	Global Standard Pack; Std Rack 19"W x 7"H; Black; UL Listed w/ (2) 6" GVCS and a Anchor Kit for concrete floor

Chatsworth	<u>35441-703</u>	Evolution Horizontal Cable Manager, Single-Sided, 19" Wide X 3 RMU, Black
Chatsworth	<u>41050-719</u>	Rack Base Dust Cover; 19"W; Black; Channel Size: 3
Chatsworth	<u>40602-700</u>	Rack Line-Up Spacer Kit; Black; Rack Type: Universal
Chatsworth	<u>40604-003</u>	Concrete Floor Installation Kit

CATV Bill of
Material

AMP	1933309-1	24-Port 1U Multimedia Angled Patch Panel, SL
AMP	1933310-1	48-Port 2U Multimedia Angled Patch Panel, SL
AMP	1499416-6	Cat 6A F/UTP COPPER CABLE , CMP violet
AMP	1711160-1	SL Series AMP-TWIST 6A Modular Jack with dust cover
AMP	1499832-6	6' Cat 6A Shielded Patch Cord, Violet
AMP	1499832-8	8' Cat 6A Shielded Patch Cord, Violet
AMP	1499832-10	10' Cat 6A Shielded Patch Cord, Violet
AMP	1339118	Single gang Faceplate (up to 6 ports)
AMP	1116406	SL Module, 2 port angled insert, 1.5 Unit

WAP Bill of
Material

AMP	1933309-1	24-Port 1U Multimedia Angled Patch Panel, SL
AMP	1933310-1	48-Port 2U Multimedia Angled Patch Panel, SL
AMP	1499416-2	Cat 6A F/UTP COPPER CABLE , CMP Green
AMP	1711160-1	SL Series AMP-TWIST 6A Modular Jack with dust cover
AMP	1499830-6	6' Cat 6A Shielded Patch Cord, Green
AMP	1499830-8	8' Cat 6A Shielded Patch Cord, Green
AMP	1499830-10	10' Cat 6A Shielded Patch Cord, Green
AMP	1339118	Single gang Faceplate (up to 6 ports)
AMP	1116406	SL Module, 2 port angled insert, 1.5 Unit

CCTV Bill of
Material

AMP	1933309-1	24-Port 1U Multimedia Angled Patch Panel, SL
AMP	1933310-1	48-Port 2U Multimedia Angled Patch Panel, SL
AMP	1499416-1	Cat 6A F/UTP COPPER CABLE , CMP white

AMP	1711160-1	SL Series AMP-TWIST 6A Modular Jack with dust cover
AMP	1499480-6	6' Cat 6A Shielded Patch Cord, white
AMP	1499480-8	8' Cat 6A Shielded Patch Cord, white
AMP	149948010	10' Cat 6A Shielded Patch Cord, white
AMP	1339118	Single gang Faceplate (up to 6 ports)
AMP	1116406	SL Module, 2 port angled insert, 1.5 Unit

Access
Control Bill
of Material

AMP	1933309-1	24-Port 1U Multimedia Angled Patch Panel, SL
AMP	1933310-1	48-Port 2U Multimedia Angled Patch Panel, SL
AMP	1499416-4	Cat 6A F/UTP COPPER CABLE , CMP Neon Green
AMP	1711160-1	SL Series AMP-TWIST 6A Modular Jack with dust cover
AMP	1499831-6	6' Cat 6A Shielded Patch Cord, Orange
AMP	1499831-8	8' Cat 6A Shielded Patch Cord, Orange
AMP	1499831-10	10' Cat 6A Shielded Patch Cord, Orange
AMP	1339118	Single gang Faceplate (up to 6 ports)
AMP	1116406	SL Module, 2 port angled insert, 1.5 Unit

SECTION 27 1343

COMMUNICATIONS BACKBONE CABLING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Pathways.
- B. 62.5/125-micrometer, optical fiber cabling.
- C. Cable connecting hardware, patch panels, and cross-connects.
- D. Cabling identification products.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. 26 0100 - GENERAL PROVISIONS, ELECTRICAL
- C. 26 0500 - BASIC MATERIALS AND METHODS, ELECTRICAL
- D. 26 0526 - GROUNDING AND BONDING

1.3 DEFINITIONS

- A. BICSI: Building Industry Consulting Service International.
- B. RCDD: Registered Communications Distribution Designer.

1.4 BACKBONE CABLING DESCRIPTION

- A. Backbone cabling system shall provide interconnections between communications equipment rooms in the ARFF, Hangar Building and Fixed Base Operator Terminal Building. Cabling system consists of backbone cables, intermediate and main cross-connects mechanical terminations, and patch cords or jumpers used for backbone-to-backbone cross-connection.
- B. Backbone cabling cross-connects may be located in communications equipment rooms or at entrance facilities. Bridged taps and splitters shall not be used as part of backbone cabling.

1.5 PERFORMANCE REQUIREMENTS

- A. General Performance: Backbone cabling system shall comply with transmission standards in TIA/EIA-568-B.1, when tested according to test procedures of this standard.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type cable installed.
 - 1. For all cable, include the following installation data for each type used:
 - a. Nominal OD.
 - b. Minimum bending radius.
 - c. Maximum pulling tension.
 - d. Manufacturer's on-reel testing reports

- B. Shop Drawings:
 1. System Labeling Schedules: Electronic copy of labeling schedules, in software and format selected by Engineer.
 2. Cabling administration drawings and printouts.
 3. Wiring diagrams to show typical wiring schematics including the following:
 - a. Cross-connects.
 - b. Patch panels.
 - c. Patch cords.
 4. Cross-connects and patch panels. Detail mounting assemblies and show elevations and physical relationship between the installed components.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer, BICSI qualified layout technician, installation supervisor, and field inspector.
- B. Source quality-control reports.
- C. Field quality-control reports.
- D. Maintenance Data: For patch panels and connectors to include in maintenance manuals.

1.8 CLOSEOUT SUBMITTALS

- A. Installation cable testing results:
- B. As-Built drawings in Auto-CAD

1.9 QUALITY ASSURANCE

- A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.
 1. Layout Responsibility: Preparation of Shop Drawings Cabling Administration Drawings, and field testing program development by an RCDD.
 2. Installation Supervision: Installation shall be under the direct supervision of BICSI Level2 Registered Installation Technician [who shall be present at all times when Work of this Section is performed at Project site.
 3. Testing Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.
- B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 1. Flame-Spread Index: 25 or less.
 2. Smoke-Developed Index: 450 or less.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA70, by a qualified testing agency, and marked for intended location and application.
- D. Telecommunications Pathways and Spaces: Comply with TIA/EIA-569-A.
- E. Grounding: Comply with ANSI-J-STD-607-A.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Test cables upon receipt at Project site.
 1. Test optical fiber cable to determine the continuity of the strand end to end. Use optical loss test set.

2. Test optical fiber cable while on reels. Use an optical time domain reflectometer to verify the cable length and locate cable defects, splices, and connector, including the loss value of each. Do not install cable that testing reveals contains splices Retain test data and include the record in maintenance data.

1.11 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install cables and connecting materials until wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.12 COORDINATION

- A. Coordinate layout and installation of telecommunications pathways and cabling with security equipment and service suppliers.

PART 2 - PRODUCTS

2.1 PATHWAYS

- A. General Requirements: Comply with TIA/EIA-569-A.
- B. Cable Support: NRTL labeled for support of Category 6 cabling, designed to prevent degradation of cable performance and pinch points that could damage cable.
 1. Support brackets with cable tie slots for fastening cable ties to brackets.
 2. Lacing bars, spools, J-hooks, and D-rings.
 3. Straps and other devices.
 4. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Cable Management Solutions, Inc.
 - b. Cablofil Inc.
 - c. Cooper B-Line, Inc.
 - d. Cope - Tyco/Allied Tube & Conduit.
 - e. GS Metals Corp.
- C. Conduit and Boxes: Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems

2.2 BACKBOARDS

- A. Backboards: Fire-retardant treated Plywood, 3/4 by 48 by 96.

2.3 OPTICAL FIBER CABLE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 1. Berk-Tek; a Nexans company.
 2. CommScope, Inc.
 3. Corning Cable Systems.
 4. General Cable Technologies Corporation.
 5. Mohawk; a division of Belden CDT.
 6. Nordex/CDT; a subsidiary of Cable Design Technologies.
 7. Optical Connectivity Solutions Division; Emerson Network Power.
 8. Superior Essex Inc.
 9. SYSTIMAX Solutions; a CommScope Inc. brand.

10. 3M.
 11. Tyco Electronics/AMP Netconnect; Tyco International Ltd.
- B. Description: Multimode, 62.5/125-micrometer, 6-strand fiber, nonconductive, tight buffer, optical fiber cable and single mode 24 strand nonconductive tight buffer fiber optic cables where shown on the drawings
1. Comply with TIA/EIA-568-B.3 for performance specifications.
 2. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL444, UL1651, and NFPA70 for the following types:
 - a. General Purpose, Nonconductive: Type OFN or OFNG.
 - b. Plenum Rated, Nonconductive: Type OFNP, complying with NFPA 262.
 - c. Riser Rated, Nonconductive: Type OFNR, complying with UL 1666.
 3. Maximum Attenuation: 3.50 dB/km at 850 nm; 1.5 dB/km at 1300 nm.
 4. Minimum Modal Bandwidth: 160 MHz-km at 850 nm; 500 MHz-km at 1300 nm.
- C. Jacket:
1. Cable cordage jacket, fiber, unit, and group color shall be according to TIA/EIA-598-B.
 2. Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches.

2.4 OPTICAL FIBER CABLE HARDWARE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. ADC.
 2. American Technology Systems Industries, Inc.
 3. Berk-Tek; a Nexans company.
 4. Corning Cable Systems.
 5. Dynacom Corporation.
 6. Hubbell Premise Wiring.
 7. Molex Premise Networks; a division of Molex, Inc.
 8. Nordex/CDT; a subsidiary of Cable Design Technologies.
 9. Optical Connectivity Solutions Division; Emerson Network Power.
 10. Siemon Co. (The).
- B. Cross-Connects and Patch Panels: Modular panels housing multiple-numbered, duplex cable connectors.
1. Number of Connectors per Field: Two for each fiber of cable or cables assigned to field, plus spares and blank positions adequate to suit specified expansion criteria.
- C. Patch Cords: Factory-made, dual-fiber cables in 36-inch lengths.
- D. Cable Connecting Hardware:
1. Comply with Optical Fiber Connector Intermateability Standards (FOCIS) specifications of TIA/EIA-604-2, TIA/EIA-604-3-A, and TIA/EIA-604-12. Comply with TIA/EIA-568-B.3.
 2. Quick-connect, duplex, Type SC or Type LC connectors. Insertion loss not more than 0.75 dB.

2.5 GROUNDING

- A. Comply with requirements in Division 26 Section "Grounding and Bonding for Electrical Systems." for grounding conductors and connectors.
- B. Comply with ANSI-J-STD-607-A.

2.6 IDENTIFICATION PRODUCTS

- A. Comply with TIA/EIA-606-A and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

2.7 SOURCE QUALITY CONTROL

- A. Factory test cables on reels according to TIA/EIA-568-B.1.
- B. Factory test multimode optical fiber cables according to TIA/EIA-526-14-A and TIA/EIA-568-B.3.
- C. Cable will be considered defective if it does not pass tests and inspections and will be replaced at no cost to the Owner.
- D. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 ENTRANCE FACILITIES

- A. Coordinate backbone cabling with security system equipment provider

3.2 WIRING METHODS

- A. Wiring Method: Install cables in raceways and cable trays except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces, in attics, and in gypsum board partitions where unenclosed wiring method may be used. Conceal raceway and cables except in unfinished spaces.
 1. Install plenum cable in environmental air spaces, including plenum ceilings.
 2. Comply with requirements for raceways and boxes specified in Division 16 Section "Raceway and Boxes for Electrical Systems."
- B. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.
- C. Wiring within Enclosures: Bundle, lace, and train cables within enclosures. Connect to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

3.3 INSTALLATION OF PATHWAYS

- A. Comply with TIA/EIA-569-A for pull-box sizing and length of conduit and number of bends between pull points.
- B. Comply with requirements in Division 16 Section "Raceway and Boxes for Electrical Systems" for installation of conduits and wire ways.
- C. Install manufactured conduit sweeps and long-radius elbows whenever possible.
- D. Pathway Installation in Communications Equipment Rooms:
 1. Position conduit ends adjacent to a corner on backboard where a single piece of plywood is installed, or in the corner of room where multiple sheets of plywood are installed around perimeter walls of room.
 2. Install cable trays to route cables if conduits cannot be located in these positions.
 3. Secure conduits to backboard when entering room from overhead.

4. Extend conduits 3 inches above finished floor.
 5. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.
- E. Backboards: Install backboards with 96-inch dimension vertical. Butt adjacent sheets tightly and form smooth gap-free corners and joints.

3.4 INSTALLATION OF CABLES

- A. Comply with NECA 1.
- B. General Requirements for Cabling:
1. Comply with TIA/EIA-568-B.1.
 2. Comply with BICSI ITSIM, Ch.6, "Cable Termination Practices."
 3. Terminate all conductors; no cable shall contain un-terminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
 4. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
 5. Install lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.
 6. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Use lacing bars and distribution spools.
 7. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
 8. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
 9. In the communications equipment room, install a 10-foot- long service loop on each end of cable.
 10. Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.
- C. Optical Fiber Cable Installation:
1. Comply with TIA/EIA-568-B.3.
 2. Cable may be terminated on connecting hardware that is rack or cabinet mounted.
- D. Open-Cable Installation:
1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
 2. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.
- E. Group connecting hardware for cables into separate logical fields.
- F. Separation from EMI Sources:
1. Comply with BICSI TDMM and TIA/EIA-569-A recommendations for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
 2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
 - a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches.
 - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches.
 - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches.
 3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
 - a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches.
 - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches.

- c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12.
- 4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
 - a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
 - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3
 - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches.
- 5. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches.
- 6. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches

3.5 FIRESTOPPING

- A. Comply with requirements in Division 07 Section "Penetration Firestopping."
- B. Comply with TIA/EIA-569-A, Annex A, "Firestopping."
- C. Comply with BICSI TDMM, "Firestopping Systems" Article.

3.6 GROUNDING

- A. Install grounding according to BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.
- B. Comply with ANSI-J-STD-607-A.
- C. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch clearance behind the grounding bus bar. Connect grounding bus bar with a minimum No. 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.
- D. Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.

3.7 IDENTIFICATION

- A. Identify system components, wiring, and cabling complying with TIA/EIA-606-A. Comply with requirements for identification specified in Division 16 Section "Identification for Electrical Systems."
- B. Comply with requirements in Division 09 Section "Interior Painting" for painting backboards. For fire-resistant plywood, do not paint over manufacturer's label.
- C. Cable Schedule: Install in a prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Furnish an electronic copy of final comprehensive schedules for Project.
- D. Cabling Administration Drawings: Show building floor plans with cabling administration-point labeling. Identify labeling convention and show labels for telecommunications closets, backbone pathways and cables, entrance pathways and cables, terminal hardware and positions, horizontal cables, work areas, grounding buses and pathways, and equipment grounding conductors.
- E. Cable and Wire Identification:
 - 1. Label each cable within 4 inches of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.

2. Each wire connected to building-mounted devices is not required to be numbered at device if color of wire is consistent with associated wire connected and numbered within panel or cabinet.
 3. Exposed Cables and Cables in Cable Trays and Wire Troughs: Label each cable at intervals not exceeding 15 feet.
 4. Label each unit and field within distribution racks and frames.
 5. Identification within Connector Fields in Equipment Rooms and Wiring Closets: Label each connector and each discrete unit of cable-terminating and connecting hardware. Where similar jacks and plugs are used for both voice and data communication cabling, use a different color for jacks and plugs of each service.
- F. Labels shall be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket color but still complies with requirements in TIA/EIA 606-A, for the following:
1. Cables use flexible vinyl or polyester that flexes as cables are bent.
- 3.8 FIELD QUALITY CONTROL.
- A. Testing Agency: The Contractor shall engage a qualified testing agency to perform tests and inspections.
- B. Tests and Inspections:
1. Visually inspect optical fiber jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding and inspect cabling connections for compliance with TIA/EIA-568-B.1.
 2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
 3. Optical Fiber Cable Tests:
 - a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.1. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
 - b. Link End-to-End Attenuation Tests:
 - 1) Horizontal and multimode backbone link measurements: Test at 850 or 1300 nm in 1 direction according to TIA/EIA-526-14-A, Method B, One Reference Jumper.
 - 2) Attenuation test results for backbone links shall be less than 2.0 dB. Attenuation test results shall be less than that calculated according to equation in TIA/EIA-568-B.1.
- C. Data for each measurement shall be documented. Data for submittals shall be printed in a summary report that is formatted similar to Table 10.1 in BICSI TDMM, or transferred from the instrument to the computer, saved as text files, and printed and submitted.
- D. Remove and replace cabling where test results indicate that they do not comply with specified requirements.
- E. End-to-end cabling will be considered defective if it does not pass tests and inspections.
- F. Prepare test and inspection reports.

END OF SECTION

SECTION 28 3153

FIRE ALARM SYSTEM

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Provide fire alarm and smoke detection systems as specified hereinafter and as indicated on the drawings.
- B. Each system shall be put in operation, tested, and adjusted for satisfactory operation by authorized representatives of the equipment manufacturers.
- C. All equipment shall be suitable for operation on nominal 120 volt 60hz single phase electric power supply.
- D. The system shall be microprocessor based with addressable operation, completed for installation per NFPA 72A. Electronic equipment shall be of the solid state type.
- E. Sound systems shall provide clear, audible, and undistorted sound of the appropriate types, without feedback, hum, and other extraneous noises.
- F. Automatic detector installations shall comply with NFPA 72E.

1.2 RELATED SECTIONS

- A. DIVISION 8 - DOORS AND WINDOWS.
- B. DIVISION 9 - FINISHES.
- C. DIVISION 11 - EQUIPMENT.
- D. DIVISION 26- ELECTRICAL.
- E. Section 26 0100 - GENERAL PROVISIONS, ELECTRICAL.
- F. Section 26 0500 - BASIC MATERIALS AND METHODS, ELECTRICAL.

1.3 SUBMITTALS (Submit under provisions of Division 01)

- A. Manufacturer's name, brand name and catalog reference of equipment supplied. Submittal's shall be based on the specific installation and shall include the fire department conditions and notation of approval.
- B. Partial submittals are unacceptable.
- C. Wiring diagrams shall include equipment and building wiring schematic layouts. A drawing showing the building zones throughout the system shall be provided in a protected frame.
- D. Shop drawings shall include shapes, general construction and installation details.
- E. List of zones identifying devices on each zone.
- F. Catalog information of equipment.
- G. Bill of materials.
- H. Spare parts list.

- I. Service information including address of nearest representative.
- J. Installation, operation, testing, and maintenance manuals. Three copies.

PART 2 - PRODUCTS

2.1 FIRE ALARM SYSTEM

- A. Furnish and install all conduit, wire, outlet boxes, junction boxes, terminal equipment, and accessories to install a zoned, non-coded continuous ringing, battery standby, supervised fire alarm system. Include control panel, power supply, annunciator, initiating, control and indicating devices. The system shall be UL Listed and meet all national and local codes.
- B. Locations of the various system components shall be as indicated. The system shall be put in operation, tested, and adjusted for satisfactory operation by authorized representatives of the equipment manufacturer. All fire alarm equipment shall be UL listed, and shall be as manufactured by Simplex, Edwards Notifier or Honeywell. The devices and system control shall be manufactured by the same company and shall be UL Listed for the system involved. All catalog numbers listed below are those of Simplex Time Recorder Co., except as otherwise specified. Where the equipment of another manufacturer is used, the items of equipment shall be identified by manufacturer number and device description.
- C. All smoke detectors for the entire fire alarm system, including those located within the AC equipment and/or ducts, shall be furnished and wired under the Electrical Section. Smoke detectors located in the AC units and/or ducts shall be properly installed therein by the AC Section, ready for electrical connections all other smoke detectors shall be installed. Smoke detectors shall be equipped with analog sensitivity testing features.
- D. Operation: Activation of any smoke or any other automatic or manual fire alarm device shall initiate a fire alarm, and shall stop all AC unit fans, all exhaust and intake fans, and shall initiate a fire alarm on the local energy system of the Central Alarm Company.
- E. Coordinate the fire alarm system with the Fire Department, the AC Section (See CONTROL SYSTEM in the AC Section), and all other appropriate Sections.
- F. All Tamper Switches and Flow Switches when a sprinkler system is used, shall be wired by the electrical section. Flow and tamper switches shall be furnished and installed by the plumbing section, left ready for electrical connection. An addressable adapter module (ZAM) shall be provided for each device.
- G. If there are elevators in this project, the system furnished shall include elevator recall to the fire access floor with an alternate floor as required by codes. Outputs shall be provided to operate sprinkler system solenoid valves. Shaft and machines room heat and smoke detectors shall be provided.
- H. Make all other connections to other equipment, as indicated, and as required.
- I. The new fire station fire alarm system shall monitor the fire alarm system located in the existing air terminal building next door.
- J. Equipment Shall Include:
 - 1. Manual fire alarm stations: Simplex 2099 Series non-coded single action manual semi-flush or surface mounted, as applicable. Station shall be equipped with key lock for resetting. All stations and control panels shall be keyed alike. Provide addressable bases.
 - 2. Smoke detectors, photo electric type: Simplex 4098 Series flush mounted type for ceiling installation. The unit shall be completely shielded, contain mesh insect screens, dust proof, and have a locking screw for head removal. Provide addressable bases.

3. Smoke detectors, photo electric type for AHU's and ducts: Simplex type 4098. Unit shall include indicator, remote indicator output and auxiliary contact. For concealed ducts provide Type 4098 remote indicator. Consult manufacturer for proper location of detector. Provide addressable bases.
4. Combination Audible and Visual Signal: shall be Simplex 2903-9101 wall mounted, white lens with red lettering "FIRE". Unit shall be Xenon flashtype. The unit shall be equipped with tamper resistant lens, have adequate side visibility and be system compatible.
5. Annunciator: Shall be Simplex Type 4005 Series with zones as required. Provide a "B" auxiliary panel for remote control of the control panel. Each zone shall be backlighted, and shall have custom zone designations as directed.
6. Control Panel: Addressable modular micro processor based panel: Simplex Panel 4100-8001 Edwards ESA 2000, Notifier Model AM2020, or Faraday MPC2000, up to 104 input zones with at least 512 address points. Control Panel with the following features:
 - a. A central processing unit module shall provide a central location for the operating and indicating functions of the fire system. This module shall have switches for manual control of system reset, alarm signal silence, trouble signal silence, manual evacuation, city connection circuit disconnect, auxiliary one bypass and auxiliary two bypass. Indicators shall be provided for system trouble (Yellow), signal circuits 1 trouble (Yellow), signal circuit 2 trouble (Yellow), city or central station trouble (Yellow), annunciator trouble (Yellow), power trouble (Yellow), earth ground trouble (Yellow), AC power on (Green), Alarm indicators per initiating circuit (Red) and trouble indicators per initiating circuit (Yellow) shall be provided on the main control panel. LCD display shall be provided for program input functions and record of event output data. A tone device shall be provided to pulse on alarm and sound continuous in trouble. Provide 2 SPDT auxiliary fused alarm relays with contacts rated at 2 amps-30 VDC, one SPDT auxiliary trouble relay with contacts rated at 2 amps-30 VDC, one trouble output of 150 ma-24 VDC and a supervised annunciator output per zone of 150 ma-24 VDC. A city connection circuit shall be provided on the CPU Board. It shall be field selectable to provide 24 VDC remote station, local energy, shunt master box or form 'C' contact outputs. A power supply shall be provided to yield 5 amps-24 VDC output for the system. The on board battery charge shall charge system batteries to 70% of charge in 12 hours. A 2 amp 24 VDC filtered power output for 4 wire smoke detectors shall be provided as well as supervised remote inputs for alarm silence and system reset.
 - b. Supply additional zone modules to provide zones as shown on plans for a maximum number of initiating zones as limited by the listed control panel. Each circuit shall be able to operate two-wire smoke detectors as well as manual stations, heat detectors and other initiating devices.
 - c. Supply additional modules to provide signals as required for a minimum of 12 spare indicating appliance circuits after required system is provided. Capacity for each signal initiating circuit shall be minimum 1.5 amps, 24 volts but shall be of sufficient capacity to power all horns, audible and audible visual devices connected in the zone and on the circuit.
 - d. Supply manual override switches as required for fan control, damper control and light control. Switches shall be provided as HOA switches, two per module for a maximum of 8 switches. Control outputs shall be supervised to within three feet of the controlled device as defined in Life Safety Code, NFPA 101. Output circuits shall be controlled directly by the Panel CPU or the HOA switches without the use of an intermediary relay.
 - e. Provide transformer, fuses, auxiliary relays for central station, AHU shutdown, etc., and terminals necessary to meet above operations.
 - f. Standby battery shall be Simplex sealed rechargeable battery pack to be mounted in control panel. Battery capacity shall be sufficient to power system for 24 hours in standby followed by 5 minutes in alarm with devices operating per NFPA 72A.

- K. NOTE: ALL SMOKE DETECTORS FOR AHU'S, AND ALL OTHER DETECTION DEVICES THAT WILL BE CONNECTED TO SHUT DOWN AHU FANS, SHALL HAVE SUFFICIENT AUXILIARY CONTACTS FOR CONNECTION TO AC MASTER CONTROL BOARD, AS REQUIRED. THIS ALSO APPLIES TO SMOKE DETECTORS WHICH WILL BE CONNECTED TO CLOSE DAMPERS.

PART 3 - EXECUTION

3.1 INSTALLATION OF FIRE ALARM

- A. System installation shall be performed by personnel whose license is recognized to install fire alarm systems and who have been qualified by previous system installation experience on the equipment of the supplier. Final connections between equipment and the system wiring shall be made under the direct supervision of the equipment manufacturer representative.
- B. Install all wiring in metal conduit, in accordance with manufacturer's wiring diagram using TFN or other type listed by NFPA for non power limited fire protective signaling circuits. Use copper wire.
- C. Where smoke detectors are mounted in ducts above ceiling, mount the remote LED indicator through the ceiling, at the smoke detector location, so that it will be visible from the corridor or room. Provide a, 3/4 inch wide by length required, laminated white plastic nameplate engraved with "Smoke Detector" in 1/2 inch high black letters. Permanently attach the nameplate to the ceiling support grid or ceiling tile next to the indicator.
- D. Provide wiring for all fire alarm equipment. Provide wiring between devices and adapter or interfacing components.

3.2 FIELD TESTS

- A. Following complete installation, perform all operations specified in presence of Owner.
- B. Provide Owner with services of one capable instructor for a minimum of two days to familiarize using personnel with system operation and capability.

3.3 SYSTEM SERVICE

- A. Duly authorized systems agent shall be capable of providing service to the Owner within four hours of the Owners call including 24 hour and weekend periods.
- B. System shall be completely covered for one year service after the recorded date of field test completion. Calls and visits to the site shall be included.
- C. During the one year warranty period the Contractor shall reimburse the Owner for false alarm penalties charged by the Fire Department for fire alarms attributed to equipment malfunction.

END OF SECTION

SECTION 31 3116

TERMITE CONTROL

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Soil treatment with termiticide.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.3 SUBMITTALS

- A. Product Data: For each type of termite control product.
 - 1. Include the EPA-Registered Label for termiticide products.
- B. Qualification Data: For qualified Installer.
- C. Product Certificates: For termite control products, from manufacturer.
- D. Soil Treatment Application Report: After application of termiticide is completed, submit report for Owner's records and include the following:
 - 1. Date and time of application.
 - 2. Moisture content of soil before application.
 - 3. Termiticide brand name and manufacturer.
 - 4. Quantity of undiluted termiticide used.
 - 5. Dilutions, methods, volumes used, and rates of application.
 - 6. Areas of application.
 - 7. Water source for application.
- E. Warranties: Sample of special warranties.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located, and who employs workers trained and approved by manufacturer to install manufacturer's products.
- B. Regulatory Requirements: Formulate and apply termiticides and termiticide devices according to the EPA-Registered Label.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: To ensure penetration, do not treat soil that is water saturated or frozen. Do not treat soil while precipitation is occurring. Comply with requirements of the EPA-Registered Label and requirements of authorities having jurisdiction.
- B. Coordinate soil treatment application with excavating, filling, grading, and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs before construction.

1.6 WARRANTY

- A. Soil Treatment Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor, certifying that termite control work, consisting of applied soil termiticide treatment, will prevent infestation of subterranean termites. If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.
 - 1. Warranty Period: Five years from date of Final Completion.

1.7 MAINTENANCE SERVICE

- A. Continuing Service: Beginning at Substantial Completion, provide a proposal for continuing service including monitoring, inspection, and re-treatment for occurrences of termite activity. Provide a standard continuing service agreement. State services, obligations, conditions, terms for agreement period, and terms for future renewal options.

PART 2 - PRODUCTS

2.1 SOIL TREATMENT

- A. Termiticide: Provide an EPA-Registered termiticide, complying with requirements of authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation. Provide quantity required for application at the label volume and rate for the maximum termiticide concentration allowed for each specific use, according to product's EPA-Registered Label.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. BASF Corporation, Agricultural Products; Termidor.
 - b. Bayer Environmental Science; Premise 75.
 - c. FMC Corporation, Agricultural Products Group.
 - d. Syngenta.
 - 2. Service Life of Treatment: Soil treatment termiticide that is effective for not less than **five** years against infestation of subterranean termites.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for moisture content of soil per termiticide label requirements, interfaces with earthwork, slab and foundation work, landscaping, utility installation, and other conditions affecting performance of termite control.
- B. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's written instructions for preparation before beginning application of termite control treatment. Remove all extraneous sources of wood cellulose and other edible materials such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil within and around foundations.

- B. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated except previously compacted areas under slabs and footings. Termiticides may be applied before placing compacted fill under slabs if recommended in writing by termiticide manufacturer.
 - 1. Fit filling hose connected to water source at the site with a backflow preventer, complying with requirements of authorities having jurisdiction.

3.3 APPLICATION, GENERAL

- A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's EPA-Registered Label for products.

3.4 APPLYING SOIL TREATMENT

- A. Application: Mix soil treatment termiticide solution to a uniform consistency. Provide quantity required for application at the label volume and rate for the maximum specified concentration of termiticide, according to manufacturer's EPA-Registered Label, to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction. Distribute treatment evenly.
 - 1. Slabs-on-Grade and Basement Slabs: Underground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.
 - 2. Foundations: Adjacent soil, including soil along the entire inside perimeter of foundation walls; along both sides of interior partition walls; around plumbing pipes and electric conduit penetrating the slab; around interior column footers, piers, and chimney bases; and along the entire outside perimeter, from grade to bottom of footing. Avoid soil washout around footings.
 - 3. Crawlspace: Soil under and adjacent to foundations as previously indicated. Treat adjacent areas including around entrance platform, porches, and equipment bases. Apply overall treatment only where attached concrete platform and porches are on fill or ground.
 - 4. Masonry: Treat voids.
 - 5. Penetrations: At expansion joints, control joints, and areas where slabs will be penetrated.
- B. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.
- C. Protect termiticide solution, dispersed in treated soils and fills, from being diluted until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.
- D. Post warning signs in areas of application.
- E. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

END OF SECTION

ATTACHMENT 1



CONSTRUCTION SAFETY AND PHASING PLAN (CSPP)



MSCAA Project No.: 23-1476-17-02
Foth Infrastructure and Environment, LLC Project No.: 0025M300.17

Snow Removal Equipment Building – Phase 1

May 11, 2026

FINAL

Prepared for:
Memphis-Shelby County Airport Authority (MSCAA)
Memphis International Airport
Memphis, Tennessee

Prepared by:
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Purpose

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 CSPP is the culmination of that planning effort during the design of the project. MSCAA staff, the FAA, and critical stakeholders have provided input on this CSPP. It has been developed from guidance set forth in the FAA Advisory Circular 150/5370-2G, Operations Safety on Airports During Construction. It is imperative that the provisions set forth in this plan be reviewed by the Contractor prior to mobilizing to the site and the document be followed without alteration.

Prior to mobilization, the Contractor must submit a Safety Plan Compliance Document (SPCD) describing how the Contractor will comply with the requirements set forth in this CSPP. An example SPCD is provided as an appendix to this document.

If the Contractor sees a need to alter the CSPP in any way, a request must be submitted to MSCAA, in writing, prior to the start of construction. Please note that changes to the CSPP may require coordination with all impacted parties and, potentially, a resubmittal to the FAA. This can be a 90–120 day process. If the change is accepted, it will be treated the same as any other change to the contract documents.

If the Contractor's activities do not comply with the provisions of this CSPP, the Contractor will be issued a written request to immediately cease the non-compliant action until a meeting can be held to discuss the issues and all necessary corrective actions, to be performed by the Contractor, are in place. Delays for non-compliance with the CSPP will not result in an extension of the allotted contract time for any phase of work or the total contract. All liquidated damage provisions set forth in the contract will still apply.

Scope of Work

The scope of this project is the construction of new snow removal equipment building at MEM. This project is Phase 2 of the overall program. In this phase a 49,000 SF pre-engineered metal building designed to store snow removal equipment will be constructed. Overall scope will include building construction, relocated AOA fencing, concrete paving, and associated utilities. This includes PEMB construction, storm drainage, utility installation (fiber optic, electrical, water), fire sprinkler system, Portland cement concrete pavement, joint sealing, chain link fencing, and other efforts usually required for building construction.

Coordination

Airport operational safety during construction will be discussed at the pre-design, pre-bid, and pre-construction conferences. Construction progress meetings and meetings with the FAA Air Traffic Organization (ATO) will be coordinated as required throughout the contract.

The Contractor must provide contact information for key construction personnel prior to the start of the project. MSCAA will add engineering staff and key airport personnel to this list and it will be distributed to all relevant parties. Updated and current contact lists must be submitted if personnel change.

1. Prebid Conference

A pre-bid conference will be held for prospective bidders to ask questions and visit the site.

2. Preconstruction Conference

A pre-construction conference will be held prior to issuance of Notice to Proceed. Attendees will include MSCAA Engineering Staff, MSCAA Operations Staff, local air traffic control management (if necessary),

MSCAA Maintenance Staff, Engineer of Record, Engineer Field Staff (RPR), Contractor Project Superintendent, and Contractor Foreman, as well as the project foreman for each subcontractor employed by the prime Contractor. The agenda for this preconstruction conference will include a review of this CSPP.

3. Construction Progress Meetings

Construction progress meetings will be held throughout the duration of the project. Attendees will include MSCAA Engineering Staff, MSCAA Operations Staff, Prime Contractor, Project Superintendent and/or Foreman, and Engineer of Record and/or Engineer Field Staff (RPR). Local air traffic control management as well as airport tenants will be invited as needed, based on the project work impacting their operations on a week-to-week basis. Construction phasing and safety will be a standing agenda item at the weekly construction progress meetings.

4. Daily Coordination

At all times when construction activities are being performed on this project, the prime Contractor must have a foreman on-site who is authorized to make decisions regarding the operations and safety of all personnel employed by the Contractor and Subcontractors. The designated foreman will meet with Airport Operations Staff as work items being performed require.

5. ATCT Coordination

Coordination with ATCT will be as needed during the project. Only properly badged personnel with Class 3 driving privileges, Engineer Field Staff (RPR), or MSCAA will contact the ATCT during the project. The MEM Ground frequency is 121.9 MHz and MEM UNICOM frequency is 122.95 MHz.

6. CSPP Modifications

Proposed changes and substantial delays will require additional coordination with the airport and the FAA for the purpose of evaluating possible revisions to the CSPP. FAA shall approve of all proposed CSPP changes prior to execution.

Phasing

1. Locations, Durations, and Sequence of the Work

All work for each phase shall be completed in accordance with the project phasing plans, the project technical specifications, this CSPP, and the Contractor submitted SPCD.

The project has a duration of 160 calendar days and consists of two primary work areas. A calendar day is defined as any day on the calendar. It includes Saturdays, Sundays, Holidays, and non-workdays. Refer to the project plans for graphical depictions of the phases along with notes on phase-specific sequencing and operational requirements. In general, the phases are as follows:

a. Phase 1

Phase 1 work has a duration of 120 calendar days and has no sub-phases. Phase 1 consists of work done in the inside lanes of the VSR. Traffic will be maintained on the outside lanes during this phase.

Affected Areas of Operations

1. Operational Affect Table

Operational Requiremen	Normal	Phase 1	Phase 2
Runway 18R/36L	9,320' length ADG D-V	Open	Open
Runway 18C/36C	11,120' length ADG D-V	Open	Open
Runway 18L/36R	9000' length	Open	Open
Runway 9/27	9000' length	Open	Open
All other Taxiways	Varies	Open	Open

Navigational Aid (NAVAID) Facilities

Aircraft Navigational Aids provide visual and electronic information that is used by pilots who operate and land aircraft at the airport. Construction activities can have negative impacts on the functionality and serviceability of NAVAIDS.

There are no anticipated impacts to NAVAIDS associated with this project.

Contractor Access

1. Stockpiled Materials/Staging Location

Stockpiled materials and equipment storage are not permitted within active Safety Areas (RSA/TSA), Object Free Zones (OFZ), and Object Free Areas (OFA) of an operational runway or taxiway. Staging and stockpile location(s) are shown in the plans and may be located within the AOA.

There is one staging area for this project: Located within project limits.

Stockpiles are limited to maintain a clear line of sight from the Air Traffic Control Tower to all active taxiways and runways. Stockpile locations shall not be located over any MSCAA or FAA electrical/communications infrastructure.

a. Height

Stockpile height limits for material will be 20 feet.

b. Wildlife Attractant

The Contractor must manage stockpiles so that they do not attract wildlife (Refer to Wildlife Management Section below).

c. Foreign Object Debris (FOD)

The Contractor must manage stockpiles so that they do not create FOD (Refer to Foreign Object Debris (FOD) Management section below).

2. Vehicle and Personnel Operations

a. Access to Airport Operations Area (AOA)

The airport operations area is defined by the perimeter fence surrounding the airfield. Access onto the AOA is through any number of gates along the fence or doors through buildings. Contractor access onto the AOA is limited to Gate FX-WN-1.

No person shall enter upon the Air Operations Area (AOA) or any other restricted area except Contractors that have been authorized and have completed security badge training and have been assigned to duty therein, or personnel escorted by an appropriately badged escort.

b. Mechanisms to Prevent Improper Movement

Contractor operations within the AOA are limited to the areas shown on the project phasing plans. A visual boundary will be installed by the Contractor around the work area. The boundary will consist of lighted low-profile barricades on pavement surfaces (when closed) at the perimeter of the work area and/or orange traffic cones, generally aligning with Object Free Area limits of adjacent operational pavement. Additionally, the boundary will consist of high-visibility orange safety fence on turf surfaces, installed as shown on detail in project plans. The project phasing plans show the location of the work area boundary. Construction vehicles and personnel shall not cross barricades without an approved escort.

c. Parking Areas for Personal Vehicles and Equipment

Contractor employee personal vehicles shall be parked outside of the AOA. Employee parking shall be as shown on the plans. Contractor employee personal vehicles shall not be driven inside the AOA. Contractor vehicles and equipment are allowed inside of the project work area within the AOA. Equipment staging/parking areas are shown on the project phasing plans and must be approved in advance by the MSCAA.

d. Haul Routes

The phasing plan sheets depict haul routes from adjacent public roadways to the individual phase work areas through the airport perimeter fence. Contractor access and hauling operations are strictly limited to the haul route shown. Prior to the start of construction, the Contractor, Engineer and Owner will review haul routes and document existing condition. Following completion of construction, the Contractor, Engineer, and Owner will review haul routes and document condition. The Contractor is required to restore haul routes to original condition.

e. Contractor Vehicle Marking and Lighting

Each Contractor licensed vehicle must display a company logo on both sides of sufficient size to be recognizable to personnel in the control tower. Signs must be a minimum of 200 square inches and be approved by the airport. Specialized construction equipment does not require signs. Each Contractor licensed vehicle must have a yellow/amber rotating beacon affixed to the uppermost part of the vehicle. Lights must be visible from any direction, including the air. Construction equipment does not require rotating beacon lights during day operations, provided an aircraft warning flag is displayed at the highest point of the equipment. Contractor vehicle

marking and lighting is the sole responsibility of the Contractor. The airport will not provide markings, flags, or lights.

3. Radio Communications

a. Two-Way Radios

Contractors may utilize two-way radios on the project provided that they do not interfere with existing Airport and FAA communication equipment and frequencies.

b. Air Traffic Control (ATC) Radio Communication

For this project, when the Contractor requires access to the movement area, staff with Class 3 driving privileges or the Engineer Field Staff (RPR) will communicate with ATCT.

4. Airport Security

- a. The Memphis-Shelby County Airport Authority (MSCAA) conducts its security operations in a serious manner and incorporates its mandated security directives to the letter. The management of the Airport fully expects all Tenants and Contractors to help enforce security regulations. The MSCAA strictly enforces the requirements on issuance and use of Airport identification/access media. Companies and individuals found to be in non-compliance with rules and regulations outlined in this manual may face revocation of access privileges and/or prosecution. The Contractor shall comply with all security requirements as outlined in the contract documents.
- b. The Contractor shall provide security at entry points, staging/storage locations, employee parking areas, and the work areas.

5. TSA Requirements

The Transportation Security Administration (TSA) through several Transportation Security Regulations (TSR) has the regulatory power to assess fines for breaches of airport security. The TSA will test the Contractors security means and methods for compliance with applicable security codes and regulations throughout the course of the project. Accordingly, if the Contractor is found culpable for security breaches, fines assessed to the Airport will be collected from the Contractor.

6. Security Badging Requirements

The Contractor will be required to obtain security badging in accordance with the requirements in the Specification.

7. Contractor Access

The Contractor shall be responsible for controlled access to the work site. The Contractor shall provide and manage security/badged personnel at proposed access locations.

Wildlife Management

1. Trash

Food scraps must be collected from construction personnel activity continuously.

2. Standing Water

Any activity taking place that creates a standing body of water must be remedied within 24 hours.

3. Tall Grass and Seeds

If needed within the project area, the contractor shall be responsible for mowing the grass within their work areas. Mowing schedules have been established to maintain, when possible, a height of 6 to 10 inches to help prevent large flocks of starlings, crows, and other species from becoming a hazard. It will be the responsibility of the Contractor to establish and maintain a schedule that allows a maximum grass height of 10 inches within the construction work area.

4. Poorly Maintained Fencing and Gates

Periodic perimeter fence inspections are required by the Contractor to ensure the fence is secured. Fence inspections performed by the contractor shall be within the vicinity of the project area, staging area, and site access points. Any issues shall be reported to MSCAA Operations or the MSCAA Project Engineer. These inspections also include identifying any animal digs that are located under the fence and ensuring that perimeter gates and drainage gates are tightly secured to prevent animal access. In addition, Contractors will take appropriate actions to reduce any other observed wildlife activity.

5. Disruption of Existing Wildlife Habitat

While this will frequently be unavoidable due to the nature of the project, Contractor personnel should immediately notify airport operations of a wildlife sighting.

Foreign Object Debris (FOD) Management

1. Description of FOD

Foreign object debris at airports includes any object found in an inappropriate location that can damage aircraft, equipment, or airport personnel. On construction sites, FOD typically is comprised of loose gravel, blowing sand, dust, wire bristles from sweeper heads, food wrappers, and material packaging. The presence of FOD on an airport's air operations area (AOA) poses a significant threat to the safety of air travel. FOD has the potential to damage aircrafts during critical phases of flight, which can lead to catastrophic loss of life and airframe, and at the very least increased maintenance and operating costs.

2. Methods of FOD Control

a. Training

The Contractor shall provide training to all employees working within the AOA on effective FOD management. Training shall include description and consequences of FOD, FOD awareness, and housekeeping procedures.

b. Housekeeping

Preventing FOD from occurring is the most effective form of FOD management. The Contractor must monitor construction activities and proactively develop a plan to prevent FOD from occurring. Typical FOD prevention measures include the use of covered trash containers, covered loads, zero tolerance of littering, and tying down items which may be easily wind-blown.

c. Ground Vehicle Tire Inspections

Prior to entering active airfield pavement, the Contractor must perform a vehicle tire check for any loose rocks that may be in the tread. Tires covered in mud must be cleaned prior to entering active airfield pavement in order to prevent tracking of dirt.

d. Pavement Inspections

Prior to opening completed portions of pavement work to airport operations, the Contractor shall keep the entire pavement surface clean and to the satisfaction of the Owner. Work areas will be inspected and approved by the MSCAA prior to opening the area to aircraft operations. This includes conducting a FOD walk with the RPR and MSCAA operations staff prior to opening.

e. FOD Inspections

Refer to Inspection Requirements section for FOD inspection requirements. The Contractor shall keep the project site and vehicles clean, employing a “clean as you go” approach throughout the project.

Hazardous Material Management

1. Haz-Mat Procedures

Haz-Mat Procedures are to be developed by the Contractor and submitted to the Engineer for review and Owner’s records, including but not limited to:

- a. Fuel Storage Locations
- b. Spill Procedures
- c. MSDS

All temporary fuel storage tanks brought to the site must be double walled and placed in secondary containment. In addition, the tanks must be permitted by the fire marshal prior to use.

Notification of Construction Activities

1. List of Responsible Representatives

Persons who have questions concerning policies, procedures, or requirements of the Airport Security Program, should contact Airport Administration. Persons who observe a security violation, suspicious act, or any serious act that may endanger persons or property should immediately contact Airport Public Safety.

a. Emergency	(901) 922-8333
b. MSCAA Emergencies	(901) 922-8333
c. MSCAA Operations Center	(901) 922-8117
d. MSCAA Communication Center	(901) 922-8298
e. NAVAID Emergency Contract	1-866-432-2622

2. NOTAMs

Contractor shall coordinate with the Engineer Field Staff (RPR) and Airport Operations personnel for the issuance of all NOTAMs related to the project construction. Airport Operations and FAA shall generate and issue NOTAMs based on Contractor construction schedules and facility impacts.

3. Emergency Notification Procedures

In the case of a life-threatening situation, dial 911 and Airport Public Safety immediately thereafter. Airport Public Safety will coordinate any emergency response.

4. Aircraft Emergencies

In the event of an aircraft emergency, the Engineer Field Staff (RPR) will coordinate with Aircraft Rescue and Fire Fighting (ARFF) and the FAA and all construction personnel shall stop work and wait for direction from Airport Public Safety. In the event evacuation is requested, personnel shall immediately vacate the work site, secure construction access gate(s), and return when cleared by Airport Public Safety.

5. Coordination with ARFF Personnel

The Contractor must coordinate, through the RPR, with ARFF personnel, mutual aid providers, and other emergency services if construction requires the following:

- a. The deactivation and subsequent reactivation of water lines or fire hydrants.
- b. The re-routing or blocking of emergency access routes.
- c. The use of hazardous materials on the airfield.

Inspection Requirements

1. FOD Inspection

During construction, the Contractor shall continuously monitor for FOD and remove immediately.

2. Contractor Inspection

- a. Prior to opening completed work areas and pavement to aircraft operations, the contractor shall coordinate with Airport Operations for inspection of the work area. Pavements must be free of all dirt, sand, gravel, wire bristles, or any other objects that could cause damage to aircraft engines. All soil areas must be free of dirt clods, ruts, or surface irregularities that could damage an aircraft should it leave the pavement.
- b. Daily inspections shall be completed to assure all traffic control devices are in proper locations and working order.

3. Airport Operations Inspection

The MSCAA staff will conduct pavement inspections prior to opening any pavement to aircraft operations.

4. Final Inspections

Before re-opening closed sections of the airport to operations, the Contractor, Airport Operator, and Engineer Field Staff (RPR) shall inspect the area. Upon their concurrence that the area is safe to operate aircraft, the area will re-open.

Underground Utilities

Special attention shall be given to preventing unscheduled interruption of utility services and facilities. It is the Contractor's responsibility to locate all existing utilities and underground airport facilities that may be affected by this project and to verify their exact location and elevation prior to commencing work.

Electrical cables, telecommunication lines, overhead electrical lines, FAA communication lines, jet fuel lines, sanitary sewer lines, storm water lines, gas lines, and water lines may be located in the limits or vicinity of work limits. Utilities interfering with construction shall be reset or relocated by the Contractor or utility company concerned, unless noted otherwise. The Contractor shall give proper notice to all utility companies and facility owners regarding removal/relocation or when working in the vicinity of utility lines and airport facilities.

The Contractor shall call Tennessee 811 and submit a completed MSCAA On Airport Utility Locate Request form to the Engineer Field Staff (RPR) 72 hours prior to digging on site. The Contractor will verify with all parties the location of all utilities before digging begins. Prior to digging near a utility, the contractor shall pothole the utility to physically verify its location and depth. The Contractor shall use extreme care in digging around the utility so as not to cause any damage to the utility. All subcontractors performing excavation activities shall follow the same procedures as outlined above.

Penalties

The following penalties will be administered by the Airport, FAA, and Transportation Security Administration (TSA) as allowed per the requirements of the Construction Safety and Phasing Plan.

1. Escort Violation and Piggybacking, Wearing of Security Badge, Challenging Penalties

The following penalties apply for all persons: who do not properly display their security badge on the upper body (waist level or above) on the outermost garment; who do not challenge another person in their area who is not properly displaying their security badge; who allow another person to piggyback on their card through an entry; or who allow unauthorized access to the SIDA through an entry. It is necessary for each employee entering the SIDA/AOA to enter their PIN along with having their badge read by the appropriate device.

- a. 1st Offense Penalty—Airport badge for each employee involved will be suspended for a minimum of seven (7) days, at the discretion of the Airport Security Coordinator (ASC) depending on the severity of the security infraction. The employee must attend MSCAA security training.
- b. 2nd Offense Penalty—Airport badge for each employee involved will be suspended for a minimum of thirty (30) days, at the discretion of the ASC depending on the severity of the infraction. The employee(s) and their supervisors(s) must attend security training.
- c. 3rd Offense Penalty—Airport badge for each employee will be suspended for one (1) year. The employee(s) and their supervisors(s) must attend security training. Reinstatement is at the sole discretion of the MSCAA ASC.

2. Runway Incursions

A runway incursion is any unauthorized intrusion onto a runway, regardless of whether or not an aircraft presents a potential conflict. See runway incursion penalty table below:

Runway Incursion Category	Description	Penalty
Category A	A serious incident in which a collision was narrowly avoided.	\$1500 and Rescission of Access to the AOA
Category B	An incident in which separation decreases and there is a significant potential for collision, which may result in a time critical corrective/evasive response to avoid a collision.	\$500 and Rescission of Access to the AOA
Category C	An incident characterized by ample time and/or distance to avoid a collision.	Rescission of Driving Privileges
Category D	An incident that meets the definition of runway incursion such as incorrect presence of a single vehicle/person/aircraft on the protected area of a surface designated for the landing and take-off of aircraft but with no immediate safety consequences.	Written Warning

Violations of the CSPP outside of runway incursions will be assessed a written warning for the first violation and then \$500 per violation thereafter.

3. Returning Airport Badge

All security badges issued by the MSCAA Identification Office are the property of the Memphis-Shelby County Airport Authority and must be returned upon expiration, separation of employment (for any reason), when job function no longer requires an airport-issued security badge, and/or upon demand from the MSCAA. Retainage will not be related until all badges have been returned at the end of the project. Any misuse or willful failure to return a security badge is punishable by criminal prosecution. Security badges are non-transferable and must be used only by the person to whom they are issued. The security badge must be returned to the Company manager/supervisor at the end of employment and, in turn, by the Company to the MSCAA Identification Office.

4. Driver—Restricted Areas

All restricted area (SIDA/AOA) drivers shall possess and carry a valid US driver's license while driving on MSCAA restricted area roadways. Each driver is required to receive behind the wheel driver's training on the SIDA/AOA by their Employer and must take and successfully pass the written examination administered by the MSCAA at the security training class.

5. Releasing Airport Security Information

No person issued a security badge may divulge any information concerning an act of unlawful interference with civil aviation if such information is likely to jeopardize the safety of domestic or international aviation, or regarding any airport or airport tenant's security system to unauthorized persons.

6. Lost, Stolen, or Misplaced Security Badges

Immediately report to the Airport Authority by all means available NO EXCEPTIONS. Report to the ID Office 901-922-8788; if outside normal business hours, report to the MSCAA Communication Center at 901-922-8298. You must speak with Airport Security Personnel to report the unaccounted-for Security Badge.

7. Authority and Legal Action

The airport public safety department and designated airport security coordinators can issue violations resulting from poor or improper driving or security procedures. It is also the responsibility of all badge holders to notify public safety immediately when a possible breach in security has occurred.

8. FOD

The airport has a zero-tolerance approach to FOD, and the Contractor may be subject to fines from the Airport, FAA, or other agencies for failure to properly manage FOD during construction activities.

Special Conditions

In the case of an aircraft in distress or an accident, all Contractor personnel must remove all equipment from the project site and return to the staging area. The project will be suspended until clearance is given from the Engineer Field Staff (RPR) and the Airport Operator. In the event of a V/PD, the project will be suspended until a safety meeting and de-briefing of the incident occurs. In the event of a declared severe weather event, including an event requiring low-visibility operations/surface movement guidance and control system (LVO/MGCS) procedures, airport operations personnel may request the Contractor to temporarily suspend operations and vacate the premise until the event is over.

Runway and Taxiway Visual Aids—Marking, Lighting, Signs, and Visual Aids

Areas where aircraft will be operating are clearly and visibly separated from construction areas. Throughout the duration of the construction project, verify that these areas remain clearly marked and visible at all times.

1. General

Airport markings, lighting, signs, and visual NAVAIDs must be clearly visible to pilots and not be misleading, confusing, or deceptive. All must be secured in-place to prevent movement by prop wash, jet blast, wing vortices, or other wind currents and constructed of materials that would minimize damage to an aircraft in the event of inadvertent contact.

2. Markings

Markings must be in compliance with the standards of AC 150/5340-1, Standards for Airport Markings. Runway and exit taxiways closed to aircraft operations are marked with a yellow X.

a. Temporary 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.

b. Temporary 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.

c. Temporary Closure X

Construct the temporary closure X from any of the following materials: fabric, colored plastic, painted sheets of plywood, snow fence, or similar materials. They must be yellow and properly configured and appropriately secured to prevent movement by prop wash, jet blast, or other wind currents.

d. Temporary Markings

The application rate of paint to mark a short-term temporary runway and taxiway marking may deviate from the standard, but the dimensions must meet the existing standards.

3. Lighting and Visual NAVAIDs

Lighting must be in conformance with AC 150/5340-30, Design and Installation Details for Airport Visual Aids, and AC 150/5345-50, Specifications for Portable Runway and Taxiway Lights. When disconnecting runway and taxiway lighting fixtures, disconnect the associated isolation transformers. Alternatively, 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 aboveground temporary wiring in rigid conduit to prevent electrocution and fire ignition sources. Where possible, avoid allowing equipment and vehicles to drive over the conduit. If this cannot be avoided, the Contractor must protect the conduit from movement and damage with ramps that distribute the load away from the conduit. All temporary protection measures must be submitted to the Engineer Field Staff (RPR) prior to use.

4. Temporarily Closed Runways

If available, use a lighted X, both at night and during the day, placed at each end of the runway facing the approach. 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.

5. Partially Closed Runways and Displaced Thresholds (not used)

6. 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 such a way to prevent light leakage.

7. 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. To the extent possible, signs must be in conformance with AC 150/5345-44, Specifications for Runway and Taxiway Signs and AC 150/5340-18, Standard for Airport Sign Systems. At any time, if a sign does not serve its normal function, it must be covered or removed to prevent misdirecting pilots.

Marking and Signs for Access Routes

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.

Hazard Marking, Lighting, and Signing

- a. Low profile barricades with flashing red lights will be used at the perimeter of all pavement closures. Barricade spacing shall be as shown on the plans. Refer to the phasing plans for exact locations of low-profile barricades. Barricade placement and operation of flashing red lights shall be checked daily, at a minimum, for proper placement and operation and fixed immediately upon discovery of any deficiencies.
- b. All construction vehicles shall have an amber rotating beacon and signage.
- c. All construction equipment shall have an orange and white aircraft warning flag.
- d. All tall construction equipment shall have a red obstruction light in addition to an orange and white aircraft warning flag.
- e. The Contractor shall provide a representative on-call 24-hours a day for emergency maintenance of hazard marking, barricades, lighting and signage.

Work Zone Lighting

All work is anticipated to be constructed during daytime hours. If a need for night work arises, the Contractor must submit a work zone lighting plan to the RPR.

Protection of Runway and Taxiway Safety Areas

Runway Safety Areas (RSA), Taxiway Safety Areas (TSA), Obstacle Free Zones (OFZ), Object Free Areas (OFA), and approach surfaces must be protected during construction and are shown on the plan sheets. Protection of these areas includes limitations on the locations and height of equipment and stockpiled material. See the plan sheets of the CSPP for locations and dimensions of the protected areas.

1. Runway Safety Area (RSA) and Taxiway Safety Area (TSA)

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. 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. Construction activities within the existing RSA and TSA are subject to the following conditions:

- a. No construction may occur within the existing RSA or TSA while the corresponding runway or taxiway is open for aircraft operations.
- b. Open trenches or excavations are not permitted within the RSA or TSA while the corresponding runway or taxiway is open. If possible, backfill trenches before the runway or taxiway is opened. If the runway or taxiway must be opened before the excavations are backfilled, cover the excavations appropriately. Covering for open trenches must allow safe operation of the heaviest aircraft operating on the runway or taxiway across the trench without damage to the aircraft. Construction Contractors must prominently mark open trenches and excavations at the 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.

- c. Soil erosion must be controlled to maintain RSA and TSA standards. The RSA and 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 the occasional passage of aircraft without causing structural damage to the aircraft.

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.

3. 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 TOFA while the taxiway is open for aircraft operations.

- a. Construction activity may be accomplished within the TOFA subject to the following restrictions:
 1. Appropriate NOTAMs are issued.
 2. Marking and lighting meeting the provisions of this CSPP are implemented.
 3. Five-foot clearance is maintained between equipment and materials and any part of an aircraft (includes wingtip overhang). In these situations, flaggers must be used to direct construction equipment and wing walkers will be necessary to guide aircraft. Wing walkers should be airline/aviation personnel rather than construction workers.

4. 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.

5. Runway Approach/Departure Areas and Clearways

All personnel, materials, and/or equipment must remain clear of the applicable threshold siting surfaces as shown on the plan sheets of the CSPP. Objects that do not penetrate these surfaces may still be obstructions to air navigation.

Other Limitations on Construction

- a. Tall equipment used by the Contractor requires airport approval and a 7460-1 determination letter issued by the FAA for such equipment.
- b. All Contractor's construction equipment shall require an orange and white flag.
- c. The use of open flame welding or torches is prohibited unless fire safety precautions are provided and airport operations has approved their use. A hot work permit must be obtained and the airport's Hot Work Program followed.

- d. The use of electrical blasting caps is prohibited on or within 1,000 feet of airport property.
- e. Construction suspension may be required during specific airport operations. The Airport Operator will notify the Contractor and Engineer if this is required.
- f. Emergency Aircraft Rescue and Firefighting (ARFF) access in and around the site must be maintained by the Contractor at all times. Any hazards, open trenches, or excavations near the ARFF access must be clearly marked and lighted with red lights during hours of restricted visibility or darkness.

ATTACHMENT 2

**ATTACHMENT B: AC 150/5370-2G SAFETY COMPLIANCE DOCUMENT (SPCD)
WORKSHEET FOR AIRPORT PROJECTS**

Contractor's Responsibility

Following Federal Aviation Administration Advisory Circular 150/5370-2G, this SPCD shall be submitted to the Engineer and to the airport operator for review and approval. This should be submitted 14 days prior to the preconstruction conference. The notice-to-proceed cannot be issued without approval of this document.

The SPCD shall be prepared in a detailed, written and pictorial format (if needed) that identifies the timing and methodology for the contractor's compliance with the project's Construction Safety and Phasing Plan (CSPP) located in the construction plans & specifications. Any analysis and determination can be made of the proposed modification.

Project Information

Project ID: _____ Airport: _____
Description of Project: _____
Type of Work: _____
Prime Contractor: _____
Address: _____
Contractor Contact: _____ Phone: _____
BOA Project Manager: _____ Phone: _____
Airport Operations Contact: _____ Phone: _____

The following shall be complement the safety plan compliance document:

1. Contractor shall have copies of the CSPP and SPCD available at all times for reference by the airport operator and its representatives, and by subcontractors and contractor employees.

Location (s) of CSPP and SPCD:

2. Provide a point of contact who will coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport. Project will require a 24-hour coverage.

Point of Contact: _____ Phone: _____

3. Contractor's on-site employees responsible for monitoring compliance with the CSPP and SPCD whenever active construction is taking place.

Contact Person: _____ Phone: _____
Contact Person: _____ Phone: _____

4. The contractor shall list all proposed deviations or modifications to the CSPP. For each alteration, the contractor shall provide:
- a. The reason why the alteration is desired
 - b. Provide a sufficient narrative description and/or pictorial descriptions of the proposed change so a complete review of the proposal can be made.
 - c. If no alterations are to be made to the CSPP, clearly state; **“No alterations to the CSPP are proposed.”**

The following are proposed deviations or modifications to the CSPP:

(Attach additional sheets as needed)

5. The contractor shall provide a list of the specific hazard equipment and lighting that will be employed to ensure compliance.

The following are proposed hazard equipment and lighting for the project:

(Attach additional sheets as needed)

6. The contractor shall describe the frequency of 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. Inspections shall ensure that all proper safety devices, signs, demarcations etc. are in place and in proper working order in accordance with the approved CSPP & SPCD. A Construction Project Daily Safety Checklist is attached to aid in making a thorough inspection.

The inspection frequency will be _____.

7. Provide a description and schedule for any anticipated supplemental submittal through the airport operator of Form 7460-1 for the purpose of conducting aeronautical study of contractor, equipment such as tall equipment (cranes, concrete pumps, and other equipment), stock piles, and haul routes when difference from cases previously filed as part of the CSPP.

An additional Form 7460-1 will/will not (circle one) be required. If additional Form 7460-1 will be required, they will be submitted by _____.

8. Provide a description of the contractor's plan to ensure that the construction personnel are familiar with the safety procedures and regulations on the airport, the CSPP, and the SPCD.

(Attach additional sheets as needed)

SPCD Amendment

The SPCD shall be amended anytime there is a construction practice proposed by the contractor that does not conform to the CSPP and SPCD and may impact the airport's operational safety. This will require a revision to the CSPP and SPCD and re-coordination with the airport operation and the FAA in advance.

Certification

I certify that we understand the operational safety requirements of the CSPP and assert that we will not deviate from the approved CSPP and SPCD unless written approval is granted by the airport operator.

Print Name: _____ Title: _____

Signature: _____ Date: _____

Note to Contractor: Please provide copies of your company's general safety policy as an attachment.

Appendix D. AC 150/5370-2G – December 13, 2017

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 constructor may use to aid in identifying and correcting potentially hazardous conditions. It should be customized as appropriated for each project.

Table D-1. Potentially Hazardous Conditions

Item	Action Required (Describe)	Or	None
Excavation adjacent to runways, taxiways, and apron improperly backfilled.			☐
Mounds of earth, construction materials, temporary structures, and other obstacle near any open runway, taxiway, or taxi lane; in the related Object Free area and aircraft approach or departure areas/zones; or obstructing any signs or marking.			☐
Runway resurfacing projects resulting in lips exceeding 3 in (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 approach zones.		
Improperly positioned or malfunctioning lights or unlighted airport hazards, such as holes or excavations, or 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, and 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 the construction personnel activity), grass seeds, tall grass, or standing water – or any 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.		

Failure to issue, update, or cancel NOTAMs about airport or runway closures or other construction 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 aircrafts 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).		☐
Failure to provide for proper electrical lockout and tagging procedures. At larger airports with multiple maintenance shifts/works, construction contractors should make provisions for coordinating work on circuits.		☐
Failure to control dust. Consider limiting the amount of area from which contractor is allowed to strip turf.		☐
Exposed wiring that created 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.		☐

ATTACHMENT 3



Memphis-Shelby County Airport Authority COMPREHENSIVE STORM WATER POLLUTION PREVENTION PLAN

**For Contractors Performing
Construction Activities at the
Memphis International Airport
Under Permits TNR10-0000 and TNR15-0091**

Comprehensive Storm Water Pollution Prevention Plan

Appendix A: Figures

Appendix B: Permit and Forms

Appendix C: Best Management Practices

Appendix D: Spill Response Notification

Appendix E: Site Specific Information

**Prepared By:
Lori Morris, P.E.
Manager of Environmental Services, MSCAA**

**Version 5
June 2022**

Comprehensive Storm Water Pollution Prevention Plan

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Appendix C	Best Management Practices
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Appendix E	Site Specific Information

**COMPREHENSIVE STORM WATER POLLUTION PREVENTION PLAN
CERTIFICATION PAGE**

Name of Construction Project: All Construction Projects at Memphis International Airport
(Oct. 2021 – Sept. 2026)

Location of Facility: Memphis International Airport (MEM)
2491 Winchester Road, Suite 113
Memphis, Tennessee 38116-3856

MANAGEMENT CERTIFICATION

"I certify under penalty of law that this document and all attachments were prepared by me, or under my direction or supervision. The submitted information is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. As specified in Tennessee Code Annotated Section 39-16- 702(a)(4), this declaration is made under penalty of perjury."

Terry Blue

Terry Blue (Jun 8, 2022 14:44 PDT)

Signature: Mr. Terry Blue
Memphis-Shelby County Airport Authority
Vice-President, Operations

Jun 8, 2022

Date

CONTRACTOR CERTIFICATION

"I certify under penalty of law that I have reviewed this document, any attachments, and the SWPPP referenced above. Based on my inquiry of the construction site owner/developer identified above and/or my inquiry of the person directly responsible for assembling this NOI and SWPPP, I believe the information submitted is accurate. I am aware that this NOI, if approved, makes the above-described construction activity subject to NPDES permit number TNR100000, and that certain of my activities on- site are thereby regulated. I am aware that there are significant penalties, including the possibility of fine and imprisonment for knowing violations, and for failure to comply with these permit requirements. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury."

Signature

Date

Printed Name

Title

Company Name

Phone Number

Company Address

Signature Page for MEM Construction SWPPP

Final Audit Report

2022-06-08

Created:	2022-06-08
By:	Lori Morris (lmorris@flymemphis.com)
Status:	Signed
Transaction ID:	CBJCHBCAABAavyxOs9bkCvSt5jNfJK-t6aOE5Uhus8m

"Signature Page for MEM Construction SWPPP" History

-  Document created by Lori Morris (lmorris@flymemphis.com)
2022-06-08 - 2:17:09 AM GMT- IP address: 162.229.86.238
-  Document emailed to Terry Blue (tblue@flymemphis.com) for signature
2022-06-08 - 2:17:38 AM GMT
-  Email viewed by Terry Blue (tblue@flymemphis.com)
2022-06-08 - 9:43:50 PM GMT- IP address: 104.28.116.131
-  Document e-signed by Terry Blue (tblue@flymemphis.com)
Signature Date: 2022-06-08 - 9:44:12 PM GMT - Time Source: server- IP address: 107.115.99.4
-  Agreement completed.
2022-06-08 - 9:44:12 PM GMT



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1.0 INTRODUCTION

The State of Tennessee Department of Environment and Conservation (TDEC) has authorized the discharges of storm water from all construction sites at the Memphis International Airport (MEM) under the Tennessee General Permit Number TNR10-0000 and the MEM Permit Tracking Number TNR15-0091, provided that the permit provisions are adhered to and the State of Tennessee (the State) receives formal application 30 days before groundbreaking from the parties responsible for a construction project at MEM. Under TNR10-0000 and TNR15-0091, both the Memphis-Shelby County Airport Authority (MSCAA) and the contractors performing the construction activities are responsible for complying with the permits. MSCAA has developed this Comprehensive Storm Water Pollution Prevention Plan (SWPPP) to assist contractors in complying with the provisions of TNR10-0000 and TNR15-0091 and to coordinate the compliance responsibilities of the contractors and subcontractors engaged in construction activities on properties owned or managed by MSCAA.

MSCAA originally obtained permit coverage and prepared a SWPPP under TNR10-0000 in 2001. On June 16, 2005, MSCAA obtained coverage under a new general permit and prepared a revised SWPPP (Version 2) dated June 2006. On May 24, 2011, MSCAA obtained coverage under a new general permit and prepared a revised SWPPP (Version 3) dated November 2011. On October 1, 2016, MSCAA received automatic coverage under the general permit and has prepared this revised SWPPP (Version 4) dated February 2017. On October 1, 2021, MSCAA received automatic coverage under the new general permit and has prepared this revised SWPPP (Version 5) dated June 2022. This SWPPP must be updated no later than 12 months following any new permit effective date.

1.1 Construction Activities at MEM

MEM is an onshore air transportation facility located in the south-central area of the City of Memphis, Tennessee. Construction of taxiways, runways, parking areas, and terminals is ongoing. MEM is a full-scale air transportation facility with tenants that provide commercial passenger and freight service, aircraft maintenance, fueling, de-icing, storage for private aircraft, and executive flight services.

Of the 4,800 acres at MEM, up to 350 acres are expected to be disturbed by construction during the term of this permit. A significant portion of the construction will take place on currently impervious airport facilities being retrofitted. However, a net loss of pervious area at the airport is expected over the next 5 years.

1.2 Areas Covered Under TNR15-0091

Construction projects covered under this permit include, but are not limited to, Reconstruction of Taxiway Alpha, Tree Clearing Project, south of Airfield, Demolition of south end of Concourse C, and site preparation for MRO Hangar west of the MEM Fuel Farm. Equipment staging areas, materials storage areas, excavated materials holding and/or disposal areas and borrow areas are also covered, and are subject to all of the provisions of TNR15-0091, whether the areas are contiguous to the main construction area or at remote locations. These areas, the activities to be conducted in these areas, and the storm water pollution control measures to be implemented must be incorporated into the site-specific Erosion Prevention and Sediment Control Plan (EPSCP). When one or more of these areas are operated by and/or utilized by more than one contractor, the pollution control provisions for that area shall be coordinated so the effectiveness of the pollution control provisions are not compromised.

The following figures are incorporated as Appendix A of this SWPPP to adequately address the areas and projects covered under TNR15-0091. Both MSCAA construction projects and tenant construction projects are included.

- The first map in Appendix A is the *MEM Storm Drainage* map that shows storm drainage basins, outfalls, storm drainage features, tenants, and industrial National Pollutant Discharge Elimination System (NPDES) permit information.
- The second map in Appendix A is the *Airport Property Map* that depicts each parcel owned by the airport to ensure that any construction projects on MEM parcels outside the main airport activity area are covered under TNR15-0091. This map additionally serves as a site location map with roads and streams depicted.

1.3 Tennessee General Permit for Construction Activities Requirements

TNR10-0000, included as Appendix B, authorizes the discharge of storm water from sites that are under construction, provided that the permit provisions are adhered to and TDEC receives formal application from the parties responsible for the construction. Under this general permit, both the owner/developer of the property and the contractors performing the construction activities are responsible for complying with the permit. MSCAA has developed this SWPPP to comply with the provisions of TNR10-0000 and to coordinate the compliance responsibilities of the contractors and subcontractors engaged in construction activities on properties owned or managed by MSCAA. MEM drains into water with Unavailable Parameters (Days Creek,

Hurricane Creek and Nonconnah Creek); therefore, all construction at MEM is subject to more stringent permit requirements for erosion and sediment control. These requirements are incorporated into this SWPPP.

The parties subject to this permit include the owner/developer of the construction site (MSCAA) and all contractors and subcontractors who have either the authority to make or modify the plans and specifications or the day-to-day responsibility for execution of the plans and/or compliance with the specifications. Table 1-1 summarizes TNR10-0000 permit requirements at MEM:

**Table 1-1
Permitted Storm Water Discharges**

Permit #/ Tracking #	Permit Required Activities
TNR10-0000/ TNR15-0091	Contractors must conduct all activities in compliance with the CGP, including but not limited to: • Sign Notice of Intent and Storm Water Pollution Prevention Plan (SWPPP), keep SWPPP onsite, and update SWPPP as needed; • Hire a qualified person to conduct biweekly erosion prevention and sediment control inspections (72 hours apart) and keep site inspector's certification onsite; • Make corrections to site before next rain event but in no case more than 7 days after the need is identified; • Update SWPPP within 14 days of correction to site; • Document twice-weekly inspections on Tennessee Department of Environment and Conservation form and maintain inspection file and SWPPP at the construction site or Memphis-Shelby County Airport Authority (MSCAA); • A quality assurance site assessment of erosion prevention and sediment controls must be conducted by a Professional Engineer or other qualified individual at each outfall involving drainage totaling 5 or more acres within 30 days of construction commencing at each portion of the site that drains the 5 or more acres; • Stabilize soils (temporary or permanent) 14 days after construction ceases; • Post a copy of the notice of permit coverage, contact information, project description and location of the SWPPP at the job site; • Install and maintain a rain gauge at the site; and • Maintain a form onsite that tracks the acreage of disturbed area each day (no more than 50 acres may be disturbed at one time unless linear project).

2.0 ACQUIRING PERMIT COVERAGE AT MEM

To acquire permit coverage under TNR15-0091, owner must:

Submit a complete sub-project Notice of Intent (NOI) using the TNR15-0091 tracking number, along with a construction site map and site specific EPSCP (provided by project designer) with drawings:

Construction Site map: excerpt (8 ½" by 11" or 11" by 17") from the appropriate 7.5 minute United States Geological Survey (USGS) topographic map, with the proposed construction site centered. For additional information, see Section 3.1.

- The entire proposed construction area must be clearly identified (outlined in red) on this map.
- The total area to be disturbed (in acres) should be included on the map.
- Outline the boundaries of projects, developments and the construction site in relation to major roads, streams or other landmarks.
- Identify all outfalls where runoff will leave the property
- Identify stream(s) receiving the discharge, and storm sewer system(s) conveying the discharge from all site outfalls

Site-specific EPSCP: The plan showing the approximate location of each control measure along with a description of the timing during the construction process for implementing each measure (e.g., prior to the start of earth disturbance, as the slopes are altered and after major grading is finished). The different stages of construction (initial/major grading, installation of infrastructure, final contours, etc.) and the erosion preventions and sediment control measures that will be utilized during each stage should be depicted on multiple plan sheets (see Section 3.0).

- have a full understanding of this SWPPP and the requirements of TNR10-0000 and have the ability to be in compliance with permit terms and conditions.

2.1 Notice of Intent

To become an authorized party to this permit, owners wishing coverage must first develop an EPSCP specific to the construction activities being contracted and submit the site plan and a properly signed NOI to the State and the City via MSCAA. The project designer will submit

EPSCP drawings to MSCAA for review prior to TDEC submittal. An NOI is included at the end of Appendix B with the permit forms.

Contractors performing construction activities at MEM are required to be signatories on the NOI under TNR10-0000 and TNR15-0091 if they have either the authority to make or modify the plans and specifications or have the day-to-day responsibility for execution of the plans and/or compliance with the specifications. The MSCAA requires the following responsibilities of these signatories.

The MSCAA must:

- Ensure the project specifications the contractors develop meet the minimum requirements of Section 3.0 of this SWPPP and all other applicable conditions.
- Ensure that the site plan for the contracted project indicates the areas of the project where contractor has design control (including the ability to make modifications in specifications).
- Ensure all other permittees implementing portions of the SWPPP for their part of the project that will be impacted by any changes signatories make to the SWPPP are notified of such modifications in a timely manner.
- Ensure that all common facilities (e.g., sediment treatment basin and drainage structures) that are necessary for the prevention of erosion or control of sediment are maintained and effective until all construction is complete and all disturbed areas in the entire project are stabilized.
- If parties with day-to-day operational control of the construction site have not been identified at the time the SWPPP is initially developed, the MSCAA shall be considered to be the responsible party until such time the supplemental NOI is submitted, identifying the new operator(s). These new operators (e.g., general contractor, utilities contractors, subcontractors, erosion control contractors, hired commercial builders) are considered secondary permittees. The EPSCP must be updated to reflect the addition of new operators as needed to reflect operational or design control.
- Ensure that all operators on site have permit coverage and are complying with the SWPPP.

Tenants and contractors with day-to-day operational control must:

- Ensure that the SWPPP for portions of the project where they are operators meets the minimum requirements of Section 3.0 of the SWPPP and identify the parties responsible for implementation of control measures identified in the plan.
- Ensure that measures in the SWPPP are adequate to prevent erosion and control sediment that may result from their earth-disturbing activity.
- Permittees with operational control over only a portion of a larger construction project are responsible for compliance with all applicable terms and conditions of this permit as it relates to their activities on their portion of the construction site. This includes, but is not limited to, implementation of Best Management Practices (BMPs) and other controls required by the SWPPP.
- NOIs must be filed at least 30 days prior to the start of the construction project activities or the addition of a new party to the permit. If there is a change in contractor responsibilities, a NOI must be filed at least 48 hours before responsibilities are transferred from one contractor to another. To the extent possible, all contractors filing NOIs for a scope of work should be joint signatories to a single NOI.

A NOI submitted for authorization to discharge under TNR10-0000 and TNR15-0091 shall be submitted by the contractor to MSCAA Manager of Environmental Services or MSCAA's construction management team (Parsons). MSCAA will review the NOI and site plan for completeness and, if they are found to be complete, forward original copies of the NOI and site plan to TDEC via email (DWR.MEFO.Permits@tn.gov).

A copy of the NOI will also be forwarded to the City of Memphis Department of Public Works Storm Water Program for notification purposes. TDEC will issue Notice of Coverage within 30 days of NOI submittal, unless the division has responded to the operator within that time requesting additional information.

MSCAA and contractor shall retain a copy of both the NOI and BOC on project site.

2.2 Storm Water Pollution Prevention Plan

Owners and Contractors wishing to obtain coverage under a NPDES permit must develop and submit a site-specific EPSCP with their NOI. The project designer will submit the EPSCP for review and approval prior to submittal to TDEC. This SWPPP constitutes the comprehensive SWPPP addressing all construction-related activities from the date construction commences at MEM to the date of termination of permit coverage. The SWPPP was developed, implemented, and updated according to the requirements in TNR10-0000. The SWPPP has been an effective tool since 2001 when coverage under TNR10-0000 was obtained at MEM. Because there is more than one operator at MEM, preparation and implementation of the SWPPP has been a cooperative effort. New operators with design and operational control of their portion of the construction site are required to adopt and implement this comprehensive SWPPP.

2.3 Permit Application Fees

MSCAA has paid the permit application fee for all construction projects at MEM by submittal of a one-time maximum fee of \$7,500.00 for the maximum acreage permitted. Contractors and tenants do not need to pay permit application fees. No annual maintenance fee apply to this permit since it was obtained in 2006, prior to the establishment of Tennessee Rule, Chapter 0400-40-11-.2(12)(i) in 2016.

2.4 Notice of Coverage

TDEC will review the NOI for completeness and will issue a Notice of Coverage (NOC) to the MSCAA for each project identified on the NOI form. Each project will be independently tracked by TDEC with a project tracking number. Before initiation of construction activities, copies of the NOI, this SWPPP, the EPSCP, and the NOC must be located at each construction site management office. The NOC must be posted along with the following information:

- Name, company name, e-mail address (if available), telephone number, and address of the project site owner or a local contact person;
- A brief description of the project; and
- The location of the SWPPP if the site is inactive or does not have an onsite location to store the plan.

Necessary copies of the NOC and the project-specific EPSCP will be distributed by MSCAA to all parties assigned responsibility for oversight of the construction project.

2.5 Notice of Termination

Individual contractors who have completed their responsibilities must submit a Notice of Termination (NOT) to be relieved of their responsibilities under the permit. Upon completion of the project, MSCAA, in conjunction with the contractors covered by the permit, is to submit a NOT. NOT forms are included at the end of Appendix B with the permit forms. NOTs are to be submitted to the contracting official at MSCAA. MSCAA or Parsons will forward the NOTs to TDEC via email (DWR.MEFO.Permits@tn.gov).

The following requirements for submitting an NOT are listed below.

- All earth-disturbing activities and, if applicable, construction support activities permitted under Section 1.2.2 at the site are complete;
- All requirements for permanent vegetation or non-vegetation stabilization are met and groundcover has achieved stabilization;
- All construction materials, as well as waste and waste hauling devices have been removed;
- All equipment and vehicles that were used during construction, unless they are intended for long-term use following termination of permit coverage, have been removed;
- All stormwater controls, except those that are intended for long-term use, have been removed;
- The permittee has transferred control of all areas of the site for which he is responsible under this permit to another operator, and that operator has submitted an NOI and obtained coverage under this permit.
- The permittee obtains coverage under an individual or alternative general NPDES permit

TDEC will notify MSCAA of the final decision within 30 days from receipt of a complete NOT and may require a site visit by the TDEC permit writer before permit is terminated. TDEC may also deny termination of coverage if there are any existing deficiencies.

2.6 Permitted Discharges

TNR10-0000 and TNR15-0091 authorize discharges of storm water from construction activities such as clearing, grading, filling, and excavation activities in preparation for paving or construction activities on projects sized 1-acre or greater. It also authorizes storm water discharges from support activities (e.g., equipment staging yards, material storage areas, excavated material disposal areas, borrow areas) provided that:

- The support activity is primarily related to a construction site that is covered under this permit;
- That the owner/contractor of the support activity is the same as the owner/contractor of the construction site;
- The support activity is not a commercial operation serving multiple unrelated construction projects by different contractors; and
- Support activities are identified in the NOI and the SWPPP and appropriate controls and measures are identified in the SWPPP covering the discharges from the support activity areas.

The following non-storm water discharges from active construction sites are authorized by TNR10-0000 and TNR15-0091, provided the non-storm water component of the discharge is in compliance with the permit:

- dewatering of work areas of collected storm water and groundwater;
- waters used to wash dust and oil from vehicles where detergents are not used and detention and/or filtering is provided before the water leaves the site (wash removal of oil, asphalt, or concrete is not authorized);
- water used to control dust;

- potable water sources including waterline flushings; from which chlorine has been removed to the maximum extent practicable
- routine external building wash-down that does not use detergents or other chemicals;
- uncontaminated groundwater or spring water; and
- foundation or footing drains where flows are not contaminated with process materials such as solvents.
- Discharges from emergency fire-fighting activities.
- Fire hydrant flushings.
- Landscape irrigation.
- Pavement wash waters, provided spills or leaks of toxic or hazardous substances have not occurred (unless all spill material has been removed) and where soaps, solvents, and detergents are not used.
- Uncontaminated air conditioning or compressor condensate.

Discharges of storm water or wastewater authorized by and in compliance with a different NPDES permit (other than this permit) may be mixed with discharges authorized by this permit. All non-storm water discharges authorized by this permit must be free of sediment or other solids and must not cause erosion of soil or the stream bank or result in sediment impacts to the receiving stream.

TNR10-0000 does not authorize storm water or other discharges that would result in a violation of State water quality standards (TDEC Rules, Chapters 0400-40-03, 0400-40-04). Such discharges constitute a violation of this TNR10-0000. Where a discharge is already authorized under the permit and the division determines the discharge to cause or contribute to the violation of applicable state water quality standards, the permitting authority will notify the operator of such violation(s). The permittee shall take all necessary actions to ensure future

discharges do not cause or contribute to the violation of a water quality standard and shall document these actions in the SWPPP.

The construction activity shall be carried out in such a manner as to prevent violations of water quality criteria as stated in the TDEC Rules, Chapter 0400-40-03-.03. This includes but is not limited to the prevention of any discharge that causes a condition in which visible solids, bottom deposits, or turbidity impairs the usefulness of waters of the state for any of the uses designated for that water body by TDEC Rules, Chapter 0400-40-04. There shall be no distinctly visible floating scum, oil, or other matter contained in the storm water discharge. The storm water discharge must not cause an objectionable color contrast in the receiving stream. The storm water discharge must result in no materials in concentrations sufficient to be hazardous or otherwise detrimental to humans, livestock, wildlife, plant life, or fish and aquatic life in the receiving stream. Solids or other materials removed by any sediment control treatment devices must be disposed of in a manner that prevents its entrance into or pollution of any surface or subsurface waters

3.0 POLLUTION PREVENTION SITE PLAN DEVELOPMENT

The grading, drainage, and erosion prevention and sediment control plans for each project at MEM are considered to be part of the overall site plan and must accompany the individual project's NOI submittal. Each construction project must calculate its post-construction runoff coefficient and, where appropriate, send a Geotechnical Report for the site with the site plans to the TDEC office with the job-specific NOI via the MSCAA.

Storm water leaving construction sites at MEM enters the MSCAA's storm sewer system going to either Days Creek or Hurricane Creek, which then enters Nonconnah Creek. In general, construction projects at MEM have an estimated post-construction runoff coefficient of 0.70.

The EPSCP must be prepared in accordance with good engineering practices and the latest edition of the Tennessee Erosion and Sediment Control Handbook. The handbook is designed to provide information to planners, developers, engineers, and contractors on the proper selection, installation, and maintenance of BMPs. In addition, tenants and contractors must consult the City of Memphis Storm Water Management Manual (SWMM) to ensure compliance with local storm water requirements. Appendix C of this SWPPP provides the current web site address to the TDEC Erosion and Sediment Control Handbook, as well as the SWMM. Because the receiving streams for MEM storm water discharges are water with unavailable parameters, beginning May 24, 2013, the EPSCP must be prepared by a person who, at a minimum, has completed the TDEC's *Level II Design Principles for Erosion Prevention and Sediment Control for Construction Sites* course. A copy of the certification or training record for inspector certification should be included with the EPSCP.

The EPSCP must:

- Identify all potential sources of pollution that are likely to affect the quality of storm water discharges from the construction site.
- Describe practices to be used to reduce pollutants in storm water discharges from the construction site.
- Assure compliance with the terms and conditions of this permit.

Once a definable portion of a project has been finally stabilized, the co-permittee and MSCAA may identify the stabilized area on the EPSCP. At that time, no further SWPPP or inspection requirements apply to that portion of the site (e.g., earth-disturbing activities around one of three buildings in a complex are done and the area is finally stabilized; 1 mile of a roadway or pipeline project is done and finally stabilized, etc.).

Plans and specifications for any building or structure, including the design of sediment basins or other sediment controls involving structural, hydraulic, hydrologic or other engineering calculations shall be prepared by a licensed professional engineer or landscape architect and stamped and certified in accordance with the Tennessee Code Annotated, Title 62, Chapter 2 and the rules of the Tennessee Board of Architectural and Engineering Examiners. Engineering design of sediment basins and other sediment controls must be included in SWPPPs for construction sites involving drainage to an outfall totaling 5 acres or more due to the receiving water having unavailable parameters status.

3.1 Site Description

The EPSCP must provide a description of pollutant sources and other information as indicated:

- A description of all construction activities at the site (not just grading and street construction)
- The intended sequence of major activities that disturb soils for major portions of the site (e.g., grubbing, excavation, grading, utilities, and infrastructure installation, etc.)
- Estimates of the total area of the site and the total area that is expected to be disturbed by excavation, grading, filling, or other construction activities
- A description of the topography of the site including an estimation of the percent slope and the variation in percent slope found on the site; such estimation should be on the basis of a drainage area serving each outfall, rather than an entire project.
- Any data describing the soil (data may be referenced or summarized) and how the soil type will dictate the needed control measures and the expected quality of any discharge from the site.

An estimate of the runoff coefficient of the site after construction activities are completed and how the runoff will be handled to prevent erosion at the permanent outfall and receiving stream.

An erosion prevention and sediment control map of the site with the proposed construction area clearly outlined. The map should indicate:

- the boundaries of the permitted area;
- drainage patterns and approximate slopes anticipated after major grading activities;
- areas of soil disturbance;
- an outline of areas that are not to be disturbed;
- the location of major structural and nonstructural controls identified in the SWPPP;
- the location of areas where stabilization practices are expected to occur;
- surface waters including wetlands;
- streams and sinkholes;
- and careful identification of outfall points intended for coverage under the general permit for storm water discharges from the site.
- A description of any discharge associated with industrial activity other than construction storm water that originates onsite and the location of that activity and its permit number.
- Identification of any stream or wetland on or adjacent to the project, a description of any anticipated alteration of these waters, and the permit number or the tracking number of the Aquatic Resources Alteration Permit or Section 401 Certification issued for the alteration.
- The name of the receiving water(s) and approximate size and location of affected wetland acreage at the site.

- If applicable, identify and outline the buffer zones established to protect waters of the state located within the boundaries of the project.
- For projects of more than 50-acres, the construction phases must be described. (No more than 50 acres may be disturbed at any one time.)
- If only a portion of the total acreage of the construction site is to be disturbed, then the protections employed to limit the disturbance must be discussed (i.e., caution fence, stream side buffer zones, etc.)
- Limits of disturbance shall be clearly marked in the SWPPP and areas to be undisturbed clearly marked in the field before construction activities begin.

3.2 Description of Storm Water Runoff Controls

The EPSCP must include a description of appropriate erosion prevention and sediment controls and other BMPs that will be implemented at the construction site. The plan must clearly describe each major activity that disturbs soils for major portions of the site (e.g., grubbing, excavation, grading, utilities, and infrastructure installation, etc.) and indicate the following:

- Appropriate control measures and the general timing for the measures to be implemented during construction activities
- Which permittee is responsible for implementation of which controls

The EPSC plans must show the approximate location of each control measure along with a description of the timing during the construction process for implementing each measure (e.g., prior to the start of earth disturbance, as the slopes are altered and after major grading is finished). The different stages of construction (initial/major grading, installation of infrastructure, final contours, etc.) and the erosion prevention and sediment control measures that will be utilized during each stage should be depicted on multiple plan sheets (see following paragraphs). Half sheets are acceptable. One sheet showing all EPSCs that will be used during the life of the multi-phase project implementing different EPSC controls at each stage will not be considered complete.

For site disturbances less than 5-acres, at least two separate EPSC plan sheets must be developed. At least two stages must be identified, with associated EPSC measures addressed. The plan stages must be addressed separately in plan sheets, with each stage reflecting the conditions and EPSC measures necessary to manage storm water runoff, erosion and sediment during the initial land disturbance (initial grading) and the conditions and EPSC measures necessary to manage storm water, erosion and sediment at final grading.

For site disturbances more than 5-acres, at least three separate EPSC plan sheets must be developed. Three stages must be identified. The first plan sheet should reflect the conditions and EPSC measures necessary to manage storm water runoff, erosion, and sediment during the initial land disturbance (initial grading). The second plan sheet shall reflect the conditions and the EPSC measures necessary to manage storm water runoff, erosion and sediment from interim land disturbance activities. The third plan sheet shall reflect the conditions and EPSC measures necessary to manage storm water runoff, erosion and sediment at final grading while permanent site stabilization is being achieved.

3.3 Construction Sequencing

In general, the construction sequence to be followed in order to reduce erosion and prevent sediment from leaving the construction site is:

- Install erosion control devices (i.e., ditch blocks, silt fencing).
- Remove existing topsoil (if re-grading site) to a minimum of 6 inches to a stockpile with erosion controls.
- Remove existing pavement.
- Grade and prepare subgrade for new building slab and/or paving.
- Construct new building and/or paving.
- Place earthen fill for side slopes from shoulder to existing grade.
- Clean out any ditch blocks/ponds.
- Sod areas of soil disturbance.

3.4 Erosion Prevention and Sediment Controls

The following are the general TNR10-0000 and TNR15-0091 criteria that will be required for the development of the EPSCP:

- The construction-phase erosion prevention controls shall be designed to eliminate (or minimize if complete elimination is not possible) the dislodging and suspension of soil in water. Sediment controls shall be designed to retain mobilized sediment on site to the maximum extent practicable.
- The design, inspection and maintenance of BMPs described in this SWPPP must be prepared in accordance with good engineering practices and at a minimum, must be consistent with the requirements and recommendations contained in the current edition of the Tennessee Erosion and Sediment Control Handbook. In addition, all control measures must be properly selected, installed, and maintained in accordance with the manufacturer's specifications (where applicable). All control measures selected must be able to slow runoff so that rill and gully formation is prevented. When steep slopes and/or fine particle soils are present at the site, additional physical or chemical treatment of storm water runoff may be required. Proposed physical and/or chemical treatment must be researched and applied according to the manufacturer's guidelines and fully described in the SWPPP. If periodic inspections or other information indicates a control has been used inappropriately, or incorrectly, the permittee must replace or modify the control for relevant site situations.
- If permanent or temporary vegetation is to be used as a control measure, then the timing of the planting of the vegetation cover must be discussed in the SWPPP. Planning for planting cover vegetation during winter months or dry months should be avoided.
- If you plan to add treatment chemicals to stormwater and/or authorized non-stormwater prior to discharge, you may not submit your Notice of Intent (NOI) until you notify an appropriate EFO in advance and the EFO authorizes coverage under this permit after you have included appropriate controls and implementation procedures designed to ensure that your use of treatment chemicals will not lead to discharges that cause an exceedance of water quality standards.

- Chemicals used for treating stormwater runoff must be shown to be non-toxic to sensitive aquatic species through a 48-hour or 96-hour acute toxicity test as reported in the product's Safety Data Sheets. The chemical feed rate shall be such that the effluent concentration of the product is lower than the LC50 toxicity value for sensitive aquatic species as reported in the products Safety Data Sheets. Calculations used to determine the chemical feed rate so that runoff or effluent is not toxic to sensitive aquatic species shall also be included in the SWPPP. Chemicals used for treating stormwater runoff shall be applied in accordance with manufacturer specifications and securely stored on-site within the contractor's staging and storage area if not stored off-site or provided by others. Chemicals shall not be applied directly to any stream.
- If sediment escapes the permitted area, offsite accumulations of sediment that have not reached a stream must be removed at a frequency sufficient to minimize offsite impacts (e.g., fugitive sediment that has escaped the construction site and has collected in a street must be removed so that it is not subsequently washed into storm sewers and streams by the next rain and/or so that it does not pose a safety hazard to users of public streets). Permittees shall not initiate remediation/restoration of a stream without consulting the TDEC first. TNR100000 does not authorize access to private property. Arrangements concerning removal of sediment on adjoining property must be settled by the permittee with the adjoining landowner.
- Sediment should be removed from sediment traps, silt fences, sedimentation ponds, and other sediment controls as recommended in the Tennessee Erosion and Sediment Control Handbook and must be removed when design capacity has been reduced by 50 percent.
- Litter, construction debris, and construction chemicals exposed to storm water shall be picked up prior to anticipated storm events or before being carried offsite by wind (e.g., forecasted by local weather reports), or otherwise prevented from becoming a pollutant source for storm water discharges (e.g., screening outfalls, daily pick-up, etc.). After use, materials used for erosion prevention and sediment control (such as silt fence) should be removed or otherwise prevented from becoming a pollutant source for storm water discharges.

- Erodible material storage areas (including but not limited to overburden and stockpiles of soil etc.) and borrow pits used primarily for the permitted project and which are contiguous to the site are considered a part of the site and shall be identified on the NOI, addressed in the SWPPP and included in the fee calculation.
- Pre-construction vegetative ground cover shall not be destroyed, removed or disturbed more than 14 days prior to grading or earth moving activities unless the area is seeded and/subsequently temporarily or mulched or other temporary cover is permanently stabilized.
- Clearing and grubbing must be held to the minimum necessary for grading and equipment operation. Existing vegetation at the site should be preserved to the maximum extent practicable.
- Construction must be sequenced to minimize the exposure time of graded or denuded areas.
- Construction phasing is recommended on all projects regardless of size as a major practice for minimizing erosion and limiting sedimentation. Construction should be phased to keep the total disturbed area less than 50-acres at any one time. Areas of the completed phase must be stabilized within 14 days. No more than 50-acres of active soil disturbance should be planned at any time during the construction project. This includes offsite borrow or disposal areas that meet the conditions previously listed. However, the MSCAA historically negotiated an exception with TDEC because many MEM projects require more than 50 acres to be disturbed at one time. In the new permit, this exception has become standardized for linear projects, like those at MEM; therefore, the use of this exception has new requirements as shown in the following list. Even with this exception, MSCAA encourages tenants and contractors to make every effort to phase all projects at MEM.
- The 50-acre limitation does not apply to linear construction projects (such as roadway, pipeline, and other infrastructure construction activities at MEM) if the following conditions are met:
 - o Where no one area of active soil disturbance is greater than 50-acres and the various areas of disturbance have distinct receiving waters; or

- o Where contiguous disturbances amount to greater than 50-acres, but no one distinct water is receiving runoff from more than 50 disturbed acres; or
 - o With the MSCAA's written concurrence, where more than 50 acres of disturbance is to occur and where one receiving water will receive runoff from more than 50 acres; or
 - o Where no one area of active soil disturbance is greater than 50-acres and the various areas of disturbance are more than 5 miles apart.
 - o In order for a linear project at MEM to take advantage of the 50-acre rule exemption outlined in this paragraph, the contractor shall conduct monthly site assessments as described in Section 4.3 of this SWPPP until the site is permanently stabilized.
- Erosion prevention and sediment control measures must be in place and functional before earth moving operations begin and must be constructed and maintained throughout the construction period. Temporary measures may be removed at the beginning of the workday but must be replaced at the end of the workday.
- The following records shall be maintained on or near site: the dates when major grading activities occur; the dates when construction activities temporarily or permanently cease on a portion of the site; the dates when stabilization measures are initiated; inspection records and rainfall records. MSCAA maintains daily logbooks with this information; information is collected by the MSCAA contracted inspectors, via Parsons.
- Offsite vehicle tracking of sediments and the generation of dust shall be minimized. A stabilized construction access (a point of entrance/exit to a construction site) shall be described and implemented, as needed, to reduce the tracking of mud and dirt onto public roads by construction vehicles.
- Permittees shall maintain a rain gauge and daily rainfall records at the site or use a reference site for a record of daily amount of precipitation.

3.4.1 General Permit Requirements for Stabilization Practices

The EPSCP shall include a description of interim and post-construction stabilization practices, including site-specific scheduling of the implementation of the practices. Site plans should ensure that existing vegetation is preserved where attainable and that disturbed portions of the site are stabilized. Site plans should comply with buffer zone requirements (for new construction only) for any projects in which construction activities, borrow, and/or fill are prohibited. Stabilization practices may include temporary seeding, permanent seeding, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, preservation of mature vegetation, and other appropriate measures. Use of impervious surfaces for final stabilization in lieu of a permanent vegetative cover should be avoided where practicable. No stabilization, erosion control, or sediment treatment measures are to be installed in a stream without obtaining a Section 404 Permit and an Aquatic Resource Alteration Permit, if such permits are required and appropriate.

Stabilization measures shall be initiated as soon as possible in portions of the site where construction activities have temporarily or permanently ceased. Temporary or permanent soil stabilization at the construction site (or a phase of the project) must be completed no later than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased. In the following situations, temporary stabilization measures are not required:

- Where the initiation of stabilization measures is precluded by snow cover or frozen ground conditions or adverse soggy ground conditions. In this situation, stabilization measures shall be initiated as soon as practicable.
- Where construction activity on a portion of the site is temporarily ceased and earth disturbing activities will be resumed within 14 days.
- Steep slopes (natural or created slope of 35 percent grade or greater) shall be temporarily stabilized no later than 7 days after construction activity on the slope has temporarily or permanently ceased.
- Permanent stabilization with perennial vegetation (using native herbaceous and woody plants where practicable) or other permanently stable, non-eroding surface shall replace

any temporary measures as soon as practicable. Unpacked gravel containing fines (silt and clay sized particles) or crusher runs will not be considered a non-eroding surface.

3.4.2 General Permit Requirements for Structural Practices

The EPSCP shall include a description of structural practices to divert flows from exposed soils, store flows, or otherwise limit runoff and discharge of pollutants from exposed areas of the site. Such practices may include silt fences, earth dikes, drainage swales, sediment traps, check dams, subsurface drains, pipe slope drains, level spreaders, storm drain inlet protection, rock outlet protection, reinforced soil-retaining systems, gabions, and temporary or permanent sediment basins. Structural controls shall not be placed in streams or wetlands except as authorized by a Section 404 Permit and/or Aquatic Resource Alteration Permit.

Erosion prevention and sediment control measures must be prepared in accordance with good engineering practices and the latest edition of the Tennessee Erosion and Sediment Control Handbook. In addition, erosion prevention and sediment controls shall be designed to minimize erosion and maximize sediment removal resulting from a 5-year, 24-hour storm due to the receiving stream being water with unavailable parameters (the design storm — see definition in text box to right), as a minimum, either from total rainfall in the designated period or the equivalent intensity. When clay and other fine particle soils or highly erodible soils are present at the construction site, chemical treatment of the stormwater runoff may be necessary to minimize the amount of sediment being discharged. However, the use of cationic polymers for treatment is prohibited.

“5-year design storm depths and intensities” means the estimated design rainfall amounts, for any return period interval (i.e., 2-year, 5-year, 25-year, etc.) in terms of either 24-hour depths or intensities for any duration, can be found by accessing the following NOAA National Weather Service Atlas 14 data for Tennessee: http://hdsc.nws.noaa.gov/hdsc/pfds/orb/tn_pfds.html.

Other data sources may be acceptable with prior written approval by TDEC Water Pollution Control.

For an onsite outfall which receives drainage from 10 or more acres, a minimum sediment basin volume that will provide treatment for a calculated volume of runoff from a 5-year, 24-hour storm and runoff from each acre drained, or equivalent control measures as specified in the Tennessee Erosion and Sediment Control Handbook, shall be provided until final stabilization of the site. A drainage area of 10 acres or more includes both disturbed and undisturbed portions of the site or areas adjacent to the site, all draining through the common outfall. Where an equivalent control measure is substituted for a sediment retention basin, the equivalency must be justified to the division. Runoff from any undisturbed acreage should be

diverted around the disturbed area and the sediment basin. Diverted runoff can be omitted from the volume calculation. Sediment storage expected from the disturbed areas must be included. Discharges from basins and impoundments shall utilize outlet structures that only withdraw water from near the surface of the basin or impoundment, unless infeasible.

All calculations of drainage areas, runoff coefficients and basin volumes must be provided as a part of the EPSCP submittal. The discharge structure from a sediment basin must be designed to retain sediment during the lower flows. Muddy water to be pumped from excavation and work areas must be held in settling basins or filtered or chemically treated prior to its discharge into surface waters. Water must be discharged through a pipe, well-grassed or lined channel, or other equivalent means so that the discharge does not cause erosion and sedimentation. Discharged water must not cause an objectionable color contrast with the receiving stream.

3.5 Storm Water Management

The EPSCP must be developed to ensure that measures have been completed that will be installed during the construction process to control pollutants in storm water discharges that will occur after construction operations have been completed. The plan should also consider measures that will be installed during the construction process to control pollutants and any increase in the volume of storm water discharges that will occur after construction operations have been completed. For steep slope sites, the plan will also consider measures that will be installed to dissipate the volume and energy of the storm water runoff to predevelopment levels. This permit only addresses the installation of storm water management measures and not the ultimate operation and maintenance of such structures after the construction activities have been completed, the site has undergone final stabilization, and the permit coverage has been terminated. Permittees are only responsible for the installation and maintenance of storm water management measures prior to final stabilization of the site and are not responsible for maintenance after storm water discharges associated with construction activity have been eliminated from the site. All construction at MEM must comply with the city of Memphis SWMM, available at <https://www.memphistn.gov/government/engineering/roadway-drainage-design/drainage-manual/>, regarding requirements to limit the amount of post-construction runoff in order to minimize in-stream channel erosion in the receiving stream.

Construction storm water runoff management practices may include storm water detention structures (including ponds with a permanent pool); storm water retention structures; flow attenuation by use of open vegetated swales and natural depressions; infiltration of runoff onsite; and sequential systems (that combine several practices). Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel to provide a non-erosive velocity flow from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected (no significant changes in the hydrological regime of the receiving water). The EPSCP must include an explanation of the technical basis used to select the practices to control pollution where flows exceed predevelopment levels. The Tennessee Erosion and Sediment Control Handbook provides measures that can be incorporated into the design or implemented onsite to decrease erosive velocities. The link for the handbook can be found at the link below: https://tnepsc.org/TDEC_EandS_Handbook_2012_Edition4/TDEC%20EandS%20Handbook%204th%20Edition.pdf An Aquatic Resources Alteration Permit may be required if such velocity dissipation devices installed would alter the receiving stream and/or its banks.

The following factors must be accounted for in the design of all stormwater controls:

- The nature of stormwater runoff and run-on at the site, including factors such as expected flow from impervious surfaces, slopes, and site drainage features. Stormwater controls must be designed to control stormwater volume, velocity, and peak flow rates to minimize discharges of pollutants in stormwater, as well as minimizing channel and streambank erosion at discharge points.
- The soil type and range of soil particle sizes expected to be present on the site.
- Description of any measures that will be installed during the construction process to control pollutants in stormwater discharges that will occur after construction operations have been completed, including a brief description of applicable State or local erosion and sediment control requirements.

3.6 Other Items Needing Control

The EPSCP must also consider and describe the following other items potentially needing controls at the site:

- No solid materials, including building materials, shall be placed in waters of the state, except as authorized by a Section 404 permit and/or Aquatic Resources Alteration Permit (ARAP). Litter, construction debris and construction chemicals exposed to stormwater shall be picked up prior to storm events or before being carried off the site by wind so that they do not become a pollutant source for stormwater discharges. EPSC materials shall be prevented from becoming a pollutant source for stormwater discharges.
- The SWPPP shall identify and provide the necessary EPSC measures for the installation of any waste disposal system, sanitary sewer or septic system. Contractor must also comply with applicable state and local waste disposal, sanitary sewer or septic system regulations as necessary.
- The SWPPP shall include a description of construction and waste materials expected to be stored on-site. The SWPPP shall also include a description of controls used to reduce pollution from materials stored on site. Controls may include storage practices to minimize exposure of the materials to stormwater or spill prevention and response.

3.7 Best Management Practices

All construction at MEM must comply with the most current TDEC Erosion and Sediment Control Handbook and City of Memphis Storm water Control Manual. See Appendix C for website address. MSCAA encourages implementation of a series of BMPs and recommends that storm water controls be designed to limit the discharge of storm water pollutants offsite to predevelopment levels to the maximum extent practicable (MEP). Due to colloidal clay soils in the Memphis area, sediment removal BMPs may not yield clear storm water.

Additionally, erosion prevention and sediment control measures must be maintained in good and effective operating condition. Maintenance needs identified by inspections or other means shall be addressed before the next storm event, but in no case more than 7 days after the need is identified. The EPSCP must provide maintenance requirements for BMPs. As a reference, the maintenance of typical measures is included in Appendix C.

4.0 INSPECTIONS

Inspections of erosion controls must be performed to ensure proper maintenance and effectiveness of the devices. Initial inspections shall also indicate if all EPSCs have been installed as designed in the submitted SWPPP and EPSC plans; and, if not, measures that need to be taken so those EPSCs meet the design specifications in the field SWPPP and EPSC plans.

4.1 Inspector Training and Certification

Inspectors performing the required twice-weekly inspections must have at least 1 of the following credentials:

- a person with a valid certification from the “Fundamentals of Erosion Prevention and Sediment Control Level I” course,
- a licensed professional engineer or landscape architect,
- a Certified Professional in Erosion and Sediment Control (CPESC), or
- a person who has successfully completed the “Level II Design Principles for Erosion

A copy of the certification or training record for inspector certification must be maintained on the construction site or with our MSCAA staff or construction management team (Parsons).

An integral part of improving water quality at the airport is the training of those requesting coverage under TNR15-0091. To meet this need, MSCAA recommends the *Fundamentals of Erosion Prevention and Sediment Control Level I* course for its contractors. The Level I Fundamentals workshop is a one-day foundation-building course for individuals involved in land-disturbing activities and is intended for contractors, developers, plan preparers, reviewers, designers, engineers, and inspection and enforcement personnel from all levels of government. The fundamentals course aims to build a solid working knowledge of erosion and sedimentation processes and practices. Topics include Construction General Permit and related SWPPP requirements; function, installation, limitations, inspection, and maintenance of BMPs; roles of local officials and state government agencies involved in the permitting process; and basic hydrologic and erosion processes. The Level I Fundamentals workshop provides a Certificate of Completion with 7 hours of Professional Development Hours (PDH) credit upon successful completion of the short Course Certification Exam.

4.2 Schedule of Inspections

Inspections must be performed at least twice every calendar week. Inspections must be performed at least 72 hours apart. Where sites or portions of construction sites have been temporarily stabilized or where runoff is unlikely due to winter conditions (e.g., site covered with snow or ice), or due to extreme drought, such inspection only has to be conducted once per month until thawing or participation results in runoff or construction activity resumes. Inspections requirements do not apply to definable areas that have been finally stabilized. Written notification of the intent to change the inspection frequency and the justification for such request must be submitted to the local Environmental Field Office.

4.3 Inspection Items

- Qualified personnel, as defined in section 5.5.3.10 of the Permit (provided by the permittee or cooperatively by multiple permittees) shall inspect disturbed areas of the construction site that have not been finally stabilized, areas used for storage of materials that are exposed to precipitation, structural control measures, locations where vehicles enter or exit the site, and each outfall.
- Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the site's drainage system. Erosion prevention and sediment control measures shall be observed to ensure that they are operating correctly.
- Outfall points (where discharges leave the site and/or enter waters of the state) shall be inspected to determine whether erosion prevention and sediment control measures are effective in preventing significant impacts to receiving waters. Where discharge locations are inaccessible, nearby downstream locations shall be inspected. Locations where vehicles enter or exit the site shall be inspected for evidence of offsite sediment tracking.

4.4 Schedule for Corrections

Based on the results of the inspection, any inadequate control measures or control measures in disrepair shall be replaced or modified, or repaired as necessary, before the next rain event if possible, but in no case more than 7 days after the need is identified.

Based on the results of the inspection, the site description and pollution prevention measures identified in the SWPPP shall be revised as appropriate, but in no case later than 7 days following the inspection. Such modifications shall provide for timely implementation of any changes to the SWPPP, but in no case later than 14 days following the inspection.

4.5 Inspection Documentation

All inspections shall be documented on this Construction Stormwater Inspection Certification form. Alternative inspection forms may be used as long as the form contents and the inspection certification language are, at a minimum, equivalent to the division's form and the permittee has obtained a written approval from the division to use the alternative form. The form must contain the printed name and signature of the inspector and the certification must be executed by a person who meets the signatory requirements of the permit. Inspection documentation will be maintained on site and made available to the division upon request. Inspection reports must be submitted to the division within 10 days of the request.

Trained certified inspectors shall complete inspection documentation to the best of their ability. Falsifying inspection records or other documentation or failure to complete inspection documentation shall result in a violation of this permit and any other applicable acts or rules.

4.6 Site Assessment

A site assessment must be conducted at each outfall involving drainage totaling 5 acres or more when discharging to waters with unavailable parameters or Exceptional Tennessee Waters (all MEM stormwater discharges to Exceptional Tennessee Waters). The site assessment must be conducted within 30 days of construction commencing at each portion of the site that drains the qualifying acreage of such portion of the site. The site assessment can take the place of one of the twice-weekly inspections.

The site assessment must be performed by individuals with following qualifications:

- A licensed professional engineer or landscape architect;
- A Certified Professional in Erosion and Sediment Control; or

- A person that has successfully completed the *Level II Design Principles for Erosion Prevention and Sediment Control for Construction Sites* course.

The site assessment will be performed to verify the installation, functionality and performance of the erosion protection and sediment control measures described in this Plan. Following the site assessment, a thorough review and update (if applicable) of the SWPPP will be conducted; modifications of plans and specifications for any building or structure, including the design of sediment basins or other sediment controls shall be prepared by a licensed Professional Engineer or landscape architect.

The site assessment findings shall be documented, and the documentation kept with the SWPPP at the site. At a minimum, the documentation shall include information included in the inspection form provided in Appendix B of this permit. The documented site assessments shall indicate if all EPSC(s) have been installed as designed in the submitted SWPPP and EPSC plans. If structural BMPs (or equivalent EPSC measures) are not constructed or not installed per design specifications, follow-up monthly assessment(s) will be required until the BMPs are constructed per the SWPPP. The documentation must contain the printed name and signature of the individual performing the site assessment and the following certification:

“I certify under penalty of law that this document and all attachments were prepared by me, or under my direction or supervision. The submitted information is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. As specified in Tennessee Code Annotated Section 39-16- 702(a)(4), this declaration is made under penalty of perjury.”

The site assessment can take the place of one of the twice-weekly inspections. Additional site assessments may be required if TDEC observes site conditions that have potential of causing pollution to the waters of the state.

5.0 POLLUTION PREVENTION

5.1 Non-Storm Water Discharges

Construction projects at MEM may have some occasional non-storm water discharges that are authorized by the permit. The following non-storm water discharges from active construction sites are authorized by TNR00000 provided the non-storm water component of the discharge is combined with storm water discharges associated with construction activity, identified in the EPSCP with appropriate pollution prevention measures and discharged through stable discharge structures. The estimated volume of the non-storm water component(s) of the discharge must be included in the design of all impacted control measures.

- Dewatering of work areas of collected storm water and ground water (filtering or chemical treatment may be necessary prior to discharge) Additional controls may be needed such as weir tanks, dewatering tanks, gravity bag filters, sand media particulate filters, pressurized bag filters, cartridge filters, or other control units providing the level of treatment necessary to comply with permit requirements;
- Waters used to wash vehicles (of dust and soil, not process materials such as oils, asphalt or concrete) where detergents are not used and detention and/or filtering is provided before the water leaves site;
- Water used to control dust;
- Potable water sources including waterline flushings from which chlorine has been removed to the maximum extent practicable;
- Routine external building washdown that does not use detergents or other chemicals;
- Uncontaminated groundwater or spring water; and
- Foundation or footing drains where flows are not contaminated with pollutants (process materials such as solvents, heavy metals, etc.).

All non-storm water discharges authorized by this permit must be free of sediment or other solids and must not cause erosion of soil or the stream bank, or result in sediment impacts to the receiving stream.

There will be no pumping of any water standing on the outside of the erosion control structures. The water will be allowed to drain down naturally. One or more of the following will be used for dust control at the site:

- Exposing the minimum area possible of erodible earth
- Using water sprinkler trucks
- Using covered haul trucks
- Using dust palliatives or penetration asphalt on haul roads
- Storing construction materials and waste materials at an offsite location

5.1.2 Prohibited Discharges

The following discharges are prohibited:

- Wastewater from washout of concrete, unless managed by an appropriate control
- Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials
- Fuels oils or other potential pollutants used in vehicle and equipment operation and maintenance
- Soaps or solvents used in vehicle and equipment washing

5.2 Description of the Support Areas

All support areas for construction projects at MEM will be included in the site plan. The support areas may be used to stockpile soils and construction debris, park construction equipment, stage construction materials, and house the construction offices of the contractors. In addition, the support areas may also be used to conduct routine maintenance of construction equipment during the project. Using the Memphis-Shelby County BMP Manual at <https://www.memphistn.gov/wp-content/uploads/2020/09/003->

[Volume3_BestManagementPracticesManual.pdf](#) (August 2006), BMPs will be identified for each of the activities at the support areas to reduce the pollution from the support activities.

5.2.1 Soil Stockpiles

Designated stockpile areas and other construction and waste materials to be stored onsite or in support areas will have erosion controls in place to prevent pollution. BMPs will be selected for each area.

5.2.2 Construction Debris

Designated stockpile areas and other construction and waste materials to be stored onsite or in support areas will have erosion controls in place to prevent pollution. No solid materials will be discharged directly into storm water conveyance systems from support areas. BMPs will be selected for each area.

5.2.3 Hauling

Offsite vehicle tracking of sediments will be minimized. Dust control is mandated by MSCAA and frequent sprinkling of traffic areas is required. BMPs will be selected for each area and activity.

5.2.4 Construction Equipment Storage and Maintenance

Construction equipment and contractor vehicles may be stored at the support areas. Inspections for leaking vehicles will be made periodically (weekly) and repairs will be made promptly. Routine maintenance, such as oil changes, filter changes, greasing, and minor repairs may be conducted at support areas. Equipment is to be taken offsite for major repairs. No oil containers or other liquids are stored at the support area. Any spills of oils or other liquids at the support area will be promptly cleaned up and disposed of properly. Fuel stored onsite will be contained in certified fuel tanks equipped with self-contained secondary containment. BMPs will be selected for each area and activity.

5.2.5 Onsite Waste Disposal Systems, Sanitary Sewer, or Septic Systems

Portable restrooms will be used at the support areas for the construction sites. No onsite waste disposal systems, sanitary sewer or septic systems, or other systems requiring sediment controls or any permits are to be installed.

5.2.6 Fertilizer Application

Soil analysis should be performed prior to the application of fertilizer to any portion of the site. Soil analysis shall include soil pH, buffer value, phosphorus, potassium, calcium, magnesium, calculated cation exchange capacity (CEC) and base saturation at a minimum. Soil samples should be representative of the area for which fertilizer will be applied. Soil analysis results shall be used to determine correct fertilizer application rates to prevent the over-application of fertilizer to the site.

6.0 SENSITIVE ENVIRONMENTAL FEATURES

6.1 Wetlands

The only wetlands on MEM are located south of Shelby Drive at the former McKeller Park. There are currently no construction projects planned in the wetland areas. If construction activities are ever planned in the areas south of Shelby Drive, wetland issues will be addressed in detail.

6.2 Threatened and Endangered Species

Threatened, and endangered species that are found throughout Shelby County include the Indiana bat — *Myotis sodalis* (Endangered), bald eagle— *Haliaeetus leucocephalus* (Threatened), wood stork — *Mycteria americana* (Endangered-single bird observed feeding 1988), turgid-blossom pearly mussel — *Epioblasma turgidula* (Endangered), and the Least tern — *Sterna antillarum* (Endangered). However, MEM does not support any of these state- or federally-listed threatened or endangered species or their critical habitat. Should habitat for any of these species be encountered, MSCAA will follow all TDEC requirements and the site plan will be modified to include protective measures acceptable to TDEC, MSCAA, and the contractor(s).

6.3 Total Maximum Daily Loads

The SWPPP must include documentation supporting a determination of permit eligibility with regard to waters that have an approved total maximum daily load (TMDL) for a pollutant of concern, including:

- Identification of whether the discharge is identified, either specifically or generally, in an approved TMDL and any associated allocations, requirements, and assumptions identified for the discharge
- Summaries of consultation with TDEC on consistency of SWPPP conditions with the approved TMDL
- Measures taken to ensure that the discharge of pollutants from the site is consistent with the assumptions and requirements of the approved TMDL, including any specific wasteload allocation that has been established that would apply to the construction storm water discharge

The approved 2010 303(d) list includes TMDLs for pathogens in Hurricane Creek, Days Creek and Nonconnah Creek TN080121100711-2000 (all three are listed as water with unavailable parameters for *Escherichia coli*). No TMDLs for siltation have been developed for these three receiving water bodies, although Nonconnah is listed as water with unavailable parameters for loss of biological integrity due to siltation. Hurricane Creek is listed as water with unavailable parameters for low dissolved oxygen, total phosphorus, and other anthropogenic substrate alterations. All three receiving waters are listed as water with unavailable parameters for total phosphorus and other anthropogenic substrate alterations.

Because there is no current TMDL for any of the receiving streams that would apply construction storm water discharges from MEM, there are no additional requirements at this time.

6.4 Discharges to Water with Unavailable Parameters or Exceptional Tennessee Waters

Discharges that would cause measurable degradation of waters with unavailable parameters or that would cause more than de minimis degradation of Exceptional Tennessee Waters are not authorized by this permit. Because the discharges from MEM flow to receiving streams which are impaired for loss of biological integrity due to siltation, low dissolved oxygen, total phosphorus, and other anthropogenic substrate alterations, the following SWPPP requirements must be met per Section 6.4 of the permit, in addition to the other requirements mentioned throughout this SWPPP:

- SWPPP must certify that EPSC measure used at the site are designed to control stormwater runoff generated by a 5-year, 24-hour storm event
- SWPPP must be prepared by a qualifying by individuals with following qualifications:
 - o A licensed professional engineer or landscape architect;
 - o A Certified Professional in Erosion and Sediment Control; or
 - o A person that has successfully completed the *Level II Design Principles for Erosion Prevention and Sediment Control for Construction Sites* course.

For an on-site outfall in a drainage area totaling five or more acres, a minimum sediment basin volume that will provide treatment for a calculated volume of runoff from a 5-year, 24 hour storm and runoff from each acre drained; or equivalent control measures as specified in the

Tennessee Erosion and Sediment Control Handbook, shall be provided until final stabilization of the site. The drainage area includes both disturbed and undisturbed portions of the site and areas adjacent to the site, all draining through a common outfall. Where an equivalent control measure is substituted for a sediment retention basin, the equivalency must be justified in the SWPPP narrative. Runoff from any undisturbed acreage should be diverted around the disturbed area and the sediment basin. Diverted runoff can be omitted from the volume calculation. Sediment storage expected from the disturbed areas must be included and a marker installed signifying when sediment accumulation has reduced the wet storage volume by 50%. In a case that sediment marker is damaged by the volume of water or sediment, a best professional judgement should be used in evaluating sediment basin capacity.

For an on-site outfall in a drainage area totaling 3.5 - 4.9 acres, a minimum sediment trap volume that will provide treatment for a calculated volume of runoff from a 5-year, 24-hour storm and runoff from each acre drained, is recommended until final stabilization of the site. A drainage area of 3.5 - 4.9 acres includes both disturbed and undisturbed portions of the site or areas adjacent to the site, all draining through the common outfall. Runoff from any undisturbed acreage should be diverted around the disturbed area and the sediment trap. Diverted runoff can be omitted from the volume calculation. Sediment storage expected from the disturbed areas must be included and a marker installed signifying when sediment accumulation has reduced the wet storage volume by 50%.

In the event TDEC finds that a discharger is complying with the SWPPP but contributing to the impairment of a receiving stream, the director will notify the discharger in writing that the discharge is no longer eligible for coverage under the general permit. The permittee may update the SWPPP and implement the changes designed to eliminate further impairment of the receiving stream. If the permittee does not implement the SWPPP changes within 7 days of receipt of notification, the permittee will be notified in writing that continued discharges must be covered by an individual permit. To obtain the individual permit, the operator must file an individual permit application. The project must be stabilized until such time as the SWPPP is redeveloped and the individual permit is issued. No earth-disturbing activities, except those necessary for stabilization, are authorized to continue until the individual permit is issued.

6.5 Water Quality Riparian Buffer Zone Requirements for Discharges into Waters With Unavailable Parameters or Exceptional Waters

A 60-foot natural riparian buffer zone adjacent to the receiving stream designated as waters with unavailable parameters shall be preserved, to the maximum extent practicable, during construction activities at the site. All three receiving streams are listed as waters with unavailable parameters for one or more reasons; however, the buffer zone requirement only applies to new construction sites.

For projects that could arise in the future that would be considered new construction, the water quality riparian buffer zone is required to protect waters of the state that are not wet weather conveyances (e.g., perennial and intermittent streams, rivers, lakes, wetlands) located within or immediately adjacent to the boundaries of the project, as identified using methodology from Tennessee's standard operating procedures for hydrologic determinations. Because of heavy sediment load associated with construction site runoff, water quality riparian buffers are not primary sediment control measures and should not be relied on as such. However, the primary purpose of water quality riparian buffers is additional pollutant removal. Stormwater discharges must enter the water quality riparian buffer zone as sheet flow, not as concentrated flow, where site conditions allow. Rehabilitation and enhancement of a natural buffer zone is allowed, if necessary, for improvement of to improve its effectiveness of protection of the waters of the state.

The water quality riparian buffer zone should be established between the top of stream bank and the disturbed construction area. The 60-foot criterion for the width of the buffer zone can be established on an average width basis at a project, as long as the minimum width of the buffer zone is more than 30-feet at any measured location.

Every attempt should be made for construction activities not to take place within the water quality riparian buffer zone and for any existing forested areas to be preserved. Where it is not practicable to maintain a full water quality riparian buffer, BMPs providing equivalent protection to a receiving stream as a natural water quality riparian buffer zone may be used at a construction site. Such equivalent BMPs shall be designed to be as effective in reduction of sediment in storm water runoff as a natural buffer zone. Such equivalent BMPs are expected to be routinely used at construction projects typically located adjacent to surface waters. These

projects include, but are not limited to sewer line construction, roadway construction, utility line or equipment installation, greenway construction, construction of a permanent outfall, or a velocity dissipating structure, etc.

This requirement does not apply to any valid Aquatic Resource Alteration Permits or equivalent permits issued by federal authorities. Memphis and Shelby County have established a 25-foot buffer zone from the top of bank for impoundments, pools, lakes, and wetlands.

7.0 SPILLS AND LEAKS

The discharge of hazardous substances or oil in the storm water discharge(s) from the site will be prevented or minimized. Appendix D includes spill response notification and response resources. TNR10-0000 and TNR15-0091 do not relieve the contractor of the reporting requirements of Title 40 of the Code of Federal Regulations (CFR) Part 117 and 40 CFR 302. Where a release containing a hazardous substance, fuel, or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR 117 or 40 CFR 302 occurs during a 24-hour period:

1. The contractor is required to notify the National Response Center (NRC) ([800] 424-8802) and the Tennessee Emergency Management Agency (emergencies: [800] 262-3300; non-emergencies: [800] 262-3400) in accordance with the requirements of 40 CFR 117 and 40 CFR 302 as soon as he or she has knowledge of the discharge.
2. The contractor shall submit to the TDEC Memphis Field Office, 8383 Wolf Lake Drive, Bartlett, Tennessee, 38133, within 14 calendar days of knowledge of the release a written description of the release (including the type and estimate of the amount of material released), the date that such release occurred, the circumstances leading to the release, what actions were taken to mitigate effects of the release, and steps to be taken to minimize the chance of future occurrences.
3. This SWPPP must be modified within 14 calendar days of knowledge of the release to incorporate a description of the release, the circumstances leading to the release, and the date of the release. In addition, the plan must be reviewed to identify measures to prevent the reoccurrence of such releases and to respond to such releases, and the plan must be modified where appropriate.

Any spills or leaks of oils or other liquids will be promptly cleaned up and disposed properly regardless of their potential to be carried offsite by a storm event.

It should be noted that a reportable quantity of a fuel or other petroleum product is the quantity that will form a visible sheen (e.g., a very small quantity).

MSCAA's Manager of Environmental Services must be kept fully informed in a timely manner of all spills or leaks and the actions taken in response to them.

Airport Spill Response Procedures

The general procedure for cleaning up spills or releases of potential pollutants at the MEM is as follows:

All spills and releases of potential pollutants that might contaminate storm water are to be completely contained upon discovery and the source of the spill is to be identified and halted immediately. The spilled material is to be cleaned up immediately. Personnel involved in the cleanup shall take precautions to protect personal health and safety, as outlined in the Safety Data Sheet (SDS) for the spilled substance. The spilled material and all disposable, contaminated cleanup equipment shall be disposed in the appropriate containers. Non-disposable cleanup equipment shall be thoroughly cleaned, with precautions taken to not spread contamination.

Responsible personnel must be informed of any spills or releases that occur at the facility. It is their responsibility to see that the release reporting requirements, detailed in Appendix D of this SWPPP, are followed, as applicable. Following a spill or release, the responsible personnel also have the responsibility for evaluating whether changes are needed in pollution prevention plans for the construction site and for implementing necessary modifications.

8.0 RISK IDENTIFICATION AND SUMMARY OF POTENTIAL POLLUTANT SOURCES

8.1 Construction Activity

All outfalls will be protected with erosion control devices to prevent sediment from leaving the construction site. Additionally, there will be upstream structural controls, such as ditch blocks, and nonstructural controls, such as sodding, in place.

8.2 Spills and Leaks

Any spills or leaks of oils or other liquids on the construction site will be promptly cleaned up and disposed properly.

Construction site plans will denote the locations of all known underground fuel lines, storage tanks, and other utilities at the site. Previous ruptures of fuel lines have occurred during construction due to unknown, unmarked fuel line and vent pipe locations. Work has been conducted to mark all fuel line locations; however, if construction encounters a suspect stand pipe, possibly denoting the location of a vent pipe for an unmarked underground fuel line, work will stop in the immediate area until the pipe can be investigated and measures taken to ensure that any potential for a spill or leak has been mitigated.

8.3 Soil Stockpiles

Designated stockpile areas and other construction and waste materials to be stored onsite or in support areas will have erosion controls in place to prevent pollution. BMPs will be implemented for each site.

8.4 Construction Debris

Designated stockpile areas and other construction and waste materials to be stored onsite or in support areas will have erosion controls in place to prevent pollution. BMPs will be implemented for each site.

8.5 Hauling

Offsite vehicle tracking of sediments will be minimized. Dust control is mandated by the MSCAA and frequent sprinkling of traffic areas is required. Airport roads, taxiways, ramps, and runways that become tracked with soil or sediment are promptly cleaned with mechanical sweepers. BMPs will be implemented for each site.

8.6 Construction Equipment Storage and Maintenance

Construction equipment and contractor vehicles may be stored at the support areas. Inspections for leaking vehicles will be made periodically (weekly) and repairs will be made promptly. Routine maintenance, such as oil changes, filter changes, greasing, and minor repair may be conducted at support areas. Equipment is to be taken offsite for major repairs. No oil containers or other liquids are to be stored at the support area. Any spills of oils or other liquids at the support area will be promptly cleaned up and disposed of properly. Fuel stored onsite will be contained in certified fuel tanks equipped with self-contained secondary containment. BMPs will be implemented for each site.

8.7 Onsite Waste Disposal

No wastes will be disposed at the construction site or the support area. All wastes will be transported offsite for proper disposal.

9.0 MANAGEMENT OF POST-CONSTRUCTION RUNOFF

Due to the adequacy of the existing storm water management (collection and transport) systems, additional storm water management practices are not necessarily due to the new construction at this site.

The MSCAA and its construction project engineers will review the construction plans for each construction project to assess the necessity for additional storm water management practices related to increased impervious area.

10.0 RECORD KEEPING AND INTERNAL REPORTING PROCEDURES

The contractor responsible for each construction site will keep records of incidents such as spills or other discharges, along with other information describing the quality and quantity of storm water discharges. Records of spills, inspections, and maintenance activities will be maintained with the SWPPP.

MSCAA shall retain copies of the SWPPP and all reports required by this permit and records of all data used to complete the NOI for each construction site to be covered by TNR10-0000 and TNR15-0091, for a period of at least 3 years from the date the NOT is filed. This period may be extended by written request of TDEC.

Each contractor must retain a copy of the SWPPP (which includes TNR10-000 as Appendix B) at the construction site or other local location accessible to TDEC from the date construction commences to the date of final stabilization and submission of the NOT. The contractors with day-to-day operational control over pollution prevention plan implementation shall have a copy of the site plan available at a central location onsite for the use of all contractors and those identified as having responsibilities under the site plan whenever they are on the construction site. Once coverage is terminated, the permittee must maintain a copy of all records for a period of 3 years.

The contractor shall post a notice at the MSCAA Project Center with the following information:

- A copy of the NOC with the NPDES permit tracking number for the construction project;
- Name, company name, e-mail address (if available), telephone number and address of the project site owner/operator or a local contact person;
- A brief description of the project; and
- The location of the SWPPP.

The notice must be maintained in a legible condition. If posting this information near a main entrance is infeasible due to safety concerns, or not accessible to the public, the notice shall be posted in a local public building.

The contractor shall also retain following items/information in an appropriate location onsite:

- A rain gauge;
- A copy of twice-weekly inspection reports;
- A documentation of site assessments; and
- A copy of the site inspector's Fundamentals of Erosion Prevention and Sediment Control Level 1 certification.
- Records of the dates when major grading activities occur, when construction activities temporarily or permanently cease on a portion of the site, and when stabilization measures are initiated

11.0 STORM WATER POLLUTION PREVENTION PLAN ADMINISTRATION

11.1 Signature Requirements

All NOIs shall be signed as follows:

For a municipality, state, federal, or other public agency: by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a federal agency includes (1) the chief executive officer of the agency, or (2) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of the U.S. Environmental Protection Agency [USEPA]).

Storm water pollution prevention plans, reports, certifications or other information submittals shall be signed by a person described above or by a duly authorized representative of that person.

A person is a duly authorized representative only if:

- The authorization is made in writing by a person described in the previous paragraphs and submitted to TDEC.
- The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of manager, contractor, superintendent, or position of equivalent responsibility or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position).
- If an authorization under this section is no longer accurate because a different contractor has responsibility for the overall operation of the construction site, a new NOI satisfying the requirements of this section must be submitted to the state prior to, or together with, any reports, information, or applications to be signed by an authorized representative.

11.2 Availability, State Review, and Modification of the SWPPP

This SWPPP will be maintained by the contractor at the construction site trailer. A copy of the SWPPP has been submitted to the state for review and approval, as required by TNR10-0000 and TNR15-0091. This SWPPP shall be modified, if required by TDEC.

11.3 Storm Water Pollution Prevention Plan Update

This SWPPP applies to specific construction projects at MEM and will be modified whenever:

- There is a change in the scope of the project that would be expected to have a significant effect on the discharge of pollutants to the waters of the state and that has not otherwise been addressed in the SWPPP.
- Inspections or investigations by site operators, local, state, or federal officials indicate the SWPPP is proving ineffective in eliminating or significantly minimizing pollutants, or is otherwise not achieving the general objectives of controlling pollutants in storm water discharges associated with construction activity.
- Any new operator (typically contractor and/or subcontractor) has been identified as needed to reflect operational or design control that will implement a measure of the SWPPP.
- Measures need to be included to prevent a negative impact to legally protected federal or state-listed fauna or flora (or species proposed for such protection).

Amendments to the SWPPP may be reviewed by the TDEC, the City of Memphis, or an authorized regulatory agency. In the event that a release of a reportable quantity of hazardous substances or oil occurs, this SWPPP will be reviewed. The review will identify measures to prevent the recurrence of such releases, and the SWPPP will be modified where appropriate to include these measures. In accordance with state regulations, all revisions and/or modifications to the SWPPP will be reviewed and certified by an official of MSCAA who meets the signatory requirements as previously described.



Memphis-Shelby County Airport Authority COMPREHENSIVE STORM WATER POLLUTION PREVENTION PLAN

**For Contractors Performing
Construction Activities at the
Memphis International Airport
Under Permits TNR10-0000 and TNR15-0091**

Comprehensive Storm Water Pollution Prevention Plan

Appendix A: Figures

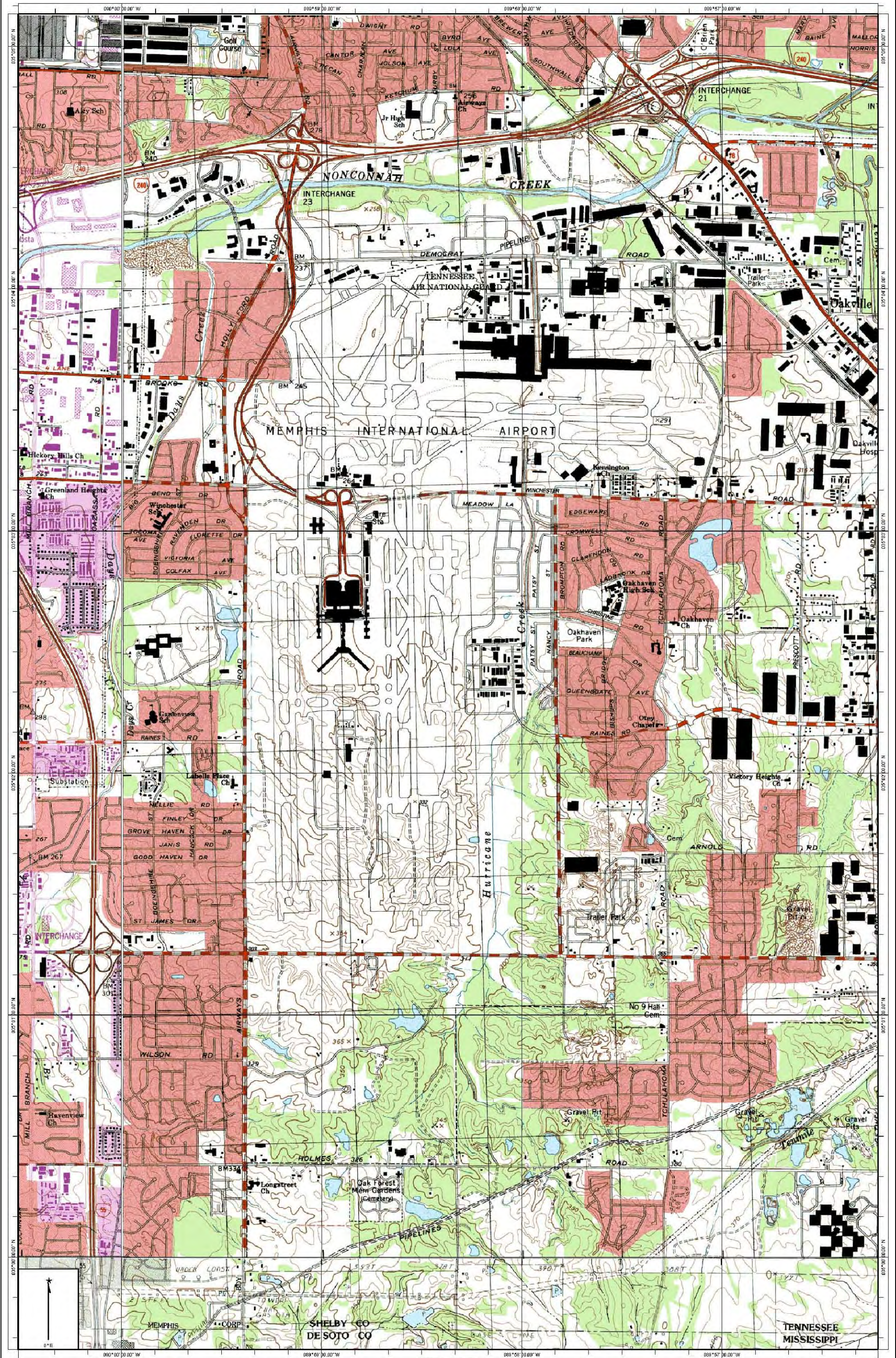
Appendix B: Permit and Forms

Appendix C: Best Management Practices

Appendix D: Spill Response Notification

Appendix E: Site Specific Information

**Version 5
June 2022**

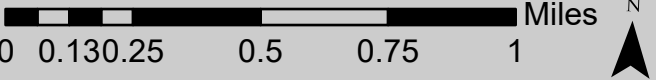




Legend

 MEM Owned Property

MEM 2019 Aerial



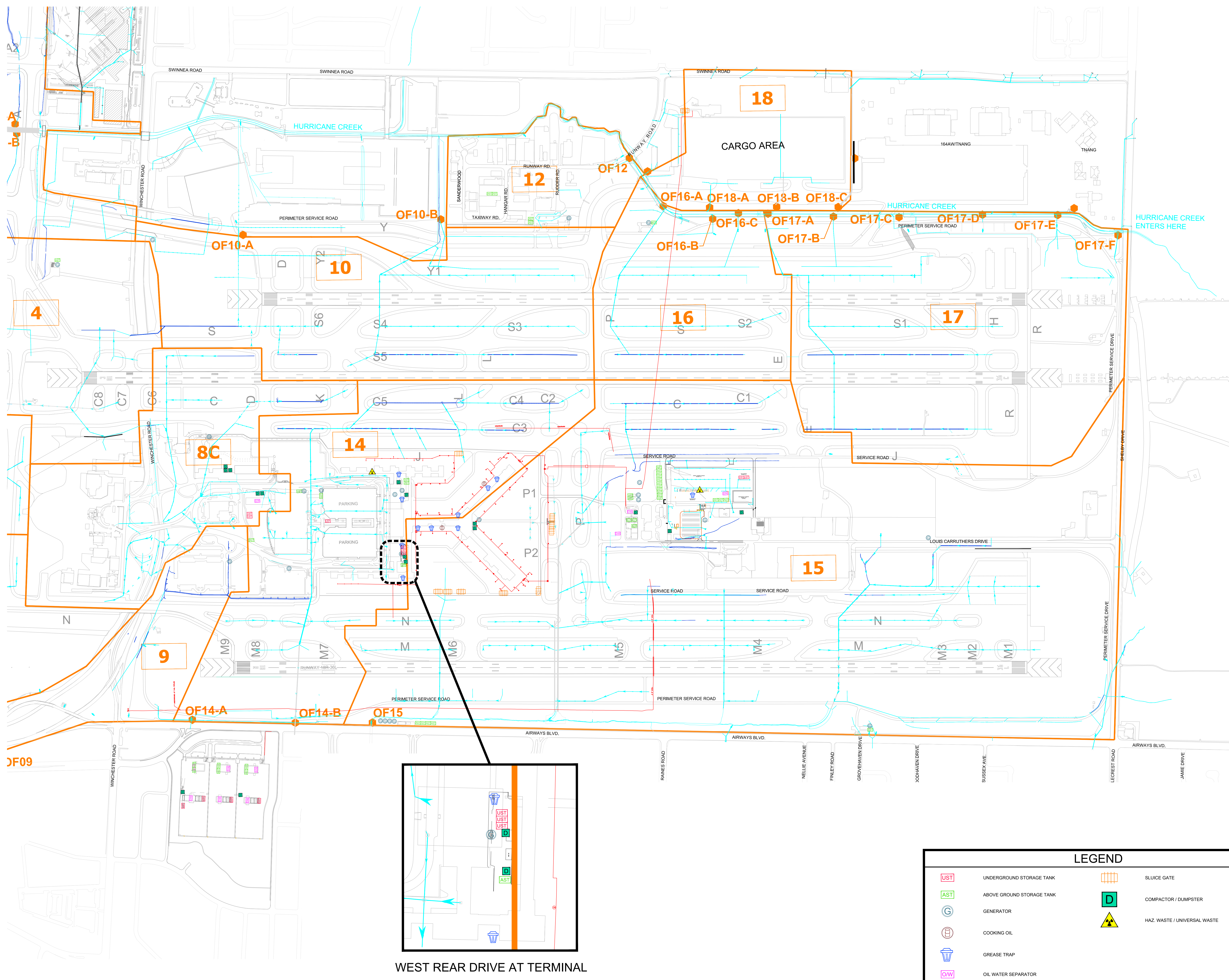


REVISIONS		
MARK	DATE	DESCRIPTION

WSPC PROJ. NO. **NOT ASSIGNED**

PROJECT: **SWPP AND SPCC MAP**

SHEET TITLE: **FIGURE 3 AIRPORT AEA**



TAKE OFF WITH US



INTERNATIONAL AIRPORT

REVISIONS		
MARK	DATE	DESCRIPTION

MSCAA PROJ. NO.

NOT ASSIGNED

PROJECT:

MEMPHIS INTERNATIONAL AIRPORT

SHEET TITLE:

FIGURE 4 DRAINAGE BASINS AND POTENTIAL POLLUTANT SOURCES

WWS FILE NAME

2020 SWPP - Figure 4 2022

REQUESTED BY:

DEV/LM & HE

DRAWN BY:

CS

DATE

6/8/21

SHEET NO.

4

SCALE

1" = 400'

LEGEND			
	UNDERGROUND STORAGE TANK		SLUICE GATE
	ABOVE GROUND STORAGE TANK		COMPACTOR / DUMPSTER
	GENERATOR		HAZ. WASTE / UNIVERSAL WASTE
	COOKING OIL		
	GREASE TRAP		
	OIL WATER SEPARATOR		



Memphis-Shelby County Airport Authority COMPREHENSIVE STORM WATER POLLUTION PREVENTION PLAN

**For Contractors Performing
Construction Activities at the
Memphis International Airport
Under Permits TNR10-0000 and TNR15-0091**

Comprehensive Storm Water Pollution Prevention Plan

Appendix A: Figures

Appendix B: Permit and Forms

Appendix C: Best Management Practices

Appendix D: Spill Response Notification

**Version 5
June 2022**



National Pollutant Discharge Elimination System (NPDES)

General Permit for Discharges of Stormwater Associated with Construction Activities

Permit Number TNR100000

Issued by
**Department of Environment and Conservation
Division of Water Resources
William R. Snodgrass - Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243-1102**

Under authority of the Tennessee Water Quality Control Act of 1977 (T.C.A. 69-3-101 et seq.) and the authorization by the United States Environmental Protection Agency under the Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977 (33 U.S.C. 1251, et seq.) and the Water Quality Act of 1987, P.L. 100-4, including special requirements as provided in Subpart 6.4 of this general permit, operators of point source discharges of stormwater associated with construction activities into waters of the State of Tennessee, are authorized to discharge stormwater associated with construction activities in accordance with the following permit monitoring and reporting requirements, effluent limitations, and other provisions as set forth in parts 1 through 10 herein, from the subject outfalls to waters of the State of Tennessee.

This permit is issued on: **September 27, 2021**

This permit is effective on: **October 1, 2021**

This permit expires on: **September 30, 2026**

for Jennifer Dodd
Director

Tennessee General Permit No. TNR100000
Stormwater Discharges Associated with Construction Activities

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PART 1

1. COVERAGE UNDER THIS GENERAL PERMIT

1.1. PERMIT AREA

The construction general permit (CGP) covers all areas of the State of Tennessee.

1.2. DISCHARGES COVERED BY THIS PERMIT

1.2.1. Stormwater Discharges Associated with Construction Activities

Discharge of stormwater associated with construction activity, as used in this permit, refers to stormwater point source discharges from areas where soil disturbing activities, or associated construction support activities (see Section 1.2.2) are located. Soil disturbing activities include but are not limited to clearing, grading, grubbing, filling and excavation.

This permit authorizes stormwater point source discharges from construction activities that result in soil disturbances of one or more acres. Soil disturbances of less than one acre are required to obtain authorization under this permit if construction activities are part of a larger common plan of development or sale that comprises at least one acre of cumulative land disturbance. One or more site operators must maintain coverage under this permit for all portions of a site that have not been permanently stabilized.

Projects of less than one acre of total land disturbance require authorization under this permit if:

- a) the director has determined that the stormwater discharge from a site is causing, contributing to, or is likely to contribute to a violation of a state water quality standard;
- b) the director has determined that the stormwater discharge is, or is likely to be a significant contributor of pollutants to waters of the state¹; or
- c) changes in state or federal rules require sites of less than one acre that are not part of a larger common plan of development or sale to obtain a stormwater discharge permit.

¹ "Significant contributor of pollutants to waters of the state" means any discharge containing pollutants that are reasonably expected to cause or contribute to a violation of a water quality criteria or receiving stream designated uses.



1.2.2. Stormwater Discharges Associated with Construction Support Activities

This permit also authorizes stormwater discharges from support activities associated with a permitted construction activity. Support activities may include concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas and borrow areas. Support activities are authorized provided all of the following conditions are met:

- a) The support activity is related to a construction activity that is covered under this general permit.
- b) The operator of the support activity is the same as the operator of the construction activity.
- c) The support activity is not a commercial operation serving multiple unrelated construction projects by different operators.
- d) The support activity does not operate beyond the completion of the construction activity of the last construction project it supports.
- e) Support activities are identified in the Notice of Intent (NOI) and the Stormwater Pollution Prevention Plan (SWPPP). The appropriate erosion prevention and sediment controls and measures applicable to the support activity shall be described in a site-wide SWPPP covering all discharges from the support activity areas.

This permit does not authorize any process (dry weather) wastewater discharges from support activities. Process (dry weather) wastewater discharges from support activities must be authorized by an individual permit or other appropriate general permit.

TDOT projects shall be addressed in the *Waste and Borrow Policy*. Stormwater discharges associated with support activities that have been issued a separate individual permit or an alternative general permit are not authorized by this general permit.

1.2.3. Non-Stormwater Discharges Authorized by this Permit

The following non-stormwater discharges from site-wide SWPPP areas of permitted construction activities are authorized by this permit provided the non-stormwater component of the discharge is in compliance with Subsection 5.5.3.12:

- a) Dewatering of collected stormwater and groundwater, discharged in accordance with section 4.1.3.



- b) Waters used to wash dust and soils from vehicles where detergents are not used and detention and/or filtering is provided before the water leaves site. Wash removal of process materials such as oil, asphalt or concrete is not authorized.
- c) Water used to control dust in accordance with Section 5.5.3.7.
- d) Potable water sources, including waterline flushings, from which chlorine has been removed to the maximum extent practicable.
- e) Routine external building washdown that does not use detergents or other chemicals.
- f) Uncontaminated, non-turbid groundwater or spring water.
- g) Foundation or footing drains where flows are not contaminated with pollutants (e.g., lubricants and fluids from mechanized equipment, process materials such as solvents, heavy metals, etc.).
- h) Discharges from emergency fire-fighting activities.
 - i) Fire hydrant flushings.
 - j) Landscape irrigation.
- k) Pavement wash waters, provided spills or leaks of toxic or hazardous substances have not occurred (unless all spill material has been removed) and where soaps, solvents, and detergents are not used.
- l) Uncontaminated air conditioning or compressor condensate.

All non-stormwater discharges authorized by this permit must be free of sediment and other solids, must not cause erosion of soils, and must not result in sediment or erosion impacts to receiving streams.

1.2.4. Other NPDES-Permitted Discharges

Discharges of stormwater or wastewater authorized by and in compliance with a different NPDES permit may be mixed with discharges authorized by this permit.

1.3. LIMITATIONS ON COVERAGE

Except for discharges from support activities, as described in Section 1.2.2 and non-stormwater discharges listed in Section 1.2.3, all discharges covered by this permit shall be composed entirely of stormwater. This permit does not authorize the following discharges:

- a) Post-construction discharges - Stormwater discharges associated with permanent stormwater management structures after construction



activities have been completed, the site has undergone permanent stabilization and the coverage under this permit has been terminated.

- b) Discharges mixed with non-stormwater - Discharges that are mixed with sources of non-stormwater, other than discharges which are identified in Section 1.2.4 and in compliance with Subsection 5.5.3.12 of this permit.
- c) Discharges covered by another permit - Discharges associated with construction activities that have been issued an individual permit in accordance with Subpart 8.11.
- d) Discharges threatening water quality - Discharges from construction sites that the director determines will cause or has the reasonable potential to cause or contribute to violations of water quality standards. Where such a determination has been made, the division will notify the discharger in writing that an individual permit application is necessary as described in Subpart 8.11. The division may authorize coverage under this permit after appropriate controls and implementation procedures have been included in the SWPPP that are designed to bring the discharge into compliance with water quality standards.
- e) Discharges into waters with unavailable parameters - Discharges to waters with unavailable parameters that would cause measurable degradation of water quality for the parameter that is unavailable; or that would cause additional loadings of unavailable parameters that are bioaccumulative or that have criteria below method detection levels. Waters with unavailable parameters means any segment of surface waters that has been identified by the division as failing to support its designated classified uses. A discharge that complies with the additional requirements set forth in Subpart 6.4 is not considered to cause measurable degradation of waters with unavailable parameters, unless the division determines upon review of the SWPPP that there is a reason to limit coverage as set forth in Subpart 1.3(d) and the SWPPP cannot be modified to bring the site into compliance.
- f) Discharges into Outstanding National Resource Waters - Discharges into waters that are designated by the Water Quality Control Board as Outstanding National Resource Waters (ONRW) pursuant to Tennessee Rules, Chapter 0400-40-03-.06(5), except activities conducted by, or on behalf of, the National Park Service on its own lands.
- g) Discharges into Exceptional Tennessee Waters - Discharges that would cause more than de minimis DE MINIMIS degradation of water quality for any available parameter in waters designated by TDEC as Exceptional Tennessee Waters. A discharge that complies with the additional requirements set forth in Subpart 6.4 is not considered to cause more than de minimis degradation of available parameters unless the division determines upon review of the SWPPP that there is a reason to limit



coverage as set forth in Subpart 1.3(d)) and the SWPPP cannot be modified to bring the site into compliance.

- h) Discharges not protective of aquatic or semi-aquatic threatened and endangered species, species deemed in need of management or special concern species - Discharges or discharge-related activities that are likely to jeopardize the continued existence of listed or proposed threatened or endangered aquatic species, or their critical habitat, under the Endangered Species Act (ESA), or other applicable state law or rule.

Discharges or conducting discharge-related activities that will cause a prohibited “take” of federally listed aquatic species (as defined under Section 3 of the ESA and 50 CFR §17.3) unless such take is authorized under Sections 7 or 10 of the ESA.

Discharges or conducting discharge-related activities that will cause a prohibited “take” of state listed aquatic species², unless such take is authorized under the provisions of T.C.A. § 70-8-106(e).

- i) Discharges from a new or proposed mining operation - Discharges from new or proposed mining operations are not authorized.
- j) Discharges into waters with an approved Total Maximum Daily Load - Discharges of a pollutant to waters for which there is an EPA-approved or established total maximum daily load (TMDL) for that pollutant, unless the SWPPP incorporates measures or controls consistent with the assumptions and requirements of the TMDL.

Any discharge of stormwater or other fluids to groundwater via an improved sinkhole or injection well requires a Class V Underground Injection Control authorization by rule, or an individual permit under the provisions of Tennessee Rules, Chapter 0400-45-06.

1.4. OBTAINING PERMIT COVERAGE

A complete NOI, Stormwater Pollution Prevention Plan (SWPPP) and application fee³ are required to obtain coverage under this general permit. **Submitting for coverage under this permit means that an applicant has examined a copy of**

² As defined in the Tennessee Wildlife Resources Commission Proclamation, Endangered or Threatened Aquatic Species, and in the Tennessee Wildlife Resources Commission Proclamation, Wildlife in Need of Management.

³ Any reference to an “*application*” in this permit should be considered equivalent to the phrase “*complete NOI, SWPPP and application fee*”



this permit and thereby acknowledged the applicant's claim of ability to comply with permit terms and conditions.

1.4.1. Notice of Intent (NOI)

Operators wishing to obtain coverage under this permit must submit a complete NOI in accordance with Part 3, using the NOI form provided in Appendix A of this permit. Electronic submittal is encouraged (see NPDES Electronic Reporting for more information). The division may review NOIs and SWPPPs for completeness and accuracy and, when deemed necessary, investigate the proposed project for potential impacts to the waters of the state. Absent extraordinary circumstances, NOCs should be issued within 30 days of NOI submittal, unless the division has responded to the operator within that time requesting additional information. Permittees must obtain all required local authorizations related to stormwater management (see Section 1.4.4).

1.4.2. Stormwater Pollution Prevention Plan (SWPPP)

Operators wishing to obtain coverage under this permit must submit a site-specific SWPPP with the NOI, or sign and certify an existing site-specific SWPPP. The SWPPP shall address all of the operators' construction-related activities from the date construction commences to the date of termination of permit coverage, to the maximum extent practicable. The SWPPP must address the total acreage planned to be disturbed, including any associated construction support activities (see Section 1.2.2). The SWPPP must be developed, implemented and updated according to the requirements in Part 5 and Section 6.4.1. The SWPPP must be implemented prior to commencement of construction activities.

Preparation and implementation of the SWPPP may be a cooperative effort with all operators at a site. New operators with design and operational control of their portion of the construction site are expected to adopt, modify, update and implement their portion of the SWPPP. Alternatively, permittees at the site may develop and submit a SWPPP addressing only their portion of the project, as long as the proposed Best Management Practices (BMPs) are compatible with the previously submitted SWPPPs, as updated, and complying with conditions of this general permit.

SWPPPs must be updated or addended if site activities diverge significantly from those indicated in the initial SWPPP. A copy of the most recent version of the SWPPP must be available at the site.



Site operators who are building single family residences on at-grade lots (see Section 2.1.2) and who are submitting an application for coverage under this permit, may complete and submit Form CN-1249, the Stormwater Pollution Prevention Plan (SWPPP) for Single Family Residential Homebuilding Sites. This SWPPP template is available on our website at:

http://tdec.tn.gov/etdec/DownloadFile.aspx?row_id=CN-1249.

Form CN-1249 is not appropriate if significant grading of the lot or lots is necessary.

1.4.3. Permit Application Fee

The permit application fee should accompany the applicant's NOI form. The fee is based on the total acreage planned to be disturbed by an entire construction project for which the applicant is requesting coverage, including any associated construction support activities (see Section 1.2.2). The applicant may present documentation of areas in the project that will not be subject to disturbance at any time during the life of the project and have these areas excluded from the fee calculation.

The application fees shall be as specified in Tennessee Rules, Chapter 0400-40-11. The application will be deemed incomplete until the appropriate application fee is paid in full. Checks for the appropriate fee should be made payable to "Treasurer, State of Tennessee." Electronic payment methods, if made available by the State of Tennessee, are acceptable and are encouraged. The following conditions apply:

- a) If stormwater discharges from the site or acreage to be disturbed was previously authorized by a CGP, but coverage has been since terminated, a primary operator must submit a new application for coverage under the CGP.
- b) A new primary operator seeking subsequent coverage under an actively permitted activity must submit the subsequent coverage fee to obtain coverage under an active NOC.
- c) Acreage additions up to 10% of the original plan area, but not to exceed a total of 5 acres, and other minor modifications of the original plan do not require separate NOI submittal. These minor additions require submittal of a plan indicating the additional area(s) of disturbance, the total acreage to be disturbed, and the updated SWPPP. The permittee is responsible for thoroughly and accurately identifying all waterbodies (including wetlands and streams) located on the added acreage and to provide a determination of the water's status if not previously provided. An additional fee and



updated NOI are required only if the total acreage of disturbance would require a higher fee than originally paid, and then only the difference is due. New acreage disturbances cannot be added as previously disturbed acreage is stabilized, to create a 'rolling' total of disturbance. Iterative changes that would create cumulative impact exceeding 10% of the original plan area, or a total of 5 acres require submittal of updated NOI and SWPPP to the division.

- d) In addition to the application fee, an annual maintenance fee applies per Tennessee Rules, Chapter 0400-40-11-.02(12)(i).

1.4.4. Submittal of Documents to Local Municipalities

Some permittees may discharge stormwater through an NPDES-permitted municipal separate storm sewer system (MS4) who are not exempted in Section 1.4.5. These permittees are encouraged to coordinate with the local MS4 authority prior to submitting an NOI to the division. Permitting status of all permittees covered, or previously covered, under this general permit as well as the most current list of all MS4 permits is available at:

<http://tn.gov/environment/article/tdec-dataviewers>.

Permittees must obtain all necessary authorizations pursuant to provisions of any local ordinances that apply to construction activities, and permittees are expected to comply with any additional erosion prevention, sediment control, and construction stormwater management measures required by a local municipality, county or permitted MS4 program.

1.4.5. Permit Coverage Through a Qualifying Local Program (QLP)

Coverage equivalent to coverage under this general permit may be obtained from a qualifying local erosion prevention and sediment control MS4 program. A Qualifying Local Program (QLP) is a municipal stormwater program implemented for stormwater discharges associated with construction activity that has been formally approved by the division. More information about Tennessee's QLP program and MS4 participants can be found at:

<https://www.tn.gov/environment/permit-permits/water-permits1/npdes-permits1/npdes-stormwater-permitting-program/tennessee-qualifying-local-program.html>.

If a construction site is within the jurisdiction of, and has obtained a notice of coverage from, a QLP, the operator is authorized to discharge stormwater associated with construction activity under this general permit without the submittal of an application to the division. Permitting of stormwater runoff from



construction sites from federal or state agencies (e.g., Tennessee Department of Transportation and Tennessee Valley Authority) and the local MS4 program itself will remain solely under the authority of TDEC.

The division may require any operator located within the jurisdiction of a QLP to obtain permit coverage directly from the division. The operator shall be notified in writing by the division that coverage by the QLP is no longer applicable and how to obtain coverage under this permit.

1.5. NOTICE OF COVERAGE

1.5.1. Permit Tracking Numbers

Construction activities covered under this permit will be assigned permit tracking numbers in the sequence TNR100001, TNR100002, etc. Permit tracking numbers assigned under a previous construction general permit will be retained. An operator applying for new permit coverage will be assigned a new permit tracking number. Assigning a permit tracking number by the division to a proposed discharge from a construction activity does not confirm or imply an authorization to discharge under this permit. Operators receiving new permit coverage will be listed as active on the TDEC Dataviewer.

1.5.2. Notice of Coverage (NOC)

The NOC is a notice from the division to the primary permittee informing them that the NOI, the SWPPP, and the application fee were received and accepted. The primary permittee is authorized to discharge stormwater associated with construction activity as of the effective date listed on the NOC.

For new operators seeking subsequent coverage under an existing tracking number, the division will not issue a NOC. New operators that notify the division to be added to an existing coverage are covered upon receipt of notification of permit coverage by the division. The permit record reflecting the additional operator will be published on TDEC's DataViewer in the next update.

The division reserves the right to deny coverage to artificial entities (e.g., corporations or partnerships, excluding entities not required to register with the Tennessee Secretary of State) that are not properly registered and in good standing (i.e., listed with an entity status of "active") with the Tennessee Secretary of State, Division of Business Services. The division also reserves the right to issue permit coverage in the correct legal name of the individual or entity seeking



coverage, including each general partner of a general partnership in addition to the general partnership.

Alterations to channels or waterbodies (see definition of streams) that are contained on, traverse through or are adjacent to the construction site are not authorized by this permit. Such alterations may require an Aquatic Resources Alteration Permit (ARAP): <https://www.tn.gov/environment/permit-permits/water-permits1/aquatic-resource-alteration-permit--arap-.html>.

It is the responsibility of the applicant to thoroughly and accurately identify all waterbodies (see definition of streams) located on the site and to provide a determination of the water's status.

For channels, this determination must be conducted in accordance with Tennessee's standard operating procedures for hydrologic determinations set forth at Tennessee Rules, Chapter 0400-40-03.05(9). Wetlands determinations must include the submission of a wetland delineation completed utilizing the USACOE 1987 *Wetlands Delineation Manual* and applicable *Regional Supplement*. For the purposes of permitting, the permittee may choose to provide all aquatic features located on the site the protections afforded to streams and wetlands in lieu of conducting hydrologic determinations. ARAPs are independent requirements from CGP coverage and complete applications for ARAPs shall precede NOI submittal. The division reserves the right to delay or withhold issuance of coverage under the CGP in some cases until the appropriate ARAP coverage has been obtained.

The treatment and disposal of wastewater (e.g., sanitary, commercial or industrial wastewater) generated during and after the construction must be also addressed prior to issuance of the NOC. The NOC may be delayed until adequate wastewater treatment is identified and accompanying disposal permits are issued.



PART 2

2. CONSTRUCTION SITE OPERATORS

2.1. TYPES OF OPERATORS

2.1.1. Owner/Developer

An owner or developer of a project is a primary permittee. This person has operational or design control over construction plans and specifications, including the ability to make modifications to those plans and specifications. This person may include, but is not limited to, a developer, landowner, realtor, commercial builder, homebuilder, utility company, etc. This person may be an individual, a corporate entity, or a governmental entity. An owner's or developer's responsibility to comply with requirements of this permit extends until permit coverage is terminated in accordance with requirements of Part 9.

The site-wide permittee is the first primary permittee to apply for coverage for a construction activity. There may be other primary permittees for a project, but there is only one site-wide permittee. Where there are multiple operators associated with the same project, all operators are required to obtain permit coverage. Once covered by a permit, each operator is responsible for complying with the permit. Permittees are jointly and severally liable for a violation related to construction activities that affect the same project site, unless a permittee affirmatively demonstrates to the satisfaction of the Department that its own action, or failure to act, was not a cause of the violation.

2.1.2. Commercial Builders

A commercial builder can be a primary or secondary permittee at a construction site.

A commercial builder who purchases one or more lots from a primary permittee for the purpose of constructing and selling a structure⁴ and has design or operational control over construction plans and specifications for that portion of

⁴ e.g., residential house, non-residential structure, commercial building, industrial facility, etc.



the site, or is hired by an end user, such as a lot owner who may not be a permittee, must obtain coverage in one of the following ways:

- a) The site-wide permittee may transfer coverage to the commercial builder, for the entire site or just the acreage/lots the builder has purchased;
- b) The commercial builder may submit a new NOI for the acreage purchased, following requirements in Section 3.1.4; or
- c) The commercial builder may be hired by the primary permittee or a lot owner to build a structure, and by mutual agreement build on the site under the existing coverage of the site-wide permittee. In this case, the commercial builder signs the primary permittee's NOI and SWPPP as a contractor (see Section 2.1.3) and is considered a secondary permittee.

2.1.3. Contractors

A contractor is considered a secondary permittee. This person has day-to-day operational control of the activities necessary to ensure compliance with the SWPPP or other permit conditions (e.g., the contractor is authorized to direct workers at a site to carry out activities required by the SWPPP or comply with other permit conditions). A contractor may be:

- a general contractor
- a grading contractor
- an erosion control contractor
- a sub-contractor responsible for land disturbing activities or erosion prevention and sediment control (EPSC) implementation and maintenance
- a commercial builder hired by the primary permittee.

The contractor may need to include in their contract with the party that hired them specific details for the contractor's responsibilities concerning EPSC measures. This includes the ability of the contractor to make EPSC modifications. The contractor shall sign the primary permittee's NOI and SWPPP associated with the construction project at which they will be an operator (insofar as possible), or submit a separate NOI to the division indicating their intent to be added to the existing activity coverage as an operator.

2.2. RESPONSIBILITIES OF OPERATORS

A permittee may meet one or more of the operational control components in the definition of "operator" found in Subpart 2.1. Either Section 2.2.1 or 2.2.2, or both, will apply depending on the type of operational control exerted by an individual permittee.



2.2.1. Permittees with Design Control

Permittees with operational control over construction plans and specifications at the construction site, including the ability to make modifications to those plans and specifications, must ensure that:

- a) the project specifications meet the minimum requirements of Part 5 (SWPPP) and all other applicable conditions;
- b) the SWPPP indicates the areas of the project where they have operational control;
- c) all other permittees implementing and maintaining portions of the SWPPP impacted by any changes made to the plan are notified of such modifications in a timely manner;
- d) all common BMPs (i.e., sediment treatment basin and drainage structures) necessary for the prevention of erosion or control of sediment are maintained and effective until all construction is complete and all disturbed areas in the entire project are stabilized, unless permit coverage has been obtained and responsibility has been taken over by a new primary permittee; and
- e) all operators on the site have permit coverage, if required.

If parties with day-to-day operational control of the construction site have not been identified at the time the site-wide SWPPP is initially developed, the permittee with operational control shall be considered to be the responsible person until an NOI is submitted identifying the new operators (see Section 3.1.4). These new operators (e.g., general contractor, utilities contractors, sub-contractors, erosion control contractors, hired commercial builders) are considered secondary permittees. The SWPPP must be updated to reflect the addition of new operators.

2.2.2. Permittees with Day-to-Day Operational Control

Permittees with day-to-day operational control of the activities necessary to ensure compliance with the SWPPP or other permit conditions must ensure that:

- a) the SWPPP for portions of the project where they are operators meets the requirements of Part 5 and identifies the parties responsible for implementing the control measures identified in the plan;
- b) the SWPPP indicates areas of the project where they have operational control over day-to-day activities; and



- c) measures in the SWPPP are adequate to prevent soil erosion and control any sediment that may result from their earth disturbing activity.

Permittees with operational control over only a portion of a larger construction project are responsible for compliance with all applicable terms and conditions of this permit as it relates to their activities on their portion of the construction site. This includes, but is not limited to, implementation of Best Management Practices (BMPs) and other controls required by the SWPPP. Permittees shall ensure either directly or through coordination with other permittees, that their activities do not render another person's pollution control ineffective. All permittees must implement their portions of the SWPPP.



PART 3

3. NOTICE OF INTENT (NOI) REQUIREMENTS

3.1. NOI SUBMITTAL

3.1.1. Who Must Submit an NOI?

All operators must submit an NOI form. For the purpose of this permit and in the context of stormwater associated with construction activity, an “operator” means any person associated with a construction project who meets either or both of the following two criteria:

- a) The person has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications. This person is considered the primary permittee and is typically:
 - the owner or developer of the project,
 - the owner or developer of a portion of the project (e.g., subsequent builder), or
 - the person who is the current owner of the construction site.
- b) The person has day-to-day operational control of the activities necessary to ensure compliance with the SWPPP or other permit conditions. This person is typically a contractor, or a commercial builder hired by the primary permittee, and is considered a secondary permittee.

3.1.2. Existing Sites

An operator presently permitted under the 2016 construction general permit shall be granted coverage under this new general permit. Coverage will be extended automatically without notification to the division or an additional fee being assessed. The existing SWPPP shall be modified according to the Section 5.3.1 of this permit.

If an operator does not wish to be continued under the new general permit, they may terminate coverage (Section 9.1). If a site with terminated coverage is unstable or if construction continues, a new NOI, SWPPP and application fee must be submitted.

3.1.3. New Sites or New Phases of Existing Sites

Except as provided in Section 3.1.4, operators must submit a complete NOI, SWPPP and an application fee in accordance with the requirements described



in Subpart 1.4. The complete application should be submitted at least 30 days prior to commencement of construction activities. The permittee is authorized to discharge stormwater associated with construction activity as of the effective date listed on the NOC or the TDEC DataViewer. The land disturbing activities shall not start until the NOC is received by the applicant according to Subpart 1.5.

3.1.4. New Operators

New operators proposing to conduct construction activities at a site with existing coverage must submit an NOI. The NOI should be submitted prior to the new operator commencing work at the site. The NOI must reference the project name and tracking number assigned to the primary permittee's NOI. The NOI may not need to be submitted immediately upon assuming operational control if the portion of the site controlled by the new operator is inactive and all the previously disturbed areas are permanently stabilized.

A new operator working as a residential home builder may submit Form CN-1249, the Stormwater Pollution Prevention Plan (SWPPP) for Single Family Residential Homebuilding Sites. This form may be found at:
http://tdec.tn.gov/etdec/DownloadFile.aspx?row_id=CN-1249.

If the primary permittee's company name has changed (but not the site ownership or authorized signators), an updated NOI should be submitted to the division within 30 days of the name change, along with documentation that the name change has been properly registered with the Tennessee Secretary of State, Division of Business Services. If the new operator agrees to comply with an existing site-wide SWPPP already implemented at the site, a copy of the SWPPP does not have to be submitted with the NOI.

If the transfer of ownership is due to foreclosure or a permittee filing for bankruptcy proceedings, the new owner (e.g., a lending institution) must obtain permit coverage if the construction activity is inactive but soil is not stabilized sufficiently. If the property is sufficiently stabilized permit coverage may not be necessary, unless and until construction activity at the site resumes.

3.1.5. Late NOIs

Dischargers are not prohibited from submitting NOIs after construction at their site has already begun. When a late NOI is submitted, and if the division authorizes coverage under this permit, such authorization is only for future discharges. Any prior, unpermitted, discharges or permit noncompliances are subject to penalties as described in Section 8.1.2.



3.1.6. Who Must Sign the NOI?

All construction site operators as defined in Subpart 2.1 must sign the NOI form. Signatory requirements for a NOI are described in Section 8.7.1. Signatures on electronically submitted NOIs are deemed to be equivalent to a hardcopy signature. An NOI that does not bear a valid signature will be deemed incomplete.

3.2. FORMAT AND CONTENT OF THE NOI FORM

3.2.1. NOI Form

The NOI form is provided in Appendix A of this permit. This form and its instructions set forth the required content of the NOI. The NOI form must be filled in completely. If the division notifies applicants by mail, E-mail, public notice or by making information available on the world wide web of electronic NOI forms (see NPDES Electronic Reporting), the operators may be required to use those electronic options to submit the NOI (Section 3.3.2)

Owners, developers and contractors that meet the definition of the operator in Subpart 2.1 shall apply for permit coverage on the same NOI, if possible. The division may accept separate NOI forms from different operators for construction activities on the same construction site when warranted.

After permit coverage has been granted to the primary permittee, any subsequent NOI submittals must include the site's previously assigned permit tracking number and the project name. The SWPPP shall be prepared in accordance with Part 5, and must be submitted with the NOI unless the NOI is only being submitted to add a secondary permittee to an existing coverage.

3.2.2. Construction Site Map

An excerpt (8 ½" by 11" or 11" by 17") from the appropriate 7.5 minute United States Geological Survey (USGS) topographic map (or other map showing contours) with the proposed construction site centered, must be included with the NOI. The entire proposed construction area must be clearly outlined on the map, with all acreage to be disturbed clearly identified. All outfalls⁵ discharging runoff from the property, streams receiving the discharge, and storm sewer systems conveying the discharge from outfalls shall be clearly identified and marked on the map. NOIs for linear projects must specify the location of each end

⁵ Phrase "point source" and term "outfall" are used interchangeably. For the purpose of this general permit, they can be considered synonyms.



of the construction area and all areas to be disturbed. Commercial builders that develop separate SWPPPs that cover only their portion of the project shall also submit a site or plat map that clearly indicates the lots for which they are applying for permit coverage, and the location of EPSCs that will be used at each lot (Section 5.5).

3.3. WHERE AND HOW TO SUBMIT AN APPLICATION

3.3.1. Traditional Submittal

The applicant shall submit the NOI, SWPPP and application fee to the appropriate Environmental Field Office (EFO) for the county where the construction activity is located and where stormwater discharges enters waters of the state. If a site straddles a county line of counties that are in different EFO service areas, the operators shall send the NOI and the application fee to the EFO that provides coverage for the majority of the proposed construction activity.

A list of counties and the corresponding EFOs is provided in Subpart 3.4. The division's Nashville Central Office will serve as a processing office for NOIs submitted by federal or state agencies (e.g., TDOT, TVA and the local MS4 programs).

3.3.2. Submittal Using Electronic Forms

The division is in the process of launching the new NPDES Electronic Reporting online customer portal for submission of permit applications and other reports. If the division notifies applicants by mail, E-mail, public notice or by making information available on the world wide web of electronic application submittal, the operators may be required to use those electronic options to submit the NOI, SWPPP and an application fee. For more information, visit <https://www.tn.gov/environment/program-areas/wr-water-resources/netdmr-and-electronic-reporting.html>.



3.4. TDEC ENVIRONMENTAL FIELD OFFICES (EFOS) AND CORRESPONDING COUNTIES

<u>EFO Name</u>	List of Counties
Chattanooga	Bledsoe, Bradley, Grundy, Hamilton, Marion, McMinn, Meigs, Polk, Rhea, Sequatchie
Columbia	Bedford, Coffee, Franklin, Giles, Hickman, Lawrence, Lewis, Lincoln, Marshall, Maury, Moore, Perry, Wayne
Cookeville	Cannon, Clay, Cumberland, DeKalb, Fentress, Jackson, Macon, Overton, Pickett, Putnam, Smith, Trousdale, Van Buren, Warren, White
Jackson	Benton, Carroll, Chester, Crockett, Decatur, Dyer, Gibson, Hardin, Haywood, Henderson, Henry, Lake, Lauderdale, Madison, McNairy, Obion, Weakley
Johnson City	Carter, Greene, Hancock, Hawkins, Johnson, Sullivan, Unicoi, Washington
Knoxville	Anderson, Blount, Campbell, Claiborne, Cocke, Grainger, Hamblen, Jefferson, Knox, Loudon, Monroe, Morgan, Roane, Scott, Sevier, Union
Memphis	Fayette, Hardeman, Shelby, Tipton
Nashville	Cheatham, Davidson, Dickson, Houston, Humphreys, Montgomery, Robertson, Rutherford, Stewart, Sumner, Williamson, Wilson

TDEC may be reached by telephone at the toll-free number 1-888-891-8332 (TDEC). Local [EFOs](#) may be reached directly when calling this number from the construction site, using a land line.



PART 4

4. CONSTRUCTION AND DEVELOPMENT EFFLUENT GUIDELINES

4.1. NON-NUMERIC EFFLUENT LIMITATIONS

Any point source authorized by this general permit must achieve, at a minimum, the effluent limitations representing the degree of effluent reduction attainable by application of best practicable control technology (BPT) currently available.

4.1.1. Erosion prevention and sediment controls

Design, install and maintain effective erosion and sediment controls to minimize the discharge of pollutants. At a minimum, such controls must be designed, installed and maintained to:

- 1.) Control stormwater volume and velocity to minimize soil erosion in order to minimize pollutant discharges;
- 2.) Control stormwater discharges, including both peak flowrates and total stormwater volume, to minimize channel and streambank erosion and scour in the immediate vicinity of discharge points;
- 3.) Minimize the amount of soil exposed during construction activity;
- 4.) Minimize the disturbance of steep slopes;
- 5.) Minimize sediment discharges from the site. The design, installation and maintenance of erosion and sediment controls must address factors such as the amount, frequency, intensity and duration of precipitation, the nature of resulting stormwater runoff, and soil characteristics, including the range of soil particle sizes expected to be present on the site;
- 6.) Provide and maintain natural buffers as described in Section 4.1.2, direct stormwater to vegetated areas and maximize stormwater infiltration to reduce pollutant discharges, unless infeasible;
- 7.) Minimize soil compaction. Minimizing soil compaction is not required where the intended function of a specific area of the site dictates that it be compacted; and
- 8.) Unless infeasible, preserve topsoil. Preserving topsoil is not required where the intended function of a specific area of the site dictates that the topsoil be disturbed or removed.

4.1.2. Water Quality Riparian Buffer Zone Requirements

The water quality riparian buffer zone requirements in this section apply to all streams with available parameters adjacent to construction sites (for waters with



unavailable parameters or Exceptional Tennessee Waters, see Section 6.4.2). A 30-foot natural water quality riparian buffer shall be preserved between such waterbodies and the disturbed areas, to the maximum extent practicable, during construction activities. The water quality riparian buffer is required to protect waters of the state that are not wet weather conveyances as identified using Tennessee's standard operating procedures for hydrologic determinations set forth in Tennessee Rules, Chapter 0400-40-03-.05(9).⁶ Because of the potential heavy sediment loading associated with construction site runoff, water quality riparian buffers are not primary sediment control measures and shall not be relied on as such; the primary purpose of water quality riparian buffers is additional pollutant removal. Stormwater discharges must enter the water quality riparian buffer zone as sheet flow, not as concentrated flow, where site conditions allow. Rehabilitation and enhancement of a natural buffer zone is allowed, if necessary, to improve its effectiveness in protecting waters of the state.

The water quality riparian buffer zone should be preserved between the top of stream bank and the disturbed construction area. The 30-foot criterion for the width of the buffer zone can be established on an average width basis at a project, as long as the minimum width of the buffer zone is more than 15 feet at any measured location. If the construction site encompasses both sides of a stream, buffer averaging can be applied to both sides, but each side must average the 30-foot criterion independently.

Construction activities within the water quality riparian buffer zone shall be avoided and existing forested buffer areas shall be preserved whenever possible. Where it is not practicable to maintain a full water quality riparian buffer, BMPs providing equivalent protection to a receiving stream as a natural water quality riparian buffer must be used. A justification for use and a design of equivalent BMPs shall be included in the SWPPP. Such equivalent BMPs are expected to be routinely used at construction projects typically located adjacent to surface waters. These projects may include sewer line construction, roadway construction, utility line or equipment installation, greenway construction, construction of a permanent outfall or a velocity dissipating structure.

⁶ If obtaining permit coverage for the first time following the effective date of this permit, 15-foot buffers are also required for any wet weather conveyance identified as waters of the United States by the U.S. Army Corps of Engineers or the Environmental Protection Agency.



This requirement does not apply to any valid Aquatic Resources Alteration Permit (ARAP), or equivalent permits issued by federal authorities. Additional buffer zone requirements may be established by the local MS4 program.

4.1.2.1. Water quality riparian buffer zone exemption based on existing uses

Water quality riparian buffer zones as described in Section 4.1.2 shall not be required in portions of the buffer where certain land uses exist and are to remain in place according to the following:

- a) A use shall be considered existing if it was present within the buffer zone as of the date of the Notice of Intent for coverage under the construction general permit. Existing uses may include buildings, parking lots, roadways, utility lines and on-site sanitary sewage systems. Only the portion of the buffer zone that contains the footprint of the existing land use is exempt from buffer zones. Activities necessary to maintain uses are allowed provided that no additional vegetation is removed from the buffer zone.
- b) If an area with an existing land use is proposed to be converted to another use or the impervious surfaces located within the buffer area are being removed, buffer zone requirements shall apply.

4.1.2.2. Pre-approved sites

Construction activity at sites that were pre-approved prior to February 1, 2010, is exempt from the buffer requirements of Section 4.1.2. Evidence of pre-approval for highway projects shall be a final right-of-way plan; and, for other construction projects, the final design drawings with attached written and dated approval by the local, state or federal agency with authority to approve such design drawings for construction.

4.1.3. Dewatering

Discharges from dewatering activities, including discharges from dewatering of trenches and excavations, are prohibited unless managed by appropriate controls. Appropriate controls may include weir tanks, dewatering tanks, gravity bag filters, sand media particulate filters, pressurized bag filters, cartridge filters or other control units providing the level of treatment necessary to comply with permit requirements.



4.1.4. Pollution Prevention Measures

The permittee must design, install, implement and maintain effective pollution prevention measures to minimize the discharge of sediment and other pollutants. At a minimum, such measures must be designed, installed, implemented and maintained to:

- a) Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water and other wash waters not containing soaps or solvents. Wash waters must be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge;
- b) Minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste and other materials present on the site to precipitation and to stormwater; and
- c) Minimize the discharge of pollutants from spills and leaks, and implement chemical spill and leak prevention and response procedures.

4.1.5. Prohibited Discharges

The following discharges are prohibited:

- a) Wastewater from washout of concrete, unless managed by an appropriate control.
- b) Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials.
- c) Fuels, oils or other potential pollutants used in vehicle and equipment operation and maintenance.
- d) Soaps or solvents used in vehicle and equipment washing.



PART 5

5. STORMWATER POLLUTION PREVENTION PLAN (SWPPP) REQUIREMENTS

5.1. THE GENERAL PURPOSE OF THE SWPPP

A SWPPP must be prepared and submitted along with the NOI as required in Section 1.4.2. The primary permittee must implement the SWPPP and maintain effective Best Management Practices (BMPs) from commencement of construction activity until permanent stabilization is complete, or until the permittee does not have design or operational control of any portion of the construction site. If a SWPPP submittal contains contradictory or ambiguous information, the division will hold the permittee to the most stringent interpretation of the information submitted. Requirements for termination of site coverage are provided in Part 9.

A site-specific SWPPP must be developed for each construction project or activity covered by this permit. The design, inspection and maintenance of BMPs described in the SWPPP must be prepared in accordance with good engineering practices. At a minimum, BMPs shall be consistent with the recommendations contained in the current edition of the Tennessee Erosion and Sediment Control Handbook (the handbook).

Once a definable area has been permanently stabilized as described in Subsection 5.5.3.4, the permittee may identify this area on the SWPPP. No further SWPPP or inspection requirements apply to that portion of the site (e.g., earth-disturbing activities around one of three buildings in a complex are done and the area is permanently stabilized, one mile of a roadway or pipeline project is done and permanently stabilized, etc.).

For more effective implementation of BMPs, a cooperative effort by the different operators at a site to prepare and participate in a site-wide SWPPP is expected. Primary permittees at a site may develop separate SWPPPs that cover only their portion of the project. In instances where there is more than one SWPPP for a site, the permittees must ensure the stormwater discharge controls and other measures are compatible with one another and do not prevent another operator from complying with permit conditions. The site-wide SWPPP developed and submitted by the primary permittee must assign responsibilities to secondary permittees and coordinate all BMPs at the construction site. Assignment and coordination can be done by name or by job title.



5.2. QUALIFICATION REQUIREMENTS

For sites greater than five acres of disturbance, the narrative portion of the SWPPP shall be prepared by an individual who has a working knowledge of erosion prevention and sediment controls, such as (but not limited to):

- a registered engineer or landscape architect,
- a Certified Professional in Erosion and Sediment Control (CPESC) or
- a person that successfully completed the “Level II Design Principles for Erosion Prevention and Sediment Control for Construction Sites” course.

For sites less than or equal to five acres of disturbance, these qualification requirements do not apply, and the division provides the following optional templates:

- Form CN-1249, the Stormwater Pollution Prevention Plan (SWPPP) for Single Family Residential Homebuilding Sites. This SWPPP template is available at:
http://tdec.tn.gov/etdec/DownloadFile.aspx?row_id=CN-1249. Form CN-1249 is not appropriate if significant grading of the lot or lots is necessary.
- SWPPP Template for Sites Not Requiring Engineer Design from the DWR – NR – G – 02 - Construction Stormwater – 05172019 Guidance regarding construction stormwater general permit coverage involving sites with Non-Engineer Design SWPPPs:
<https://www.tn.gov/content/dam/tn/environment/water/policy-and-guidance/dwr-nr-g-02-cgp-non-engineering-swppp-final-051719.pdf>
Attachment A (template):
<https://www.tn.gov/content/dam/tn/environment/water/policy-and-guidance/dwr-nr-g-02-cgp-non-engineering-swppp-final-051719-template.docx>.

Plans and specifications for any building or structure, changes in topography and drainage, including the design or modification of sediment basins or other sediment controls involving structural, hydraulic, hydrologic or other engineering calculations shall be prepared by a professional engineer or landscape architect registered in Tennessee and signed and sealed in accordance with the Tennessee Code Annotated, Title 62, Chapter 2 and the rules of the Tennessee Board of Architectural and Engineering Examiners. Engineering design of sediment basins or equivalent sediment controls must be provided for construction sites involving



drainage to an outfall totaling 10 or more acres (Subsection 5.5.3.5) or 5 or more acres if draining to waters with unavailable parameters or Exceptional Tennessee Waters (Section 6.4.1).

5.3. SWPPP PREPARATION AND COMPLIANCE

5.3.1. Existing Sites

Operators of an existing site, presently permitted under the division's 2016 construction general permit, shall maintain full compliance with the existing SWPPP. The existing SWPPP shall be modified, if necessary, to meet requirements of this new general permit, and the SWPPP changes implemented as soon as practicable but no later than 12 months following the new permit effective date. The permittee shall make the updated SWPPP available for the division's review upon request.

5.3.2. New Sites or New Phases of Existing Sites

For construction stormwater discharges not authorized under an NPDES permit as of the effective date of this permit, a SWPPP that meets the requirements of Part 5 of this permit shall be prepared and submitted along with the NOI and an appropriate fee for coverage under this permit.

5.3.3. Signature Requirements

The SWPPP shall be signed by the operators in accordance with Subpart 8.7, and if applicable, certified according to requirements in Section 5.2. Signatures on electronically submitted documents are deemed equivalent to original signatures. A SWPPP that does not bear a valid signature will be deemed incomplete.

5.3.4. SWPPP Availability

A copy of the existing version of the SWPPP shall be retained on-site at the location which generates the stormwater discharge in accordance with Part 7 of this permit. If the site is inactive or does not have an onsite location adequate to store the SWPPP, the location of the SWPPP, along with a contact phone number, shall be posted on-site. If the SWPPP is located off-site, reasonable local access to the plan during normal working hours must be provided.

The permittee shall make the existing SWPPP and inspection reports available upon request to the director; the local agency approving erosion prevention and sediment control plans, grading plans, land disturbance plans or stormwater management plans; or the operator of an MS4.



5.4. KEEPING SWPPP CURRENT

5.4.1. SWPPP Modifications

The permittee must modify, update and recertify the SWPPP if any of the following conditions apply:

- a) Whenever there is a change in the scope of the project that would be expected to have a significant effect on the discharge of pollutants to the waters of the state and which has not otherwise been addressed in the SWPPP.
- b) Whenever there is a change in chemical treatment methods, including the use of different treatment chemical, different dosage or application rate or different area of application.
- c) Whenever inspections or investigations by site operators or local, state or federal officials indicate the SWPPP is proving ineffective in eliminating or significantly minimizing pollutants from sources identified under Section 5.5.2, or is otherwise not achieving the general objectives of controlling pollutants in stormwater discharges associated with construction activity. Where local, state or federal officials determine that the SWPPP is ineffective in eliminating or significantly minimizing pollutant sources, a copy of any correspondence to that effect must be retained in the SWPPP.
- d) Whenever any new operator (typically a secondary permittee) who will implement a measure of the SWPPP must be identified (see Subpart 3.1.1 for further description of which operators must be identified).
- e) Whenever it is necessary to include water quality protection measures as required by the applicable wildlife management agency intended to prevent a negative impact to legally protected state or federally listed fauna or flora (or species proposed for such protection – Subpart 1.3). Amendments to the SWPPP may be reviewed by the division, a local MS4, the EPA, or an authorized regulatory agency.
- f) Whenever a Total Maximum Daily Load (TMDL) is developed for the receiving waters for a pollutant of concern (e.g., siltation). A list of Tennessee's TMDLs can be found at:
<https://www.tn.gov/environment/program-areas/wr-water-resources/watershed-stewardship/tennessee-s-total-maximum-daily-load--tmdl--program.html>.



5.5. COMPONENTS OF THE SWPPP

The SWPPP must:

- a) identify all potential sources of pollutants likely to affect the quality of stormwater discharges from the construction site;
- b) describe practices to be used to reduce pollutants in stormwater discharges from the construction site; and
- c) assure compliance with the terms and conditions of this permit.

The SWPPP shall include the items described in Sections 5.5.1, 5.5.2 and 5.5.3.

5.5.1. SWPPP Narrative

Each SWPPP shall provide a description of pollutant sources and other information as indicated below:

- a) A description of all construction activities at the site, including the intended sequence of activities which disturb soils for major portions of the site (e.g., grubbing, excavation, grading, utilities and infrastructure installation).
- b) Estimates of the total area of the site and the total area that is expected to be disturbed by excavation, grading, filling or other construction activities.
- c) A description of the topography of the site, including an estimation of percent slope and delineation of drainage area (acres) serving each outfall. Drainage area estimates shall include off-site drainage, if applicable.
- d) Hydric soils must be clearly identified.
- e) A description of how the runoff will be handled to prevent erosion at the permanent outfall and receiving stream.
- f) An erosion prevention and sediment control (EPSC) plan with the proposed construction area clearly outlined. The plan shall indicate the boundaries of the permitted area, drainage patterns, approximate slopes anticipated after major grading activities, areas of soil disturbance, an outline of areas which are not to be disturbed, the location of major structural and nonstructural controls identified in the SWPPP, the location of areas where stabilization practices are expected to occur, streams and sinkholes, and identification on the erosion control plan of outfall points intended for coverage. The erosion control plan must meet requirements stated in Section 5.5.3.
- g) A description of any discharge associated with industrial activity other than construction stormwater that originates on site and the location of that activity and its permit number.



- h) Identification of any streams on or adjacent to the project, a description of any anticipated alteration of these waters and the permit number or the tracking number of the Aquatic Resources Alteration Permit (ARAP) or Section 401 Certification issued for the alteration.
- i) The name of the receiving waters (this does not include wet weather conveyances connecting the site discharge to the receiving stream).
- j) Identification if those receiving waters have unavailable parameters for siltation.⁷
- k) Identification if those receiving waters are Exceptional Tennessee Waters.⁸
- l) If applicable, clearly identify and outline the buffer zones established to protect waters of the state located within the boundaries of the project.
- m) A description of the construction phasing for projects of more than 50 acres (Subsection 5.5.3.2).
- n) The timing of the planting of the vegetation cover must be discussed in the SWPPP if permanent or temporary vegetation is to be used as a control measure. Planting cover vegetation during winter months or dry months should be avoided.

5.5.2. SWPPP and EPSC plans

The SWPPP must include EPSC plans (Section 5.5.3) showing the approximate location of each control measure and a description of when the measure will be implemented during the construction process (e.g., prior to the start of earth disturbance, as the slopes are altered and after major grading is finished). The different stages of construction and the EPSC measures that will be utilized during each stage shall be depicted on multiple plan sheets as described below.

Three separate EPSC plan sheets should be developed for most sites, with the exception of single-lot homes, commercial lots, or linear infrastructure projects of less than or equal to 5 acres, for which a single plan sheet may be sufficient:

- a. The first plan sheet will address the EPSC measures necessary to manage stormwater runoff, erosion and sediment during the initial land disturbance (grading) stage.

⁷ DWR Construction Stormwater Permitting Map Viewer can be found at: <https://tdeconline.tn.gov/dwrcgp/>

⁸ List of Exceptional Waters and ORNWs in Tennessee can be found at: [https://tdec.tn.gov:8090/pls/enf_reports/f?p=9034:34304](https://tdec.tn.gov:8090/pls/enf_reports/f?p=9034:34304;); corresponding map viewer is under development



- b. A second plan sheet will address the EPSC measures necessary to manage stormwater runoff, erosion and sediment during any interim grading and construction stages.
- c. The third plan sheet will address the EPSC measures necessary to manage stormwater runoff, erosion and sediment during the final grading stage while permanent site stabilization is being achieved.

The description and implementation of controls shall address the following minimum components, as described in Sections 5.5.3, 5.5.3.6 and 5.5.3.7. Additional controls may be necessary to comply with Section 6.3.2.

5.5.3. Erosion Prevention and Sediment Controls (EPSC)

5.5.3.1. General criteria and requirements

- a) The erosion prevention controls shall be designed to eliminate to the maximum extent practicable the dislodging and suspension of soil in water. Sediment controls shall be designed to retain mobilized sediment on site to the maximum extent practicable.
- b) All control measures must be properly selected, installed and maintained in accordance with the manufacturer's specifications and/or good engineering practices. If periodic inspections or other information indicate a control has been used inappropriately, or incorrectly, the permittee must replace or modify the control.
- c) If sediment escapes the permitted area, off-site accumulations that have not reached a stream must be removed at a frequency sufficient to minimize off-site impacts (e.g., sediment that has escaped a construction site and collected in a street must be removed so that it does not subsequently wash into storm sewers and streams during the next rain or so that it does not pose a safety hazard to users of public streets). Permittees shall not initiate remediation or restoration of a stream without receiving prior authorization from the division. This permit does not authorize access to private property. Arrangements concerning the removal of sediment on adjoining property must be settled by the permittee and the adjoining landowner.
- d) Sediment must be removed from sediment traps, silt fences, sediment basins and other sediment controls when design capacity has been reduced by 50%.
- e) Erodible material storage areas (e.g., overburden and stockpiles of soil) and borrow pits that are used primarily for the permitted project are considered a part of the site and shall be identified on the NOI, addressed in the SWPPP and included in the fee calculation. TDOT projects shall be addressed in the Waste and Borrow Manual per the Statewide Stormwater Management Plan (SSWMP).



- f) Pre-construction vegetative ground cover shall not be destroyed, removed or disturbed more than 14 days prior to commencement of grading or earth moving activities unless the area is subsequently temporarily or permanently stabilized.
- g) Clearing and grubbing must be held to the minimum necessary for grading and equipment operation. Existing vegetation at the site shall be preserved to the maximum extent practicable. The limits of soil disturbance shall be clearly outlined in the SWPPP and the areas to remain undisturbed clearly indicated on the site, with the methods to be used to mark these areas described in the SWPPP.
- h) Construction must be sequenced to minimize the exposure time of graded or denuded areas.
- i) EPSC measures must be in place and functional before earth moving operations begin and must be constructed and maintained throughout the construction period stages as appropriate. Temporary measures may be removed at the beginning of the workday but must be replaced at the end of the workday.
- j) Off-site vehicle tracking of sediment and the generation of dust shall be minimized. A stabilized construction access shall be described and implemented to reduce the tracking of mud and dirt onto public roads by construction vehicles.

5.5.3.2. Construction phasing

Construction phasing is recommended on all projects regardless of size as an effective practice for minimizing erosion and limiting sedimentation. It is recommended that construction be phased to keep the total disturbed area less than 50 acres at any one time. This includes off-site borrow or disposal areas that meet the conditions of Section 1.2.2. Areas where construction is completed must be stabilized within 14 days (Subsection 5.5.3.4).

5.5.3.3. Projects Exceeding 50 acres of Disturbance

On projects where the permittee chooses to disturb more than 50 acres at one time, the following additional requirements shall apply:

- a) The permittee shall notify the division immediately if more than 50 acres of disturbance at one time is planned.
- b) Site assessments, as described in Subsection 5.5.3.8, shall be conducted on a quarterly basis.
- c) Operator inspections as described in Subsection 5.5.3.9 shall be conducted twice per week and following any rainfall event of more than 0.5 inches in



24 hours. Inspections following rainfall events can be counted as one of the twice-weekly inspections.

- d) Data describing the erodibility of soils on site, how the soil type erodibility will dictate the needed control measures and how the soil may affect the expected quality of runoff from the site shall be provided. The data may be referenced or summarized. Hydric soils must be clearly identified.
- e) A geospatial file shall be submitted to the division which identifies the project area boundaries as a polygon feature. This polygon feature can be submitted in any common data format (e.g., .kml file, shapefile, feature layer, etc.) that is compatible with common geographic systems software (e.g., Google Earth, ESRI, QGIS, etc.). The file name should reflect the same site name provided on the permit application, or a permit tracking number, if available.
- f) Stormwater runoff monitoring shall be conducted at each outfall draining 10 or more acres (Section 5.5.3.5) or 5 or more acres if draining to waters with unavailable parameters or Exceptional Tennessee Waters (Section 6.4.1).

Code	Parameter	Qualifier	Unit	Sample Type	Monitoring Frequency	Statistical Base
00070	Turbidity	Report	NTU	Grab	Monthly	Daily Maximum
00070	Turbidity	Report	NTU	Grab	Monthly	Monthly Average
00530	Total Suspended Solids (TSS)	Report	mg/L	Grab	Monthly	Daily Maximum
00530	Total Suspended Solids (TSS)	Report	mg/L	Grab	Monthly	Monthly Average
45613	Floating solids or visible foam-visual	Report	Y=1;N=0	Visual	Monthly	Value
50050	Flow	Report	MGD	Estimate	Monthly	Daily Maximum
50050	Flow	Report	MGD	Estimate	Monthly	Monthly Average

The permittee shall maintain a log of rainfall events including date, estimated duration (in hours), and total estimated rainfall per calendar day. For sampling events, the permittee shall provide an estimate of the total volume of the discharge per sampled outfall and the interval between the storm event sampled and the end of the previous measurable (greater than 0.1 inch rainfall) storm event.



The permittee shall report the estimated total drainage area and estimated acreage of land disturbance in the drainage area for each outfall for each sampling event. Record of the estimated drainage area and amount of land disturbance for a given sample event shall be reported in the notes section of the Discharge Monitoring Report.

5.5.3.4. Stabilization practices

The SWPPP shall include a description of temporary and permanent stabilization practices, including site-specific scheduling of the implementation of the practices. Site plans should ensure that existing vegetation is preserved when possible. Stabilization practices may include: temporary seeding, permanent seeding, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees and the preservation of mature vegetation. When seasonal or climate conditions would prevent timely establishment of vegetation other stabilization practices must be utilized. Use of impervious surfaces for permanent stabilization in lieu of a permanent vegetative cover should be avoided where practicable. No stabilization control measures or EPSC measures are to be installed in a stream without obtaining a Section 404 permit and an Aquatic Resources Alteration Permit (ARAP).

Stabilization measures shall be initiated as soon as possible in portions of the site where construction activities have temporarily or permanently ceased. Temporary or permanent soil stabilization at the construction site must be completed within 14 days after the construction activity in that portion of the site has temporarily or permanently ceased. In the following situations, temporary stabilization measures are not required:

- a) Where the initiation of stabilization measures is precluded by snow cover or frozen ground conditions or adverse soggy ground conditions, stabilization measures shall be initiated as soon as practicable.
- b) Where construction activity on a portion of the site is temporarily ceased, but soil disturbing activities is planned to resume within 2weeks.
- c) In arid, semiarid, and drought-stricken areas where initiating vegetative stabilization measures immediately is infeasible, alternative stabilization measures such as properly anchored mulch, soil binders or matting must be employed.

Steep slopes shall be stabilized within one week after construction activity on the slope has temporarily or permanently ceased.



Permanent stabilization with perennial vegetation (using native herbaceous and woody plants where practicable) or other permanently stable, non-eroding surface shall replace any temporary measures as soon as practicable. Unpacked gravel containing fines (silt and clay sized particles) or crusher runs will not be considered a non-eroding surface. On sites where disturbed acreage will be returned to its prior agricultural use (i/e. row crops, pasture) normal agricultural practices can be substituted.

5.5.3.5. Structural practices

The SWPPP shall include a description of structural practices utilized to divert flows from exposed soils, store flows or otherwise limit runoff and discharge of pollutants from exposed areas of the site. Such practices may include, but are not limited to silt fences, earth dikes, drainage swales, sediment traps, check dams, subsurface drains, pipe slope drains, level spreaders, storm drain inlet protection, rock outlet protection, reinforced soil retaining systems, gabions and temporary or permanent sediment basins. Structural controls shall not be placed in streams except as authorized by a section 404 permit and/or Aquatic Resources Alteration Permit (ARAP).

EPSC measures shall be designed to minimize erosion and maximize sediment removal resulting from a 2-year, 24-hour storm (the design storm). The design of erosion prevention and sediment controls must adhere to good engineering practices. The drainage area recommendations and treatment design specifications are provided in the Tennessee Erosion and Sediment Control Handbook. Chemical treatment of the stormwater runoff may be necessary to minimize the amount of sediment being discharged when clay and other fine particle soils or highly erodible soils are present at the construction site. However, the use of cationic polymers for treatment is prohibited.

For an outfall that receives drainage from 10 or more acres, a minimum sediment basin volume that will provide treatment for a calculated volume of runoff from a 2-year, 24-hour storm and runoff from each acre drained, or equivalent control measures as specified in the Tennessee Erosion and Sediment Control Handbook, shall be provided until permanent stabilization of the site. A drainage area of 10 or more acres includes disturbed and undisturbed portions of the site and areas adjacent to the site, all draining through the common outfall. Where an equivalent control measure is substituted for a sediment basin, the equivalency (with respect to sediment removal) must be justified to the division. Runoff from any undisturbed acreage should be diverted around the disturbed area and the sediment basin. Diverted runoff can be omitted from the volume calculation.



Sediment storage expected from the disturbed areas must be included. Discharges from basins and impoundments shall utilize outlet structures that only withdraw water from near the surface of the basin or impoundment, unless infeasible.

All calculations related to drainage areas, runoff coefficients, basin volumes and equivalent control measures must be provided in the SWPPP. The discharge structure from a sediment basin must be designed to retain sediment during the lower flows in accordance with the most current version of the Tennessee Erosion and Sediment Control Handbook. Muddy water to be pumped from excavation and work areas must be held in settling basins, filtered or chemically treated prior to its discharge into surface waters. Water must be discharged through a pipe, grassed or lined channel or other equivalent means so that the discharge does not cause erosion and sedimentation. Discharged water must not cause an objectionable color contrast with the receiving stream.

Sediment structures treating drainage areas in excess of 25 acres require a site-specific design that accurately defines the site hydrology, site-specific sediment loading, hydraulics of the site, and adheres to all Tennessee Erosion and Sediment Control Handbook design recommendations for sediment basins.

Velocity dissipation structures shall be installed if needed to provide for non-erosive discharge velocities to wet weather conveyances or streams.

5.5.3.6. Stormwater management

The following factors must be accounted for in the design of all stormwater controls:

- a) The nature of stormwater runoff and run-on at the site, including factors such as expected flow from impervious surfaces, slopes, and site drainage features. Stormwater controls must be designed to control stormwater volume, velocity, and peak flow rates to minimize discharges of pollutants in stormwater, as well as minimizing channel and streambank erosion at discharge points.
- b) The soil type and range of soil particle sizes expected to be present on the site.
- c) Description of any measures that will be installed during the construction process to control pollutants in stormwater discharges that will occur after construction operations have been completed, including a brief



description of applicable State or local erosion and sediment control requirements.

5.5.3.7. Other items needing control

- a) No solid materials, including building materials, shall be placed in waters of the state, except as authorized by a section 404 permit and/or Aquatic Resources Alteration Permit (ARAP). Litter, construction debris and construction chemicals exposed to stormwater shall be picked up prior to storm events or before being carried off the site by wind so that they do not become a pollutant source for stormwater discharges. EPSC materials shall be prevented from becoming a pollutant source for stormwater discharges.
- b) The SWPPP shall identify and provide the necessary EPSC measures for the installation of any waste disposal system, sanitary sewer or septic system. Permittees must also comply with applicable state and local waste disposal, sanitary sewer or septic system regulations as necessary.
- c) The SWPPP shall include a description of construction and waste materials expected to be stored on-site. The SWPPP shall also include a description of controls used to reduce pollution from materials stored on site. Controls may include storage practices to minimize exposure of the materials to stormwater or spill prevention and response.

5.5.3.8. Site Assessments

Site assessment shall be conducted at each outfall draining 10 or more acres (Section 5.5.3.5) or 5 or more acres if draining to waters with unavailable parameters or Exceptional Tennessee Waters (Section 6.4.1). The site assessment is a documented site inspection conducted by a qualified individual to verify the installation, functionality and performance of the EPSC measures described in the SWPPP. Site assessments shall cover the entire disturbed area and occur within 30 days of construction commencing at each portion of the site that drains the qualifying acreage. The site assessment shall be performed by individuals with one or more of the following qualifications:

- 1. A licensed professional engineer or landscape architect;
- 2. A Certified Professional in Erosion and Sediment Control (CPESC); or
- 3. A person who has successfully completed the "Level II Design Principles for Erosion Prevention and Sediment Control for Construction Sites"



At a minimum, site assessments should be performed to verify the installation, functionality and performance of the EPSC measures described in the SWPPP. If structural BMPs (or equivalent EPSC measures) are not constructed or construction is in progress at the time of the site assessment, a follow-up monthly assessment(s) are required until the BMPs are constructed per the SWPPP. The site assessment should be performed with the inspector and should include a review and update (if applicable) of the SWPPP. Modifications of plans and specifications for any building or structure, including the design of sediment basins or other sediment controls involving structural, hydraulic, hydrologic or other engineering calculations shall be prepared by a licensed professional engineer or landscape architect and stamped and certified in accordance with the [Tennessee Code Annotated](#), Title 62, Chapter 2 and the rules of the [Tennessee Board of Architectural and Engineering Examiners](#).

5.5.3.9. Inspections

Operators shall ensure proper installation, maintenance, and overall effectiveness of erosion prevention and sediment controls (EPSCs) by performing twice weekly site inspections. Inspections must verify and document the functionality and performance of the EPSC measures described in the SWPPP. Initial inspections shall also indicate if all EPSCs have been installed as designed in the submitted SWPPP and EPSC plans; and, if not, measures that need to be taken so those EPSCs meet the design specifications in the field SWPPP and EPSC plans.

5.5.3.10. Inspector qualifications

Twice weekly inspections can be performed by:

- a) a person with a valid certification from the "Level I - Fundamentals of Erosion Prevention and Sediment Control" course,
- b) a licensed professional engineer or landscape architect,
- c) a Certified Professional in Erosion and Sediment Control (CPESC), or
- d) a person who has successfully completed the "Level II - Design Principles for Erosion Prevention and Sediment Control for Construction Sites" course.

An inspector performs and documents the required inspections, paying particular attention to time-sensitive permit requirements, such as stabilization and maintenance activities.



5.5.3.11. Schedule of inspections

- a) Inspections described in paragraphs b, c and d below, shall be performed at least twice weekly. Inspections shall be performed at least 72 hours apart. Where sites or portions of construction sites have been temporarily stabilized, inspections only have to be conducted once per month until construction activity resumes. Inspection requirements do not apply to definable areas that have been permanently stabilized. Changes to the inspection frequency and the justification for such request must be included in the records kept on site. For projects by the Tennessee Department of Transportation (TDOT) and the Tennessee Valley Authority (TVA), such request must be submitted to the division's Nashville Central Office. The division reserves the right to require more frequent inspections if deemed necessary to ensure compliance at a site.
- b) Qualified personnel, as defined in Subsection 5.5.3.10 (provided by the permittee or cooperatively by multiple permittees), shall inspect disturbed areas of the construction site that have not been permanently stabilized, areas used for storage of materials that are exposed to precipitation, structural control measures, locations where vehicles enter or exit the site and each outfall.
- c) Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the site's drainage system. EPSC measures shall be observed to ensure that they are operating correctly.
- d) Outfall points shall be inspected to determine whether EPSC measures are effectively preventing sediment discharges off-site or impacts to receiving waters. Where discharge locations are inaccessible, nearby downstream locations shall be inspected. Locations where vehicles enter or exit the site shall be inspected for evidence of offsite sediment tracking.
- e) Based on the results of the inspection, any inadequate control measures or control measures in disrepair shall be replaced, modified or repaired as necessary, before the next rain event; but in no case more than seven days after the need is identified.
- f) Based on the results of the inspection, the site description identified in the SWPPP in accordance with Section 5.5.1 and pollution prevention measures identified in the SWPPP in accordance with Section 5.5.3 shall be revised as appropriate. Such revisions shall be made no later than seven days following the inspection. In addition, any modifications to pollution prevention measures shall be implemented as soon as practicable but no later than 14 days following the inspection.



- g) All inspections shall be documented on the *Construction Stormwater Inspection Certification Form* provided in Appendix C of this permit. An alternative inspection form may be used as long as the form contents and the inspection certification language are equivalent to the division's form and the permittee has obtained a written approval from the division to use the alternative form. The form must contain the printed name and signature of the inspector and the certification must be executed by a person who meets the signatory requirements of Section 8.7.2. Inspection reports must be submitted to the division within 10 days of the request.
- h) Inspectors shall accurately document site conditions in their inspection reports. Falsifying inspection records, or other documentation; or failure to complete inspection documentation shall result in a violation of this permit and any other applicable acts or rules.
- i) The initial primary permittee (such as a developer) is no longer required to inspect portions of the site that are covered by a subsequent primary permittee (such as a home builder). Subsequent primary permittees who have obtained coverage under this permit shall conduct twice weekly inspections as per the requirements in Subsection 5.5.3.9.

5.5.3.12. Pollution prevention measures for non-stormwater discharges

The SWPPP must identify source(s) of all non-stormwater discharge(s) listed in Section 1.2.3 if it is to be combined with stormwater discharges associated with construction activity. The SWPPP shall identify and ensure the implementation of appropriate pollution prevention measures for the non-stormwater components of the discharge. Any non-stormwater must be discharged through stable discharge structures. Estimated volume of the non-stormwater components of the discharge must be included in the design of all impacted control measures.



PART 6

6. SPECIAL CONDITIONS, MANAGEMENT PRACTICES, AND OTHER NON-NUMERIC LIMITATIONS

6.1. RELEASES IN EXCESS OF REPORTABLE QUANTITIES

The discharge of hazardous substances or oil in the stormwater discharges from a facility shall be prevented or minimized in accordance with the applicable SWPPP for the facility. This permit does not relieve the permittee of the reporting requirements of 40 CFR 117 and 40 CFR 302.

6.2. SPILLS

This permit does not authorize the discharge of hazardous substances or oil resulting from an on-site spill.

6.3. DISCHARGE COMPLIANCE WITH STATE WATER QUALITY STANDARDS

6.3.1. Violation of water quality standards

This permit does not authorize stormwater or other discharges that would cause or contribute to a violation of a state water quality standard (Tennessee State Rules, Chapters 0400-40-03, 0400-40-04). Such discharges constitute a violation of this permit.

Where a discharge is already authorized under this permit and the division determines the discharge to cause or contribute to the violation of applicable state water quality standards, the division will notify the operator of such violations. The permittee shall take all necessary actions to ensure future discharges do not cause or contribute to the violation of a water quality standard and shall document these actions in the SWPPP.

6.3.2. Discharge quality

- a) The construction activity shall be carried out in such a manner that will prevent violations of water quality criteria as stated in the Tennessee Rules, Chapter 0400-40-03-.03. This includes, but is not limited to, the prevention of any discharge that causes a condition in which visible solids, bottom deposits or turbidity impair the usefulness of waters of the state for any of the uses designated for that water body by Tennessee Rules, Chapter 0400-40-04. Construction activity carried out in the manner required by



this permit shall be considered in compliance with the Tennessee Rules, Chapter 0400-40-03-.03.

- b) There shall be no distinctly visible solids, scum, foam, oily slick, or the formation of slimes, bottom deposits, or sludge banks of such size or character as may be detrimental to fish and aquatic life.
- c) The stormwater discharge must not contain total suspended solids, turbidity, or color in such amounts or character that will result in any objectionable appearance compared to the turbidity or color of the receiving water, considering the nature and location of the water.
- d) The stormwater discharge shall not contain pollutants in quantities that will be hazardous or otherwise detrimental to humans, livestock, wildlife, plant life, or fish and aquatic life in the receiving stream. This provision includes species covered under Subpart 1.3.
- e) Solids or other materials removed by any sediment control treatment devices must be disposed of in a manner that prevents its entrance into or pollution of any surface or subsurface waters.

6.4. DISCHARGES INTO WATERS WITH UNAVAILABLE PARAMETERS OR EXCEPTIONAL TENNESSEE WATERS

6.4.1. SWPPP/BMP Requirements

- a) Discharges that would cause measurable degradation of waters with unavailable parameters or that would cause more than de minimis degradation of Exceptional Tennessee Waters are not authorized by this permit (Subpart 1.3). To be eligible to obtain and maintain coverage under this permit, the operator must satisfy, at a minimum, the following additional requirements for discharges into waters with unavailable parameters for siltation and for discharges to Exceptional Tennessee Waters⁹. All other provisions of this general permit that apply to receiving waters with available parameters shall also apply.
- b) The SWPPP must certify that EPSC measures used at the site are designed to control stormwater runoff generated by a 5-year, 24-hour storm event (the design storm), at a minimum, either from total rainfall in the designated period or the equivalent intensity as specified on the following website https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html.

⁹ or discharges upstream of such waters and because of the proximity to the segment and the nature of the discharge is likely to cause more than de minimis degradation in the unavailable or exceptional segment.



- c) The permittee shall perform inspections described in Section 5.5.3.9 at least twice every calendar week. Inspections shall be performed at least 72 hours apart.
- d) If the division finds that an operator is contributing to the impairment of a receiving stream despite complying with the SWPPP, the operator will be notified by the division in writing that the discharge is no longer eligible for coverage under the general permit. The operator may update the SWPPP and implement the necessary changes designed to eliminate further impairment of the receiving stream. If the permittee does not implement the SWPPP changes within seven days of receipt of notification, the permittee will be notified in writing that continued discharges must be covered by an individual permit (Subpart 8.11). To obtain the individual permit, the operator must file an individual permit application and submit an updated SWPPP. The project must be stabilized immediately and remain stable until the SWPPP is updated and the individual permit is issued. Only discharges from earth disturbing activities necessary for stabilization are authorized to continue until the individual permit is issued.
- e) For an on-site outfall in a drainage area totaling five or more acres, a minimum sediment basin volume that will provide treatment for a calculated volume of runoff from a 5-year, 24-hour storm and runoff from each acre drained; or equivalent control measures as specified in the Tennessee Erosion and Sediment Control Handbook, shall be provided until permanent stabilization of the site.
- f) For an on-site outfall in a drainage area totaling 3.5 - 4.9 acres, a minimum sediment trap volume or engineering equivalent that will provide treatment for a calculated volume of runoff from a 5-year, 24-hour storm and runoff from each acre drained, is required until permanent stabilization of the site. A drainage area of 3.5 - 4.9 acres includes both disturbed and undisturbed portions of the site or areas adjacent to the site, all draining through the common outfall.

6.4.2. Water Quality Riparian Buffer Zone Requirements

Sites that contain, or are adjacent to, receiving waters with unavailable parameters for siltation or designated as Exceptional Tennessee Waters shall preserve a 60-foot natural water quality riparian buffer zone adjacent to the receiving stream. All other buffer zone requirements as stated in Section 4.1.2 will apply.



The natural water quality riparian buffer zone shall be preserved between the top of stream bank and the disturbed construction area. The 60-foot criterion for the width of the buffer can be established on an average width basis at a project, as long as the minimum width of the buffer is more than 30 feet at any measured location. If the construction site encompasses both sides of a stream, buffer averaging can be applied to both sides, but each side must average the 60-foot criterion independently.

This requirement does not apply to an area that is being altered under the authorization of a valid Aquatic Resources Alteration Permit (ARAP), or equivalent permits issued by federal authorities. Additional natural buffer zone requirements may be established by the local MS4 program.



PART 7

7. RETENTION, ACCESSIBILITY AND SUBMISSION OF RECORDS

7.1. DOCUMENTS

The primary permittee shall retain copies of SWPPPs, reports required by this permit, records of all data used to complete the NOI and the NOT for a period of at least three years from the date the NOT is submitted. This period may be extended by written request of the director.

7.2. ACCESSIBILITY AND RETENTION OF RECORDS

The permittee shall retain a copy of the SWPPP and a copy of the permit at the construction site (or other location accessible to the division) from the date construction commences to the date of termination of permit coverage. Permittees with day-to-day operational control over SWPPP implementation shall have a copy of the SWPPP available at a central location onsite for the use of all operators and those identified as having responsibilities under the plan whenever they are on the construction site.

7.2.1. Posting Information at the Construction Site

A notice shall be posted near the main entrance of the construction site visible to the public with the following information:

- a) a copy of the NOC with the NPDES permit tracking number for the construction project;
- b) a name or company name; E-mail address (if available); telephone number and address of the project site owner/operator or a local contact person; and
- c) the location of the SWPPP (Subpart 7.2).

The notice must be maintained in a legible condition. The notice shall be posted in a local public building if posting this information near a main entrance is infeasible due to safety concerns or if the site is not accessible to the public. If the construction project is a linear construction project (e.g., pipeline or highway), the notice must be placed in a publicly accessible location near where construction is actively underway and moved as necessary. This permit does not provide the public with any right to trespass on a construction site for any reason, including inspection of a site. This permit does not require permittees to allow members of the public access to a construction site.



The permittee shall also retain the following items in an appropriate location on-site (or other location accessible to [the division](#)):

- a) A rain gauge (or use a reference site for a record of daily precipitation) and accurate [rainfall](#) records;
- b) A copy of all required inspection reports; and
- c) Records of the dates when major grading activities occur, when construction activities temporarily or permanently cease on a portion of the site, and when stabilization measures are initiated.

7.3. ELECTRONIC SUBMISSION OF DOCUMENTS

This permit requires the submission of forms developed by the [director](#) in order for a person to comply with certain requirements, including, but not limited to, making reports, submitting inspection findings, applying for permit coverage and requesting for termination of permit coverage. The [director](#) may make these forms available electronically and, if submitted electronically, then that electronic submission shall comply with the requirements of Chapter [0400-01-40](#). Electronic submission may be required when available, unless waived by the Commissioner in accordance with 40 C.F.R. § 127.15.

If [the division](#) notifies applicants by mail, E-mail, public notice or by making information available on the world wide web of electronic forms (see [NPDES Electronic Reporting](#)), the [operators](#) may be required to use those electronic options to submit the [NOI](#) (Section 3.3.2)

In the event of large-scale emergencies and/or prolonged electronic reporting system outages, an episodic electronic reporting waiver may be granted by the Commissioner in accordance with 40 CFR § 127.15. A request for a deadline extension or episodic electronic reporting waiver should be submitted to DWRWater.Compliance@tn.gov, in compliance with the Federal NPDES Electronic Reporting Rule.

In the event that [NPDES Electronic Reporting](#) is not functioning, the permittee shall comply with reporting conditions by mailing reports with wet-ink original signatures shall to the following address:



*STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER RESOURCES
COMPLIANCE & ENFORCEMENT UNIT
William R. Snodgrass - Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243-1102*

For purposes of determining compliance with this permit, data provided to the division electronically is legally equivalent to data submitted on signed and certified forms. A copy must be retained for the permittee's files.

7.3.1. Monitoring Results

Monitoring results (if applicable, for projects exceeding 50 acres of disturbance at one time, see Subsection 5.5.3.3) shall be recorded monthly and submitted monthly using NetDMR. Submittals shall be no later than 15 days after the completion of the reporting period. If NetDMR is not functioning, a completed DMR with an original signature shall be submitted to the address for Compliance and Enforcement Unit as listed in the Subpart 7.3 above. The first DMR is due on the 15th of the month following permit effectiveness.

DMRs must be signed and certified by a responsible corporate officer as defined in Tennessee Rule 0400-40-05-.05(6), a general partner or proprietor, or a principal municipal executive officer or ranking elected official, or his duly authorized representative. Such authorization must be submitted in writing and must explain the duties and responsibilities of the authorized representative.



PART 8

8. STANDARD PERMIT CONDITIONS

8.1. DUTY TO COMPLY

8.1.1. Duty to Comply

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Tennessee Water Quality Control Act (TWQCA) and is grounds for an enforcement action, permit termination, revocation and reissuance, modification; or for denial of a permit renewal application.

8.1.2. Penalties

Pursuant to T.C.A. § 69-3-115 of The Tennessee Water Quality Control Act of 1977, as amended:

- a) Any person who violates an effluent standard or limitation or a water quality standard established under this part (T.C.A. § 69-3-101, et. seq.); violates the terms or conditions of this permit; fails to complete a filing requirement; fails to allow or perform an entry, inspection, monitoring or reporting requirement; violates a final determination or order of the board, panel or commissioner; or violates any other provision of this part or any rule or regulation promulgated by the board, is subject to a civil penalty of up to ten thousand dollars (\$10,000) per day for each day during which the act or omission continues or occurs.
- b) Any person unlawfully polluting the waters of the state or violating or failing, neglecting, or refusing to comply with any of the provisions of this part (T.C.A. § 69-3-101, et. seq.) commits a Class C misdemeanor. Each day upon which such violation occurs constitutes a separate offense.
- c) Any person who willfully and knowingly falsifies any records, information, plans, specifications, or other data required by the board or the commissioner, or who willfully and knowingly pollutes the waters of the state, or willfully fails, neglects or refuses to comply with any of the provisions of this part (T.C.A. § 69-3-101, et. seq.) commits a Class E felony and shall be punished by a fine of not more than twenty-five thousand dollars (\$25,000) or incarceration, or both.



8.1.3. Civil and criminal liability

Nothing in this permit shall be construed to relieve the discharger from civil or criminal penalties for noncompliance. Notwithstanding this permit, the discharger shall remain liable for any damages sustained by the State of Tennessee, including but not limited to fish kills and losses of aquatic life and/or wildlife, as a result of the discharge to any surface or subsurface waters. Additionally, notwithstanding this permit, it shall be the responsibility of the discharger to conduct stormwater discharge activities in a manner such that public or private nuisances or health hazards will not be created. Furthermore, nothing in this permit shall be construed to preclude the State of Tennessee from any legal action or relieve the discharger from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or the Federal Water Pollution Control Act.

8.1.4. Liability Under State Law

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable local, state or federal law.

8.2. CONTINUATION OF THE EXPIRED GENERAL PERMIT

Permittees shall maintain coverage under this general permit until a new general permit is issued.

Operator(s) of an existing site permitted under the division's 2016 construction general permit shall maintain full compliance with the existing SWPPP. The existing SWPPP shall be modified according to the Section 5.3.1 of this permit.

8.3. NEED TO HALT OR REDUCE ACTIVITY NOT A DEFENSE

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

8.4. DUTY TO MITIGATE

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.



8.5. DUTY TO PROVIDE INFORMATION

The permittee shall furnish to the division or an authorized representative of the division, within a time specified by the division, any information that the division may request to determine compliance with this permit or other information relevant to the protection of the waters of the state. The permittee shall also furnish to the division, upon request, copies of records required to be kept by this permit.

8.6. OTHER INFORMATION

When the permittee becomes aware that he or she failed to submit any relevant facts or submitted incorrect information in the Notice of Intent or in any other report to the director, he or she shall promptly submit such facts or information.

8.7. SIGNATORY REQUIREMENTS

All NOIs, SWPPPs, NOTs, Construction Stormwater Inspection Certifications, Construction Stormwater Monitoring Report forms, reports, certifications or information either submitted to the director or the operator of a large or medium Municipal Separate Storm Sewer System (MS4) shall be signed as described in Sections 8.7.1 and 8.7.2 and dated.

8.7.1. Signatory Requirements for an NOI¹⁰

The NOI shall be signed as follows:

- a) For a corporation, by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:
 - i. a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or
 - ii. the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated site including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive

¹⁰ As specified in 40 CFR 122.22(a)(1)-(3) [48 FR 14153, Apr. 1, 1983, as amended at 48 FR 39619, Sept. 1, 1983; 49 FR 38047, Sept. 29, 1984; 50 FR 6941, Feb. 19, 1985; 55 FR 48063, Nov. 16, 1990; 65 FR 30907, May 15, 2000]



measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

- b) For a general partnership, by each general partner in the general partnership,
- c) For a sole proprietorship, by the proprietor,
- d) For a municipality, state, federal, or other public agency, by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:
 - i. the chief executive officer of the agency, or
 - ii. a senior executive officer having responsibility for the overall operations of a principle geographic unit of the agency (e.g., Regional Administrators of [EPA](#)).

NOTE: The division does not require specific assignments or delegations of authority to responsible corporate or municipal, state, federal, or other public agency officers. The division will presume that these officers have the requisite authority to sign permit applications unless the entity has notified the [director](#) to the contrary. Procedures governing authority to sign permit applications may provide for assignment or delegation to applicable positions rather than to specific individuals.

8.7.2. Signatory Requirements for SWPPPs, Reports and Other Items

SWPPPs, Construction Stormwater Inspection Certification forms, reports, certifications or other information submittals required by the permit and other information requested by [the division](#), including but not limited to Notice of Violation responses, shall be signed by a person described in Section 8.7.1, or by a duly authorized representative of that person.

8.7.3. Duly Authorized Representative

For a purpose of satisfying signatory requirements for reports (Section 8.7.2), a person is a duly authorized representative only if:

- a) the authorization is made in writing by a person described in Section 8.7.1;
- b) the authorization specifies an individual having responsibility for the overall operation of the regulated site or activity such as the position of



plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company; a duly authorized representative may thus be either a named individual or any individual occupying a named position; and

- c) the written authorization is submitted to the director or an appropriate EFO. The written authorization shall be a written document including the name of the newly authorized person or any individual occupying a named position as described in paragraph b) above, and the corresponding contact information (title, mailing address, phone number and E-mail address) for the authorized person or position. The written authorization shall be signed by the newly authorized person accepting responsibility and by the person described in Section 8.7.1 delegating the authority.

8.7.4. Changes to Authorization

If an authorization under Sections 8.7.1 or 8.7.3 is no longer accurate because a different individual or position has responsibility as the primary or secondary permittee, but the company name (permittee name) remains the same, a new NOI and SWPPP certification shall be submitted and signed by the new party who meets signatory authority satisfying the requirements of Sections 8.7.1 or 8.7.3 . The NOI shall include the new individual's information (title, mailing address, phone number and E-mail address), the existing tracking number and the project name.

8.7.5. Signatory Requirements for Primary Permittees

Primary permittees required to sign an NOI and SWPPP because they meet the definition of an operator (Subpart 2.1) shall sign the following certification statement on the NOI and on the SWPPP:

"I certify under penalty of law that this document and all attachments were prepared by me, or under my direction or supervision. The submitted information is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury."



8.7.6. Signatory Requirements for Secondary Permittees

Secondary permittees required to sign an NOI and SWPPP because they meet the definition of an operator but who are not primarily responsible for preparing an NOI and SWPPP, shall sign the following certification statement on the NOI and on the SWPPP:

"I certify under penalty of law that I have reviewed this document, any attachments, and the SWPPP referenced above. Based on my inquiry of the construction site owner/developer identified above and/or my inquiry of the person directly responsible for assembling this NOI and SWPPP, I believe the information submitted is accurate. I am aware that this NOI, if approved, makes the above-described construction activity subject to NPDES permit number TNR100000, and that certain of my activities on-site are thereby regulated. I am aware that there are significant penalties, including the possibility of fine and imprisonment for knowing violations, and for failure to comply with these permit requirements. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury."

8.8. OIL AND HAZARDOUS SUBSTANCE LIABILITY

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject to Section 311 of the Clean Water Act or Section 106 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA).

8.9. PROPERTY RIGHTS

The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges; nor does it authorize any injury to private property, any invasion of personal rights or any infringement of federal, state or local laws or regulations. The issuance of this permit does not authorize trespassing or discharges of stormwater or non-stormwater across private property.

8.10. SEVERABILITY

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.



8.11. INDIVIDUAL PERMITS

8.11.1. Required Individual Permit Coverage

The director may require any person covered by this permit to apply for and obtain an individual NPDES permit to ensure adequate protection of designated uses of a receiving stream. Any interested person may petition the director in writing to take action under this paragraph but must include in their petition the justification for such an action. Where the director requires a discharger authorized to discharge under this permit to apply for an individual NPDES permit, the director shall notify the discharger in writing that an individual permit application is required. This notification will include a brief statement of the reasons for this decision, an application form, a statement setting a deadline for the discharger to file the application and a statement that coverage under this general permit shall terminate upon the effective date of an individual NPDES permit; or denial of coverage under an individual permit. An individual NPDES permit is required only when additional permit terms or conditions beyond those set forth herein are necessary to protect water quality. Criteria for the division to require an individual NPDES permit may include, but are not limited to:

- a) Due to unique site conditions the discharge may result in greater than de minimis degradation, or a threat to threatened or endangered aquatic or semi-aquatic species.
- b) The total acreage to be disturbed and/or total drainage area to an outfall may exceed the capability of standard EPSCs and other BMPs to prevent pollution to waters.
- c) Steep grades or erosive soil conditions warrant site-specific controls that exceed the conditions of the CGP.
- d) Other site-specific conditions, such as contaminated soils or public lands.

The notification may require stabilization of the site and suspend coverage under this general permit until the individual permit is issued. Individual permit applications and updated SWPPP shall be submitted to the appropriate Environmental Field Office of the division as indicated in Subpart 3.4. The director may grant additional time to submit the application upon request of the applicant. If a discharger fails to submit in a timely manner an individual NPDES permit application as required by the director under this paragraph, then the applicability of this permit to the discharger will be terminated at the end of the day specified by the director for application submittal.



If the decision to require an individual NPDES permit precedes the issuance of coverage under this general permit, earth disturbing activities cannot begin until the individual permit is issued.

8.11.2. Permittee-Requested Individual Permit Coverage

Any discharger authorized by this permit may request to be excluded from the coverage of this permit by applying for an individual permit. Any discharger that knowingly cannot abide by the terms and conditions of this permit must apply for an individual permit. In such cases, the permittee shall submit an individual application in accordance with the requirements of 40 CFR 122.26(c)(1)(ii), with reasons supporting the request, and a SWPPP to the appropriate division's Environmental Field Office. The request may be granted by issuance of an individual permit, or alternative general permit, if the reasons cited by the permittee are adequate to support the request.

8.11.3. General Permit Termination

When an individual NPDES permit is issued to a discharger otherwise subject to this permit, or the discharger is authorized to discharge under an alternative NPDES general permit, the applicability of this permit to the discharger is terminated on the effective date of the individual permit or the date of authorization of coverage under the alternative general permit, whichever the case may be. When an individual NPDES permit is denied to an owner or operator otherwise subject to this permit, or the owner or operator is denied for coverage under an alternative NPDES general permit, the applicability of this permit to the individual NPDES permittee is terminated on the date of such denial, unless otherwise specified by the director. Coverage under the Tennessee Multi-Sector General Permit for the Discharge of Stormwater from an Industrial Activity (TMSP) will not be considered as an alternative general permit under this section without being specified by the director.

8.12. OTHER, NON-STORMWATER, PROGRAM REQUIREMENTS

No condition of this permit shall release the permittee from any responsibility or requirements under other environmental statutes or regulations.

8.13. PROPER OPERATION AND MAINTENANCE

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related equipment) which are installed or used by the permittee to achieve compliance with the conditions of this permit and with the requirements of SWPPPs.



Proper operation and maintenance requires the operation of backup or auxiliary facilities or similar systems, installed by a permittee, when determined by the permittee or the division to be necessary to achieve compliance with the conditions of the permit.

8.14. INSPECTION AND ENTRY

The permittee shall allow authorized representatives of the Environmental Protection Agency, the director or an authorized representative of the commissioner of TDEC, or, in the case of a construction site which discharges through a municipal separate storm sewer, an authorized representative of the MS4 receiving the discharge, upon the presentation of credentials and other documents as may be required by law:

- a) to enter upon the permittee's premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;
- b) to have access to and copy at reasonable times, any records that must be kept under the conditions of this permit; and
- c) to inspect any facilities or equipment, including monitoring and control equipment.

8.15. PERMIT ACTIONS

This permit may be issued, modified, revoked, reissued or terminated for cause in accordance with this permit and the applicable requirements of T.C.A. § 69-3-108. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.



PART 9

9. REQUIREMENTS FOR TERMINATION OF COVERAGE

9.1. TERMINATION OF DEVELOPER AND BUILDER COVERAGE

9.1.1. Termination Process for Primary Permittees

Primary permittees wishing to terminate coverage under this permit must submit a completed Notice of Termination (NOT) form provided in Appendix B of this permit (representative photo or video documentation of site stabilization is recommended). Electronic submittal is encouraged (see NPDES Electronic Reporting for more information). Primary permittees who abandon a site and fail to submit the NOT will be in violation of this permit. If the NOT was not submitted five years following the “estimated end date” (as identified on the NOI), the division can terminate the CGP coverage, unless the permittee specifically requests to maintain coverage. Signs notifying the public of the construction activity shall be in place until the NOT form has been submitted. Primary permittees may terminate permit coverage only if the conditions described below occur at the site:

- a) For areas where the primary permittee has control, all earth-disturbing activities and, if applicable, construction support activities permitted under Section 1.2.2 at the site are complete and the following requirements are met:
 - i. For any areas that were disturbed during construction, are not covered by permanent structures and over which the permittee had control during the construction activities; the requirements for permanent vegetation or non-vegetative stabilization described in Subsection 5.5.3.4 are met;
 - ii. The permittee has removed and properly disposed of all construction materials, as well as waste and waste handling devices. The permittee has removed all equipment and vehicles that were used during construction, unless they are intended for long-term use following termination of permit coverage;
 - iii. The permittee has removed all stormwater controls that were installed and maintained during construction, except those that are intended for long-term use following termination of permit coverage;
 - iv. The permittee has identified in the SWPPP who is responsible for ongoing maintenance of any stormwater controls left on the site for long-term use following termination of permit coverage, and
 - v. The groundcover achieves permanent stabilization.



- b) The permittee has transferred control of all areas of the site for which he is responsible (including, but not limited to, infrastructure, common areas, [stormwater](#) drainage structures, [sediment](#) control basin) under this permit to another [operator](#), and that [operator](#) has submitted an [NOI](#) and obtained coverage under this permit.
- c) The permittee obtains coverage under an individual or alternative general NPDES permit.

9.1.2. NOT Review

The division may review [NOTs](#) for completeness and accuracy and, when necessary, investigate the proposed site for which the [NOT](#) was submitted. Coverage under the permit is terminated when the permit record is published on [TDEC's DataViewer](#) as "Inactive." [Operators](#) may be liable for discharges that occur from the site after termination.

The division retains the right to deny termination of coverage under this general permit upon receipt of the [NOT](#). If the local Environmental Field Office has information indicating that the permit coverage is not eligible for termination, written notification will be provided within 30 days of receipt that permit coverage has not been terminated. The notification will include a summary of existing deficiencies. When the site meets the termination criteria, the [NOT](#) should be re-submitted.

If any permittee files for bankruptcy or the site is foreclosed on by the lender, the permittee shall notify [the division](#) of the situation so that [the division](#) may assess the site to determine if permit coverage should be obtained by any other person or whether other action is needed.

9.2. TERMINATION OF BUILDER AND CONTRACTOR COVERAGE

9.2.1. Termination Process for Secondary Permittees

Secondary permittees must request termination of coverage under this permit by submitting a [NOT](#) when they are no longer an [operator](#) at the construction site. Electronic submittal is encouraged (see [NPDES Electronic Reporting](#) for more information). Secondary permittees receive coverage under this permit but are not normally mailed a NOC. Consequently, [the division](#) may, but is not required to, notify secondary permittees that their notice of termination has been received. If [the division](#) has reason to believe that the secondary permittee's [NOT](#) should



not have been submitted, the division will deny the secondary permittee's NOT in writing, with specific reasons as to why the NOT should not have been submitted.

9.3. NOT CERTIFICATION

The NOT and the following certification must be signed in accordance with Subpart 8.7 of this permit:

"I certify under penalty of law that either: (a) all stormwater discharges associated with construction activity from the portion of the identified facility where I was an operator have ceased or have been eliminated or (b) I am no longer an operator at the construction site. I understand that by submitting this notice of termination, I am no longer authorized to discharge stormwater associated with construction activity under this general permit, and that discharging pollutants in stormwater associated with construction activity to waters of the state is unlawful under the Tennessee Water Quality Control Act where the discharge is not authorized by a NPDES permit. I also understand that the submittal of this notice of termination does not release an operator from liability for any violations of this permit or the Tennessee Water Quality Control Act. I certify under penalty of law that this document and all attachments were prepared by me, or under my direction or supervision. The submitted information is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury."

9.4. WHERE TO SUBMIT A NOT?

Electronic submittal is encouraged (see [NPDES Electronic Reporting](#) for more information). Otherwise, the NOT shall be submitted to the Environmental Field Office (EFO) which issued the NOC to the primary permittee. A list of counties and the corresponding EFOs is provided in Subpart 3.4. The appropriate permit tracking number must be clearly printed on the form.



PART 10

10. DEFINITIONS, ACRONYMS AND RESOURCES

10.1. DEFINITIONS

2-year 24-hour 5-year 24-hour	2-year and 5-year design storm depths and intensities The estimated design rainfall amounts, for any return period interval (i.e., 2-yr, 5-yr, 25-yr, etc.,) in terms of either 24-hour depths or intensities for any duration, can be found by accessing the data available at https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html . Other data sources may be acceptable with prior written approval by TDEC Division of Water Resources.
ARAP	Aquatic Resource Alteration Permit Persons who wish to make an alteration to a <u>stream</u> , river, lake or wetland must first obtain a water quality permit. Physical alterations to properties of waters of the state require an ARAP or a §401 Water Quality Certification (§401 certification). Examples of <u>stream</u> alterations that require a permit from the division include: • Dredging, excavation, channel widening, or straightening • Bank sloping; stabilization • Channel relocation • Water diversions or withdrawals • Dams, weirs, dikes, levees or other similar structures • Flooding, excavating, draining and/or filling a wetland • Road and utility crossings • Structural fill General ARAPs are developed and maintained by the division to provide a streamlined, expedited means of authorizing projects that singularly or cumulatively propose minor impacts to water resources.
BMP	Best Management Practices ("BMPs") means schedules of activities, prohibitions of practices, maintenance procedures and other management practices to prevent or reduce the discharge of pollutants to <u>waters</u> of the state. BMPs also include treatment requirements, operating procedures; and practices to control plant site runoff,



	spillage, leaks, sludge or waste disposal, or drainage from raw material storage. BMPs include source control practices (non-structural BMPs) and engineered structures designed to treat runoff. <u>Structural BMPs</u> are facilities that help prevent pollutants in stormwater runoff from leaving the site. <u>Non-structural BMPs</u> are techniques, activities and processes that reduce pollutants at the source.
borrow pit	Borrow Pit is an excavation from which erodible material (typically <u>soil</u>) is removed to be fill for another site. There is no processing or separation of erodible material conducted at the site. Given the nature of activity and pollutants present at such excavation, a borrow pit is considered a construction activity for the purpose of this permit.
buffer zone	Buffer Zone or Water Quality Riparian Buffer is a permanent strip of natural perennial vegetation, adjacent to a <u>stream</u>, river, wetland, pond, or lake that contains dense vegetation made up of grass, shrubs, and/or trees. The purpose of a water quality riparian buffer is to maintain existing water quality by minimizing risk of any potential <u>sediments</u>, nutrients or other pollutants reaching adjacent surface waters and to further prevent negative water quality impacts by providing canopy over adjacent waters
clearing	Clearing refers to removal of vegetation and disturbance of <u>soil</u> prior to grading or excavation in anticipation of construction activities. Clearing may also refer to wide area land disturbance in anticipation of non-construction activities. Clearing, grading and excavation do not refer to clearing of vegetation along existing or new roadways, highways, dams or power lines for sight distance or other maintenance and/or safety concerns, or cold planning, milling, and/or removal of concrete and/or bituminous asphalt roadway pavement surfaces. The clearing of land for agricultural purposes is exempt from federal <u>stormwater</u> NPDES permitting in accordance with Section 401(1)(1) of the 1987 Water Quality Act and state <u>stormwater</u> NPDES permitting in accordance with the Tennessee Water Quality Control Act of 1977 (<u>T.C.A. 69-3-101 et seq.</u>).



commencement	Commencement of construction: the initial disturbance of <u>soils</u> associated with clearing, grading, excavating or other construction activities.
common plan	Common plan of development or sale is broadly defined as any announcement or documentation (including a sign, public notice or hearing, sales pitch, advertisement, drawing, permit application, zoning request, computer design) or physical demarcation (including boundary signs, lot stakes, surveyor markings) indicating construction activities may occur on a specific plot. A common plan of development or sale identifies a situation in which multiple areas of disturbance are occurring on contiguous areas. This applies because the activities may take place at different times, on different schedules, by different <u>operators</u> .
control measure	Control measure refers to any Best Management Practice (BMP) or other method used to prevent or reduce the discharge of pollutants to waters of the state.
CWA	CWA means the Clean Water Act of 1977 or the Federal Water Pollution Control Act (33 U.S.C. 1251, et seq.)
director	Director means the director, or authorized representative, of the Division of Water Resources of the State of Tennessee, Department of Environment and Conservation.
degradation	Degradation means the alteration of the properties of waters by the addition of pollutants, withdrawal of water, or removal of habitat, except those alterations of a short duration.
de minimis	De Minimis is degradation of a small magnitude, as provided in this paragraph: (a) <u>Discharges and withdrawals</u> : 1. Subject to the limitation in part 3 of this subparagraph, a single discharge other than those from new domestic wastewater sources will be considered de minimis if it uses less than five percent of the available assimilative capacity for the substance being discharged. 2. Subject to the limitation in part 3 of this subparagraph, a single water withdrawal will be considered de minimis if it removes less than five percent of the 7Q10 flow of the <u>stream</u> .



	3. If more than one activity described in part 1 or 2 of this subparagraph has been authorized in a segment and the total of the authorized and proposed impacts uses no more than 10% of the assimilative capacity, or 7Q10 low flow, they are presumed to be de minimis. Where the total of the authorized and proposed impacts uses 10% of the assimilative capacity, or 7Q10 low flow, additional degradation may only be treated as de minimis if the Division finds on a scientific basis that the additional degradation has an insignificant effect on the resource. (b) Habitat alterations authorized by an Aquatic Resource Alteration Permit (ARAP) are de minimis if the Division finds that the impacts, individually and cumulatively, are offset by impact minimization and/or in-system mitigation, provided however, in Outstanding National Resource Waters (ONRWs) the mitigation must occur within the ONRW.
discharge of a pollutant	Discharge or discharge of a pollutant refers to the addition of pollutants to waters from a source.
disturbed area	Disturbed area means the total area presented as part of the development (and/or of a larger common plan of development) subject to being cleared, graded, grubbed, filled or excavated during the life of the development. The area cannot be limited to only the portion of the total area that the site-wide owner/developer initially disturbs through the process of various land clearing activities or in the construction of roadways, sewers, drainfields, and water utilities, <u>stormwater</u> drainage structures, etc., to make the property marketable.
division	Division means the Division of Water Resources of the State of Tennessee, Department of Environment and Conservation
exceptional waters	Exceptional Tennessee Waters are surface waters designated by the division as having the characteristics set forth at Tennessee Rules, Chapter 0400-40-03-.06(4). Characteristics include waters within parks or refuges; scenic rivers; waters with threatened or endangered species; waters that provide specialized recreational opportunities; waters within areas designated as lands



	unsuitable for mining; waters with naturally reproducing trout; waters with exceptional biological diversity and other waters with outstanding ecological or recreational value.
permanent stabilization	Permanent Stabilization means that all <u>soil</u> disturbing activities at the site have been completed and one of the three following criteria is met: (1) A perennial, preferably native, vegetative cover with a uniform (i.e., evenly distributed, without large bare areas) density of at least 70 percent has been established on all unpaved areas and areas not covered by permanent structures, and all slopes and channels have been permanently stabilized against erosion. (2) Equivalent permanent stabilization measures such as the use of riprap; permanent geotextiles; hardened surface materials including concrete, asphalt, gabion baskets or Reno mattresses have been employed. (3) For construction projects on land used for agricultural or silvicultural purposes, <u>permanent stabilization</u> may be accomplished by returning the disturbed land to its preconstruction agricultural or silvicultural use.
improved sinkhole	Improved sinkhole is a natural surface depression that has been altered in order to direct fluids into the hole opening. Improved sinkhole is a type of injection well regulated under the Underground Injection Control (UIC) program. Underground injection constitutes an intentional disposal of waste waters in natural depressions, open fractures and crevices, such as those commonly associated with weathering of limestone.
Level 1	Level 1 - Fundamentals of Erosion Prevention and Sediment Control training and certification program administered by University of Tennessee Water Resources Research Center (https://tnepsc.org/index.asp). The Fundamentals course is a foundation-building course intended for individuals involved in land-disturbing activities covered by the Construction General Permit. The course aims to build a working knowledge of erosion and <u>sedimentation</u> processes and practices and is intended for: site inspectors, inspection and enforcement personnel from all levels of government, plan preparers and reviewers, and designers and engineers. Topics include:



	Construction General Permit and related <u>SWPPP</u> requirements; function, installation, limitations, inspection and maintenance of Best Management Practices; roles of local officials and state government agencies involved in the permitting process; and basic hydrologic and erosion processes. Upon successful completion of a Course Certification Exam, the participant receives a Level 1 TNEPSC certificate. The Level 1 certificate is valid for three full years following the year that the certificate was issued. To meet the requirement for Level 1 certified staff, TDOT may develop and administer an approved equivalent Level1 training and certification program as provided in the TDOT individual <u>MS4</u> Permit. The equivalent TDOT Level 1 certification is valid only for TDOT staff and for projects where TDOT is the primary site <u>operator</u>.
Level 2	Level 2 - Design Principles for Erosion Prevention and Sediment Control for Construction Sites training and certification program administered by University of Tennessee Water Resources Research Center (https://tnepsc.org/index.asp). It is an advanced 2-day workshop designed for engineers and other professionals who have completed the prerequisite Level 1 course. The Level 2 Design workshop provides the general tools needed for developing an acceptable, working <u>SWPPP</u>. Topics discussed in the course include: hydrologic methods for determining peak flows; principles of <u>soil</u> erosion, scouring and <u>sediment</u> transport processes, including practice examples for preventing erosion; and open channel principles and practices for designing a stable channel, including use and examples of riprap, blankets and matting, and vegetation; <u>stormwater</u> control requirements and design; <u>sedimentation</u> principles; and <u>temporary sediment basin</u> design requirements, and detailed examples. The Level 2 Design workshop provides a Certificate of Completion after attending both days and successfully completing the take-home exam.
linear project	Linear Project is a land disturbing activity as conducted by an underground/overhead utility or highway department, including, but not limited to, any cable line or wire for the transmission of electrical energy; any conveyance pipeline for transportation of gaseous or liquid substance; any



	cable line or wire for communications; or any other energy resource transmission ROW or utility infrastructure, e.g., roads and highways. Activities include the construction and installation of these utilities within a corridor. Linear project activities also include the construction of access roads, staging areas and borrow/spoil sites associated with the linear project. Land disturbance specific to the development of residential and commercial subdivisions or high-rise structures is not considered a linear project.
measurable degradation	Measurable Degradation , as used in the context of <u>discharges</u> or withdrawals, means changes in parameters of waters that are of sufficient magnitude to be detectable by the best available instrumentation or laboratory analyses.
month	Month or Monthly refers to calendar months.
MS4	"Municipal Separate Storm Sewer System" or "MS4" is defined in 40 CFR §122.26(b)(8) to mean a conveyance or system of conveyances (e.g., roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains) that are: a) owned and operated by a state, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to state law) having jurisdiction over disposal of sewage, industrial wastes, <u>stormwater</u>, or other wastes, including special districts under state law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that <u>discharges</u> to waters of the United States; b) designed or used for collecting or conveying <u>stormwater</u>; c) not a combined sewer; and d) not part of a Publicly Owned Treatment Works (POTW) as defined in 40 CFR §122.2.
operator	Operator for the purpose of this permit and in the context of <u>stormwater</u> associated with construction activity, means any person (typically considered the primary permittee)



	associated with a construction project that meets either of the following two criteria: a) This person has operational or design control over construction plans and specifications, including the ability to make modifications to those plans and specifications. This person is typically the owner or developer of the project or a portion of the project (e.g., subsequent builder) or the person who is the current owner of the construction site. b) This person has day-to-day operational control of those activities at a project which are necessary to ensure compliance with a <u>SWPPP</u> for the site or other permit conditions. This person is typically a contractor or a commercial builder who is hired by the primary permittee and is considered a secondary permittee. It is anticipated that at different phases of a construction project, different types of parties may satisfy the definition of “operator” (see Part 2 of this permit).
point source (or outfall)	Point source means any discernible, confined and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include introduction of pollutants from non-point source agricultural and silvicultural activities, including <u>stormwater</u> runoff from orchards, cultivated crops, pastures, range lands, forest lands or return flows from irrigated agriculture or agricultural <u>stormwater</u> runoff. In short, outfall is a point where runoff leaves the site as a concentrated flow in a discrete conveyance. Phrase “point source” and term “outfall” are used interchangeably in this general permit, and can be considered synonyms.
pollutant	Pollutant means sewage, industrial wastes, or other wastes.
QLP	Qualifying State, Tribal, or local erosion and sediment control program is one that includes, as defined in 40 CFR 122.44(s):



	a) Requirements for construction site <u>operators</u> to implement appropriate erosion and <u>sediment</u> control best management practices. b) Requirements for construction site <u>operators</u> to control waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality. c) Requirements for construction site <u>operators</u> to develop and implement a <u>stormwater</u> pollution prevention plan. A stormwater pollution prevention plan includes site descriptions, descriptions of appropriate control measures, copies of approved State, Tribal or local requirements, maintenance procedures, inspection procedures and identification of non-<u>stormwater</u> discharges. d) Requirements to submit a site plan for review that incorporates consideration of potential water quality impacts.
rainfall	A rainfall event is defined as any occurrence of rain preceded by 10 hours without precipitation that results in an accumulation of 0.01 inches or more. Instances of rainfall occurring within 10 hours of each other will be considered a single rainfall event.
registered engineer	Registered Engineer and Registered Landscape Architect An engineer or landscape architect certified and registered by the State Board of Architectural and Engineer Examiners pursuant to Section 62-202, Tennessee Code Annotated, to practice in Tennessee.
runoff coefficient	Runoff coefficient means the fraction of total rainfall that will appear at the conveyance as runoff. Runoff coefficient is also defined as the ratio of the amount of water that is not absorbed by the surface to the total amount of water that falls during a rainstorm.
sediment	Sediment means solid material, both inorganic (mineral) and organic, that is in suspension, is being transported; or has been moved from the site of origin by wind, water, gravity or ice as a product of erosion.
sediment basin	Sediment basin A temporary basin consisting of an embankment constructed across a wet weather



	conveyance, an excavation that creates a basin or by a combination of both. A sediment basin typically consists of a forebay cell, dam, impoundment, permanent pool, primary spillway, secondary or emergency spillway and surface dewatering device. The size and shape of the basin depends on the location, size of drainage area, incoming runoff volume and peak flow, <u>soil</u> type and particle size, land cover, and receiving <u>stream</u> classification (i.e., waters with unavailable parameters, Exceptional TN Waters, or waters with available parameters).
sedimentation	Sedimentation means the action or process of forming or depositing sediment.
soil	Soil or Topsoil means the unconsolidated mineral and organic material on the immediate surface of the earth that serves as a natural medium for the growth of plants.
steep slope	Steep Slope or Steep Grade means a natural or created slope of 35% grade or greater. Designers of sites with steep slopes must pay attention to <u>stormwater</u> management in the <u>SWPPP</u> to engineer runoff around or over a steep slope so as not to erode the slope. In addition, site managers should focus on erosion prevention on the slopes and stabilize the slopes as soon as practicable to prevent slope failure or sediment discharges from the project.
stormwater	Stormwater means rainfall runoff, snow melt runoff, and surface runoff and drainage.
stream	A Stream is a surface water that is not a wet weather conveyance. Therefore, as used in this permit, "stream" includes lakes, wetlands and other non-linear surface waters.
construction stormwater	Stormwater associated with industrial activity is defined in 40 CFR 122.26(b)(14) and incorporated here by reference. Most relevant to this permit is 40 CFR 122.26(b)(14)(x), which relates to construction activity including clearing, grading, filling and excavation activities, including borrow pits containing erodible material. Disturbance of soil for the purpose of crop production is exempt from permit requirements, but stormwater discharges from agriculture-related activities that involve construction of structures (e.g., barn construction, road construction, pond construction) are considered associated with industrial



	activity. Maintenance to the original line and grade, hydraulic capacity; or to the original purpose of the facility (e.g., re-clearing, minor excavation performed around an existing structure necessary for maintenance or repair and repaving of an existing road) is not considered a construction activity for the purpose of this permit.
discharge-related activities	Stormwater discharge-related activities means activities that cause, contribute to or result in point source stormwater pollutant discharges. These activities may include excavation, site development, grading and other surface disturbance activities; and activities to control stormwater including the siting, construction and operation of best management practices (BMPs).
SWPPP	Stormwater Pollution Prevention Plan is a written site-specific plan required by this permit that includes a narrative pollution prevention plan and graphical erosion and sediment control plan. In its basic form, the plan contains a site map, a description of construction activities that could introduce pollutants to stormwater runoff, a description of measures or practices to control these pollutants, and erosion and sediment control plans and specifications. It must be prepared and submitted before construction begins. In order to effectively reduce erosion and <u>sedimentation</u> impacts, Best Management Practices (BMPs) must be designed, installed and maintained during land disturbing activities. The <u>SWPPP</u> should be prepared in accordance with the <u>Tennessee Erosion and Sediment Control Handbook</u> .
take	Take of an endangered species means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct.
the handbook	<u>Tennessee Erosion and Sediment Control Handbook</u> is a guidance issued by the Division of Water Resources for the purpose of developing Stormwater Pollution Prevention Plans and Erosion and Sediment Control Plans required by the TNCGP. The handbook is designed to provide information to planners, developers, engineers and contractors on the proper selection, installation and maintenance of BMPs. The handbook is intended for use during the design and



	construction of projects that require erosion and sediment controls to protect waters of the state.
temporary stabilization	Temporary stabilization is achieved when vegetation or non-erodible surface has been established on the area of disturbance and construction activity has temporarily ceased. Under certain conditions, temporary stabilization is required when construction activities temporarily cease. However, if future construction activity is planned, permit coverage continues.
TMDL	Total maximum daily load (TMDL) means the sum of the individual wasteload allocations for <u>point sources</u> and load allocations for nonpoint sources and natural background (40 CFR 130.2(l)). TMDL is a study that quantifies the amount of a pollutant in a <u>stream</u>, identifies the sources of the pollutant and recommends regulatory or other actions that may need to be taken in order for the <u>stream</u> to cease being polluted. TMDLs can also be described by the following equation: $\text{TMDL} = \text{sum of nonpoint sources (LA)} + \text{sum of } \underline{\text{point sources (WLA)}} + \text{margin of safety}$ A list of completed TMDLs that have been approved by EPA can be found at our web site: https://www.tn.gov/environment/program-areas/wr-water-resources/watershed-stewardship/tennessee-s-total-maximum-daily-load--tmdl--program.html
treatment chemicals	Treatment chemicals are polymers, flocculants or other chemicals used to reduce turbidity in stormwater discharges by chemically bonding to suspended silts and other soil materials and causing them to bind together and settle out. Common examples of anionic treatment chemicals are chitosan and anionic PAM.
turbidity	Turbidity is the cloudiness or haziness of a fluid caused by individual particles (suspended solids) that are generally invisible to the naked eye, similar to smoke in air.
waste site	Waste site is an area where material from a construction site is disposed of. When the material is erodible, such as soil, the site must be treated as a construction site.



waters or waters of the state	Waters (or waters of the state) means any and all water, public or private, on or beneath the surface of the ground, which are contained within, flow through, or border upon Tennessee or any portion thereof, except those bodies of water confined to and retained within the limits of private property in single ownership which do not combine or effect a junction with natural surface or underground waters.
unavailable parameters	Waters with unavailable parameters means any segment of surface waters that has been identified by the division as failing to support one or more classified uses. For the purpose of this permit, pollutant of concern is siltation. Based on the most recent assessment information available to staff, the division will notify applicants and permittees if their discharge is into, or is affecting, waters with unavailable parameters. Resources to be used in making this determination include biennial compilations of impaired waters, databases of assessment information, updated GIS coverages (https://tdeconline.tn.gov/dwr/), and the results of recent field surveys. GIS coverages of the streams and lakes not meeting water quality standards, plus the biennial list of waters with unavailable parameters, can be found at https://www.tn.gov/environment/program-areas/wr-water-resources/water-quality/water-quality-reports---publications.html .
week	A one-week period is a synonym of a calendar-week ; typically, a period from Sunday through Saturday.
wet weather conveyance	Wet weather conveyances are man-made or natural watercourses, including natural watercourses that have been modified by channelization, that meet the following: - The conveyance carries flow only in direct response to precipitation runoff in its immediate locality. - The conveyance's channels are at all times above the ground water table. - The flow carried by the conveyance is not suitable for drinking water supplies. - Hydrological and biological analyses indicate that, due to naturally occurring ephemeral or low flow under normal weather conditions, there is not sufficient water



	to support fish or multiple populations of obligate lotic aquatic organisms whose life cycle includes an aquatic phase of at least two months. (Tennessee Rules, Chapter 0400-40-3-.04(3)).

10.2. ACRONYMS AND ABBREVIATIONS

7Q10	7-day minimum, 10-year recurrence interval
<u>ARAP</u>	Aquatic Resource Alteration Permit
<u>BMP</u>	Best Management Practice
BPT	Best Practicable Control Technology Currently Available
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CGP	Construction General Permit (this NPDES permit)
<u>CWA</u>	Clean Water Act
<u>EFO</u>	Environmental Field Office (see Subpart 3.4)
EPA	(U.S.) Environmental Protection Agency
EPSC	Erosion Prevention and Sediment Control
<u>MS4</u>	Municipal Separate Storm Sewer System
NOC	Notice of Coverage (see Subpart 1.5)
NOI	Notice of Intent (to be covered by this permit – see Section 1.4.1)
NOT	Notice of Termination (see Part 9)
NPDES	National Pollutant Discharge Elimination System
ONRW	Outstanding National Resource Waters
<u>QLP</u>	Qualifying Local Program (see Section 1.4.5)
<u>SWPPP</u>	Stormwater Pollution Prevention Plan
TDEC	Tennessee Department of Environment and Conservation
TDOT	Tennessee Department of Transportation
<u>TMDL</u>	Total Maximum Daily Load
TMSP	Tennessee Multi-Sector General Permit for the Discharge of Stormwater from an Industrial Activity
TVA	Tennessee Valley Authority
TWQCA	Tennessee Water Quality Control Act
UIC	Underground Injection Control
USGS	United States Geological Survey



10.3. RESOURCES, HYPERLINKS, AND WEB PAGES

Electronic Code of Federal Regulations (eCFR), Title 40 (40 CFR § 1 through § 1099)

<https://www.ecfr.gov/cgi-bin/text-idx?SID=75202eb5d09974cab585afeea981220b&mc=true&tpl=/ecfrbrowse/Title40/40chapter1.tpl>

Electronic Reporting (NetDMR) Waiver Request

https://www.tn.gov/content/dam/tn/environment/water/documents/wr_electronic_reporting_waiver.pdf

Online Forms

[NPDES Electronic Reporting](#)

NPDES Compliance Inspection Manual (EPA)

<https://www.epa.gov/sites/production/files/2017-01/documents/npdesinspect.pdf>

NPDES Electronic Reporting Rule

<https://www.federalregister.gov/documents/2015/10/22/2015-24954/national-pollutant-discharge-elimination-system-npdes-electronic-reporting-rule>

Rules of the TN Department of Environment and Conservation, Chapter 0400-40

<https://publications.tnsosfiles.com/rules/0400/0400-40/0400-40.htm>

TDEC Water Quality Rules, Reports, and Publications

<https://www.tn.gov/environment/program-areas/wr-water-resources/water-quality/water-quality-reports---publications.html>

Technical Support Document for Water Quality-based Toxics Control (EPA)

<https://www3.epa.gov/npdes/pubs/owm0264.pdf>

Tennessee Water Resources Data and Map Viewers

<https://www.tn.gov/environment/program-areas/wr-water-resources/water-quality/water-resources-data-map-viewers.html>

USGS StreamStats

https://www.usgs.gov/mission-areas/water-resources/science/streamstats-streamflow-statistics-and-spatial-analysis-tools?qt-science_center_objects=0#qt-science_center_objects



USGS SWToolbox

<https://www.usgs.gov/software/swtoolbox-software-information>

(End of body of permit; appendices follow.)

APPENDIX A – NOTICE OF INTENT FORM (NOI)

(See Next Page)



TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
Division of Water Resources
William R. Snodgrass Tennessee Tower, 312 Rosa L. Parks Avenue, 11th Floor
Nashville, TN 37243
Toll Free Number: 1-888-891-8332 (TDEC)

**NOTICE OF INTENT (NOI) FOR GENERAL NPDES PERMIT FOR
STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITIES (TNR100000)**

Site or Project Name:		NPDES Tracking Number: TNR	
Street Address including city or zip code or Location:		Construction Start Date:	
		Estimated End Date:	
Site Description:		Latitude (dd.dddd):	
		Longitude (-dd.dddd):	
County(ies):	MS4 Jurisdiction (if applicable):	Acres Disturbed:	
		Total Acres:	
Are there any streams ☐ and/or wetlands ☐ on or adjacent to the construction site? If wetlands are located on-site and may be impacted, attach wetlands delineation report. If an Aquatic Resource Alteration Permit has been obtained for this site, what is the permit number? ARAP Number:			
Receiving waters:			
Include the SWPPP with the NOI ☐ SWPPP Included		Include a site location ☐ Map Included map	

Name of Site Owner or Developer (Site-Wide Permittee): (correct legal name of person, company, or entity that has operational or design control over construction plans and specifications)			
For corporate entities only, provide the Tennessee Secretary of State (SOS) Control Number:			
Site Owner or Developer Contact Name: (individual responsible for site)		Title or Position: (the party who signs the certification below):	
Mailing Address:	City:	State:	Zip:
Phone: ()	E-mail:		

Optional Contact Name:	Title or Position:		
Mailing Address:	City:	State:	Zip:
Phone: ()	E-mail:		

Owner or Developer Certification: (must be signed by president, vice-president or equivalent, or ranking elected official) (Primary Permittee)

I certify under penalty of law that this document and all attachments were prepared by me, or under my direction or supervision. The submitted information is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

Owner or Developer Name: (print or type)

Signature:

Date:

Contractor(s) Certification: (must be signed by president, vice-president or equivalent, or ranking elected official) (Secondary Permittee)

I certify under penalty of law that I have reviewed this document, any attachments, and the SWPPP referenced above. Based on my inquiry of the construction site owner/developer identified above and/or my inquiry of the person directly responsible for assembling this NOI and SWPPP, I believe the information submitted is accurate. I am aware that this NOI, if approved, makes the above-described construction activity subject to NPDES permit number TNR100000, and that certain of my activities on-site are thereby regulated. I am aware that there are significant penalties, including the possibility of fine and imprisonment for knowing violations, and for failure to comply with these permit requirements. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

Primary contractor name, address, and SOS control number (if applicable): (print or type)

Signature:

Date:

Primary contractor name, address, and SOS control number (if applicable): (print or type)

Signature:

Date:

Primary contractor name, address, and SOS control number (if applicable): (print or type)

Signature:

Date:

NOTICE OF INTENT (NOI) FOR GENERAL NPDES PERMIT FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITIES (TNR100000)

Purpose of this form: A completed notice of intent (NOI) must be submitted to obtain coverage under the Tennessee General NPDES Permit for Discharges of Stormwater Associated with Construction Activity (permit). **Requesting coverage under this permit means that an applicant has obtained and examined a copy of this permit, and thereby acknowledges applicant's claim of ability to be in compliance with permit terms and conditions.** This permit is required for stormwater discharge(s) from construction activities including clearing, grading, filling and excavating (including borrow pits) of one or more acres of land. This form should be submitted at least 30 days prior to the commencement of land disturbing activities, or no later than 48 hours prior to when a new operator assumes operational control over site specifications or commences work at the site.

The appropriate permit application fee must accompany the NOI and is based on total acreage to be disturbed by an entire project, including any associated construction support activities (e.g., equipment staging yards, material storage areas, excavated material disposal areas, borrow or waste sites):

(i) Projects equal to or greater than 150 acres	\$10,000
(ii) Projects equal to or greater than 50 acres and less than 150 acres	\$6,000
(iii) Projects equal to or greater than 20 acres and less than 50 acres	\$3,000
(iv) Projects equal to or greater than 5 acres and less than 20 acres	\$1,000
(v) Projects equal to or greater than 1 acre and less than 5 acres	\$250
(vi) Projects seeking subsequent coverage under an actively covered larger common plan of development or sale	\$100

There is no fee for sites less than 1 acre. A separate annual maintenance fee is also required for construction activities that exceed 1 year under general permit coverage. Tennessee Rules, Chapter 0400-40-11-.02(b)(12)).

Who must submit the NOI form? Per Section 2 of the permit, all site operators must submit an NOI form. "Operator" for the purpose of this permit and in the context of stormwater associated with construction activity means any person associated with a construction project who meets either or both of the following two criteria: (1) The person has operational or design control over construction plans and specifications, including the ability to make modifications to those plans and specifications. This person is typically the owner or developer of the project or a portion of the project (e.g. subsequent builder), or the person that is the current landowner of the construction site. This person is considered the primary permittee; or (2) The person has day-to-day operational control of those activities at a project which are necessary to ensure compliance with a SWPPP for the site or other permit conditions. This person is typically a contractor or a commercial builder who is hired by the primary permittee and is considered a secondary permittee.

Owners, developers and all contractors that meet the definition of the operator in subsection 2.2 of the permit shall apply for permit coverage on the same NOI, insofar as possible. After permit coverage has been granted to the primary permittee, any separate or subsequent NOI submittals must include the site's previously assigned permit tracking number and the project name. The site-wide site-specific SWPPP shall be prepared in accordance with the requirements of part 5 of the permit and must be submitted with the NOI unless the NOI being submitted is to only add a contractor (secondary permittee) to an existing coverage.

Artificial entities (e.g., corporations or partnerships excluding entities not required to register) must submit the TN Secretary of State, Division of Business Services, control number. The Division reserves the right to deny coverage to artificial entities that are not properly registered and in good standing with the TN Secretary of State.

Notice of Coverage The division will review the NOI for completeness and accuracy and prepare a notice of coverage (NOC). Stormwater discharge from the construction site is authorized as of the effective date of the NOC.

Complete the form Type or print clearly, using ink and not markers or pencil. Answer each item or enter "NA," for not applicable, if a particular item does not fit the circumstances or characteristics of your construction site or activity. If you need additional space, attach a separate piece of paper to the NOI form. **The NOI will be considered incomplete without a permit fee, a map, and the SWPPP.**

Describe and locate the project Use the legal or official name of the construction site. If a construction site lacks street name or route number, give the most accurate geographic information available to describe the location (reference to adjacent highways, roads and structures; e.g. intersection of state highways 70 and 100). Latitude and longitude (expressed in decimal degrees) of the center of the site can be located on USGS quadrangle maps. The maps can be obtained at the USGS World Wide Web site: <http://www.usgs.gov/>; latitude and longitude information can be found at numerous other web sites. Attach a copy of a portion of a 7.5 minute topographic map, a city map, or a county map showing location of site, with boundaries at least one mile outside the site boundaries. Provide estimated starting date of clearing activities and completion date of the project, and an estimate of the number of acres of the site on which soil will be disturbed, including borrow areas, fill areas, stockpiles and the total acres. For linear projects, give location at each end of the construction area.

Give name of the receiving waters Trace the route of stormwater runoff from the construction site and determine the name of the river(s), stream(s), creek(s), wetland(s), lake(s) or any other water course(s) into which the stormwater runoff drains. Note that the receiving water course may or may not be located on the construction site. If the first water body receiving construction site runoff is unnamed ("unnamed tributary"), determine the name of the water body that the unnamed tributary enters.

An ARAP may be required **If your work will disturb or cause alterations of a stream or wetland, you must obtain an appropriate Aquatic Resource Alteration Permit (ARAP).** If you have a question about the ARAP program, contact your local Environmental Field Office (EFO).

Submitting the form and obtaining more information Note that this form must be signed by the company President, Vice-President, or a ranking elected official in the case of a municipality, for details see subpart 2.5. For more information, contact your local EFO at the toll-free number 1-888-891-8332 (TDEC). Submit the completed NOI form (keep a copy for your records) to the appropriate EFO for the county(ies) where the construction activity is located, addressed to **Attention: Stormwater NOI Processing** or use MyTDEC Forms for electronic submittal.

EFO	Street Address	Zip Code	EFO	Street Address	Zip Code
Memphis	8383 Wolf Lake Drive, Bartlett	38133-4119	Cookeville	1221 South Willow Ave.	38506
Jackson	1625 Hollywood Drive	38305-4316	Chattanooga	1301 Riverfront Parkway, Suite 206	37402-2013
Nashville	711 R S Gass Boulevard	37243	Knoxville	3711 Middlebrook Pike	37921
Columbia	1421 Hampshire Pike	38401	Johnson City	2305 Silverdale Road	37601

APPENDIX B – NOTICE OF TERMINATION FORM (NOT)

(See Next Page)



TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION (TDEC)
Division of Water Resources (DWR)
William R. Snodgrass Tennessee Tower, 312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243
1-888-891-TDEC (8332)

**Notice of Termination (NOT) for
General NPDES Permit for Stormwater Discharges from Construction Activities (CGP)**

This form is required to be submitted when requesting termination of coverage from the CGP. The purpose of this form is to notify the TDEC that either all stormwater discharges associated with construction activity from the portion of the identified facility where you, as an operator, have ceased or have been eliminated; or you are no longer an operator at the construction site. Specifically, this means that all disturbed soils at the portion of the construction site where the operator had control have been permanently stabilized, the temporary erosion and sediment control measures have been removed, and/or subsequent operators have obtained permit coverage for the site or portions of the site where the operator had control. Submission of this form shall in no way relieve the permittee of permit obligations required prior to submission of this form.

Submit this form to the local DWR Environmental Field Office (EFO) address (see table below) or using MyTDEC Forms electronic submittal process. For more information, contact your local EFO at the toll-free number 1-888-891-8332 (TDEC).

Site or Project Name:	NPDES Tracking Number: TNR
Street Address or Location:	County(ies):

Name of Permittee Requesting Termination of Coverage:			
Permittee Contact Name:		Title or Position:	
Mailing Address:	City:	State:	Zip:
Phone: ()	E-mail:		

Check the reason(s) for termination of permit coverage: (check only one)

☐	Primary permittee termination: all requirements for termination under Permit Part 9.1.1. a) through c) have been met. This includes, but is not limited to, for areas the primary permittee has control all earth-disturbing activities at the site are complete and permanent stabilization as defined in Part 10 of the CGP has been achieved. (attach photo documentation).
☐	When applicable, and you are a primary permittee seeking termination, list who is responsible for ongoing maintenance of stormwater controls left on the site subject for long-term use following termination of coverage:
☐	Secondary permittee termination: all requirements for termination under Permit Part 9.2.1. have been met (no longer an operator at the construction site).

CN-1175 (Rev. 12-21)

RDA 2366

Certification and Signature:

(must be signed by president, vice-president or equivalent ranking elected official)

I certify under penalty of law that either: (a) all stormwater discharges associated with construction activity from the portion of the identified facility where I was an operator have ceased or have been eliminated or (b) I am no longer an operator at the construction site. I understand that by submitting this notice of termination, I am no longer authorized to discharge stormwater associated with construction activity under this general permit, and that discharging pollutants in stormwater associated with construction activity to waters of the state is unlawful under the Tennessee Water Quality Control Act where the discharge is not authorized by a NPDES permit. I also understand that the submittal of this notice of termination does not release an operator from liability for any violations of this permit or the Tennessee Water Quality Control Act. I certify under penalty of law that this document and all attachments were prepared by me, or under my direction or supervision. The submitted information is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

Permittee name (print or type):

Signature:

Date:

EFO	Address	EFO	Street Address
Memphis	8383 Wolf Lake Drive, Bartlett, TN 38133	Cookeville	1221 South Willow Ave., TN 38506
Jackson	1625 Hollywood Drive, TN 38305	Chattanooga	1301 Riverfront Parkway, Ste. 206, TN 37402
Nashville	711 R S Gass Boulevard, TN 37243	Knoxville	3711 Middlebrook Pike, TN 37921
Columbia	1421 Hampshire Pike, TN 38401	Johnson City	2305 Silverdale Road, TN 37601

APPENDIX C – INSPECTION REPORT FORM

(See Next Page)



TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION (TDEC)
Division of Water Resources (DWR)
William R. Snodgrass Tennessee Tower, 312 Rosa L. Parks Avenue, 11th Floor,
Nashville, Tennessee 37243
1-888-891-8332 (TDEC)

**General NPDES Permit for Stormwater Discharges from Construction Activities (CGP)
Construction Stormwater Inspection Certification (Inspection Form)**

Site or Project Name:		NPDES Tracking Number: TNR
Primary Permittee Name:		Date of Inspection:
Current approximate disturbed acreage:	Has rainfall been checked/documented daily? ☐ Yes ☐ No	Name of Inspector:
Current weather/ground conditions:	Rainfall total since last inspection:	Inspector's TNEPSC Certification Number:
Site Assessment ☐ Yes ☐ No	Assessor's TN PE registration number:	Assessor's TNEPSC Level II/CPESC number:

Check the box if the following items are on-site:	
☐	Notice of Coverage (NOC)
☐	Stormwater Pollution Prevention Plan (SWPPP)
☐	Weekly inspection documentation
☐	Site contact information
☐	Rain Gage
Off-site Reference Rain Gage Location	

Best Management Practices (BMPs):

Are the Erosion Prevention and Sediment Controls (EPSCs) functioning correctly?				
If "No," describe below in Comment Section				
1.	Are all applicable EPSCs installed and maintained per the SWPPP per the current phase?	☐ Yes	☐ No	
2.	Are EPSCs functioning correctly at all disturbed areas/material storage areas? (permit section 5.5.3)	☐ Yes	☐ No	
3.	Are EPSCs functioning correctly at outfall/discharge points such that there is no objectionable color contrast in the receiving stream, and no other water quality impacts? (permit section 5.5.3.5 and 6.3.2)	☐ Yes	☐ No	
4.	Are EPSCs functioning correctly at ingress/egress points such that there is no evidence of track-out? (permit section 5.5.3.1)	☐ Yes	☐ No	
5.	If applicable, have discharges from dewatering activities been managed by appropriate controls? (permit section 4.1.3) If "No," describe below the measure to be implemented to address deficiencies.	☐ N/A	☐ Yes	☐ No
6.	If construction activity at any location on-site has temporarily/permanently ceased, was the area stabilized within 14 days? (permit section 5.5.3.4) If "No," describe below each location and measures taken to stabilize the area(s).	☐ N/A	☐ Yes	☐ No
7.	Have pollution prevention measures been installed, implemented, and maintained to minimize the discharge of pollutants from wash waters, exposure of materials and discharges from spills and leaks per section 4.1.4? If "No," describe below the measure to be implemented to address deficiencies.	☐ N/A	☐ Yes	☐ No

Site or Project Name:		NPDES Tracking Number: TNR						
Primary Permittee Name:		Date of Inspection:						
8.	If a concrete washout facility is located on site, is it clearly identified on the project and maintained? If "No," describe below the measures to be implemented to address deficiencies. (permit section 1.2.2)	☐ N/A	☐ Yes	☐ No				
9.	Have all previous deficiencies been addressed? If "No," describe the remaining deficiencies in the Comments section. ☐ Check if deficiencies/corrective measures have been reported on a previous form.	☐ N/A	☐ Yes	☐ No				
Comment Section. If the answer is "No" for any of the above, describe the problem and summarize corrective actions to be taken. Otherwise, describe any pertinent observations: 								
Certification and Signature (must be signed by the certified inspector and the permittee per Sections 5.5.3.11 (g) and 8.7.2 of the CGP) I certify under penalty of law that this document and all attachments were prepared by me, or under my direction or supervision. The submitted information is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury.								
Inspector Name and Title :			Signature:			Date:		
Primary Permittee Name and Title:			Signature:			Date:		

Construction Stormwater Inspection Certification Form (Inspection Form)

Purpose of this form/ Instructions

An inspection, as described in subsection 5.5.3.9. of the General Permit for Stormwater Discharges from Construction Activities ("Permit"), shall be performed at the specified frequency and documented on this form. Inspections shall be performed at least 72 hours apart. Where sites or portion(s) of construction sites have been temporarily stabilized, or runoff is unlikely due to winter conditions (e.g., site covered with snow or ice), such inspection only has to be conducted once per month until thawing results in runoff or construction activity resumes.

Inspections can be performed by:

- a) a person with an valid certification from the "Fundamentals of Erosion Prevention and Sediment Control Level I" course,
- b) a licensed professional engineer or landscape architect,
- c) a Certified Professional in Erosion and Sediment Control (CPESC), or
- d) a person who has successfully completed the "Level II Design Principles for Erosion Prevention and Sediment Control for Construction Sites" course.

Qualified personnel, as defined in subsection 5.5.3.10 of the Permit (provided by the permittee or cooperatively by multiple permittees) shall inspect disturbed areas of the construction site that have not been permanently stabilized, areas used for storage of materials that are exposed to precipitation, structural control measures, locations where vehicles enter or exit the site, and each outfall.

Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the site's drainage system. Erosion prevention and sediment control measures shall be observed to ensure that they are operating correctly.

Outfall points (where discharges leave the site and/or enter waters of the state) shall be inspected to determine whether erosion prevention and sediment control measures are effective in preventing significant impacts to receiving waters. Where discharge locations are inaccessible, nearby downstream locations shall be inspected. Locations where vehicles enter or exit the site shall be inspected for evidence of offsite sediment tracking.

Based on the results of the inspection, any inadequate control measures or control measures in disrepair shall be replaced or modified, or repaired as necessary, before the next rain event if possible, but in no case more than 7 days after the need is identified.

Based on the results of the inspection, the site description identified in the SWPPP in accordance with section 5.5.1 of the Permit and pollution prevention measures identified in the SWPPP in accordance with section 5.5.2 of the Permit, shall be revised as appropriate, but in no case later than 7 days following the inspection. Such modifications shall provide for timely implementation of any changes to the SWPPP, but in no case later than 14 days following the inspection.

All inspections shall be documented on this Construction Stormwater Inspection Certification form. Alternative inspection forms may be used as long as the form contents and the inspection certification language are, at a minimum, equivalent to the Division's form and the permittee has obtained a written approval from the Division to use the alternative form. Inspection documentation will be maintained on site and made available to the Division upon request. Inspection reports must be submitted to the Division within 10 days of the request.

Trained certified inspectors shall complete inspection documentation to the best of their ability. Falsifying inspection records or other documentation or failure to complete inspection documentation shall result in a violation of this permit and any other applicable acts or rules.



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MSCAA requires that all construction activity on airport property must be in compliance with TDEC and City of Memphis requirements. All recommended techniques and materials, along with guidelines on implementation and use are provided in the following documents:

MSCAA recommends that all Contractors working on MSCAA property become fully educated on the contents of this documents and request assistance from both organizations if questions or concerns arise.

TDEC Erosion and Sediment Control Handbook

<http://tnepsc.org/handbook.asp>

City of Memphis Storm Water Control website

https://www.memphistn.gov/wp-content/uploads/2020/09/003-Volume3_BestManagementPracticesManual.pdf

MSCAA maintenance expectations, at a minimum, throughout the entire project:

Temporary Seeding and Planting

- Ensure proper calculation of seeding rate, based on seed purity and germination information
- Inspect frequently to verify that vegetation is growing
- Reseed areas to prevent sheet and rill erosion
- Spot seed in small areas

Permanent Seeding and Planting

- Ensure proper calculation of seeding rate, based on seed purity and germination information
- Inspect frequently to verify that vegetation is growing
- Reseed areas to prevent sheet and rill erosion
- Spot seed in small areas

Soil Binders

- Apply according to manufacturer's specification
- Apply stabilizers/tackifiers with sufficient drying time before rainfall (typically 24 hours)
- Select a product that is best suited for the area installed (considering longevity, curing time, resistance to abrasion, and compatibility with existing vegetation)
- Soil binders must be maintained by reapplying in high traffic areas, after storm events, or after being in-place for an extended period.

Mulches

- Inspection of the application should be performed along with other regularly scheduled erosion and sediment control inspections.
- Any areas that have washed out due to high storm water flows should be reconsidered for different BMP use, or at least retreated.
- Areas that have been disturbed by blowing wind should be retreated.
- Maintenance needs identified in inspections or by other means shall be accomplished before the next storm event if possible, but in no case more than 7 days after the need is identified.

Silt Fence

Silt fence stake pockets should be placed on the uphill side of the sediment fence, so if the stitching of the pocket pulls out, the fabric will still drape against the stakes. The bottom of the fabric of the fence should be trenched into the ground, or else water and sediment can flow under the sediment fence. The silt fence should be placed on the contour, or else a “flume” will be created where flow and sediment can concentrate. A failure is likely to occur at such a concentration point and the flume will release concentrated flow and sediment down the face of the slope. Silt fence is designed for sheet flow only and should never be placed over concentrated flows, such as channels or streams. Silt fence is designed for relatively small drainage areas and should not be placed at the bottom of a large drainage area that will overwhelm the sediment fence in the first storm event.

- Sediment fences should be cleaned of accumulated sediment after each major storm, or when deposition is one-half of the barrier height.
- Breaks or overtopped areas should be replaced or repaired immediately. Fences should be repaired and the accumulated sediment dispersed to a stable area.
- Sediment fence should be removed when the area being protected is fully stabilized and prior to termination of permit coverage.

Storm Drain Inlet Protection

Using inlet protection measures that divert flow, rather than filter flow, can result in flooding of adjacent areas, or overwhelming adjacent inlets. Common problems are bypassing of inlet protection due to insufficient packing of the ends of Biofilter bags and bypassing of the inlet protection due to overflow slots on drain inlet insert devices.

Inlet filters for storm drains should be inspected and cleaned after each significant storm event and repaired promptly. Sediment shall be removed after each significant storm event and deposited in a stable area where it will not be subject to erosion.

If the inlet protection device becomes clogged with sediment, it must be carefully removed from the inlet and either cleaned or replaced.

Temporary Sediment Basin

- Constructing a basin that is too wide and not long enough can result in short-circuiting of the basin and discharge of sediment out of the basin.
- Temporary and post-construction sediment basins should be cleaned of accumulated sediment after every significant storm event, or when sediment reaches the basin capacity as designed in the EPSCP.
- Removed sediment shall be properly disposed in a stable area that is not susceptible to erosion.

Entrance/Exit Tracking Controls

- While gravel for temporary construction entrances should be coarse enough to shake loose soil that adheres to the vehicles' wheels and undercarriage, it should not be so coarse and angular that it causes damage to tires.
- Stabilized gravel construction entrances shall be inspected for the transport of sediment onto public rights-of-way and any tracked sediment shall be removed immediately by vacuum sweeping and not washed off by water trucks. If tracking is an ongoing problem, a wheel wash facility should be added to the site.

Entrance/Exit Tire Wash

- Installation of tire wash with other entrance/exit tracking controls to reduce sediment loading on tire wash

Remove accumulated sediment from tire wash

Diversion of Run-On

- Diversion channels must be properly sized to convey design flows around disturbed soil areas or other areas of concern.
- Diversion measures must be maintained to remove debris and sediment, repair linings, and replace lost rip rap as needed.

Check Dams

- Place check dams or barriers so that the abutments are at a higher elevation than the center of the barrier so that flow around the ends of the barrier does not occur. Trench the bottom of the check dam or barrier so that undermining of the barrier does not occur.
- Check dams should be checked for undermining and/or short-circuiting and repaired or replaced if necessary.
- Check dams should be cleaned after each significant storm event or when accumulated sediment reaches one-half the height of the check dam.
- Check dams should be keyed into the channel banks a minimum of 18 inches to prevent flow around the dam or as designed in the EPSCP.



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**IMMEDIATE RESPONSE PROCEDURES
ON-SCENE PERSONNEL**

- 1. Initiate evacuation, if necessary.**
- 2. Notify MSCAA Environmental Manager at (901) 922-8754 or Airport Police at (901) 922-8298, and report the following information, if it is known or can reasonably be determined:**
 - Name of individual reporting spill
 - Location of spill
 - Number of injured personnel and number of injuries, if applicable
 - Substance spilled
 - Estimated amount spilled
 - Estimated rate at which material is currently spilling
 - Estimated time of spill occurrence
 - Extent of spill travel
 - Necessity of fire department to respond to protect life, property, and environment
 - Any additional pertinent information such as other potential hazards.
- 3. Stop spill flow when possible without undue risk of personal injury.**
- 4. Contain the spill using whatever means is readily available.**
- 5. Make spill scene OFF LIMITS to unauthorized personnel.**
- 6. Restrict all sources of ignition when flammable substances are involved.**
- 7. Report to the emergency spill response designee upon his/her arrival to the scene.**

EMERGENCY NOTIFICATIONS AND RESPONSE RESOURCES

Table D-1 contains installation and local phone numbers that are to be used to alert personnel of the incident or to request additional assistance.

Table D-1 Emergency Telephone Numbers				
Prioritized Contact List	Response Role	Contact Timeline	Day Phone	24-Hour Phone
USEPA, Region 4, Emergency Response (24-hour Hotline)	Regulator	As indicated in Table D-2	(404) 562-8700	(404) 562-8700
U.S. Coast Guard, 8 th District Marine Safety Office (for coastal waters)	Regulator	As indicated in Table D-2	(901) 544-3912 x2122	(901) 544-3912 x2122 or (866) 777-2784
Tennessee Department of Environment & Conservation (TDEC) Memphis Office	Regulator	As indicated in Table D-2	(901) 371-3000	(800) 262-3300
TN Emergency Management Agency (TEMA) 24-hr	Regulator	As indicated in Table D-2	(800) 262-3300 or (615) 741-0001	(800) 262-3300
National Response Center www.nrc.uscg.mil	Receiver of all reports of spills to waters of the U.S., or potential to affect waters.	Immediately	(800) 424-8802	(800) 424-8802
City of Memphis Storm Water	Regulator	As indicated in Table D-2	(901) 576-4349	(901) 576-6721 (hotline)
City of Memphis POTW	Regulator	As indicated in Table D-2	(901) 353-2392	
Shelby County Storm Water Hotline	Regulator	As indicated in Table D-2	(901) 545-3870	
City of Memphis Fire Department and Local Emergency Planning Committee (LEPC) within 15 minutes of spill	Emergency Assistance	Immediately	911	911
	MFD Hazmat	As needed	(901) 320-5368	(901) 320-5368
City of Memphis Fire Department	Emergency Assistance	As needed	(901) 458-3311	(901) 458-3311
YOUR on call first responders	Spill Response Contractor	As needed	TBD	TBD
MLGW Emergency	Utility Issues	As needed	(901) 528-4465	(901) 528-4465
Local Health Department	Public Health Concerns	As needed	(901) 576-7600	(901) 576-7600

Note:

The NRC will notify the U.S. Coast Guard and USEPA.

NOTIFICATION REQUIREMENTS

Table D-2 provides a cross-reference matrix that identifies specific release scenarios and associated reporting and notification requirements, including respective timeframes.

Table D-2 Notification Requirements				
Scenario #	Basis For Reporting	Agencies To Contact	Time Frame For Contact	Information To Be Provided
1	Discharge of Petroleum Product to the Grass/Soil — A 25-gallon or greater release of petroleum product to grassy or soil areas must be reported.	A	Within 24 hours	• Location, source(s), time, and duration of the release • Chemical name or identity and of any substance involved in the release • Estimate of the quantity (pounds or gallons) released • The medium (land, water, or air) in which the release occurred or exists • Extent of the release • Any known or anticipated acute or chronic health risks with the release and advice regarding medical attention necessary for exposed individuals • Proper precautions to take as a result of the release or discharge, including evacuation and other proposed response actions • The name and telephone number of the person(s) to be contacted for further information
2	Discharge of Petroleum Product to Surface Water — A discharge of petroleum product that violates 40 CFR 110.6 must be reported. This is basically any amount of petroleum product that reaches surface water (overland or through sewers).	A, B, C, D, E, G	Immediately	Same as Scenario 1 with these additions: • Location of spill and name of receiving water Shelby County Code Section 30-62 requires a written report within 5 days to Memphis and Shelby Emergency Management Agency at: Manager, P.O. Box 111249, Memphis 38111. The following particulars must be included in the report: • A description of the discharge, including an estimate of the volume. • The exact dates, times, and duration of the discharge. • Steps being taken to eliminate and prevent recurrence. • A site drawing showing the location of the spill, direction of flow, and topographical grade of the property, the impacted watercourse(s), and the properties adjacent to the spill site.

Notes:

- A Tennessee Emergency Management Agency — (800) 262-3300/Local TDEC Office (901) 368-7939
- B NRC — (800) 424-8802
- C USEPA, Region 4 — (404) 562-8700 (NRC will call)
- D U.S. Coast Guard, 8th District Marine Safety Office — (901) 544-3912 x2122 (NRC will call)
- E Memphis-Shelby Emergency Management Agency /City of Memphis Fire Department — (901) 458-1515 / 911
- F City of Memphis' WWTP — (901) 353-2392
- G City of Memphis or Shelby County Storm Water Hotline — City at (901) 576-6721 / County at (901) 545-3870

Table D-2 Notification Requirements				
Scenario #	Basis For Reporting	Agencies To Contact	Time Frame For Contact	Information To Be Provided
4	Discharge of Petroleum Product to Surface Water in Excess of 1,000 gal.— If the facility has a spill in 1,000 gal or has two spills that violate 40 CFR 110.6, a report to the USEPA Regional Administrator is required (40 CFR 112.4).	A, B, C, E, G A, C	Immediately Within 3 days of event that violates 40 CFR 112.4	Same as Scenario 2 Written report that describes: • Name of facility • Name(s) of the owner or operator of the facility • Location of the facility • Date and year of initial facility operation • Maximum storage or handling capacity of the facility and normal daily throughput • Description of the facility, including maps, flow diagrams and topographic maps • A complete copy of the SPR Plan with any amendments • The cause(s) of such spill, including a failure analysis of system or subsystem in which failure occurred • The corrective actions and/or countermeasures taken, including an adequate description of equipment repairs and/or replacements • Additional preventive measures taken or contemplated to minimize the possibility of reoccurrence • Such other information as the Regional Administrator may reasonably require pertinent to the Plan or spill event
5	Spill of Hazardous Substances in Excess of the Reportable Quantity — Table 302.4 (40 CFR 302.4 and Attachment K of this SPR) lists the spill quantity of hazardous substances that triggers reporting under 40 CFR 302. (Use "Final RQ" column) If a hazardous substance does not have a reportable quantity, use 100 pounds.	A, B, C, G E	Immediately Within 2 hours	• Facility name and address • Reporter's name and phone number • Type and quantity of material spilled • Time of spill • Is spill continuing? • Location of spill • Current response action
6	Discharge to Sanitary Sewer — Accidental spill of petroleum product, hazardous waste/material, or any other material which by reason of their nature or quantity are sufficient to cause fire or explosion or be injurious in any other way to the sewerage system or to the operation of the waste reclamation facilities.	A, E, F B, E	Immediately Immediately (depending upon substance and quantity)	• Facility name and address • Reporter's name and phone number • Type and quantity of material spilled • Time of spill • Is spill continuing? • Location of spill • Current response action

Notes:

A Tennessee Emergency Management Agency — (800) 262-3300/Local TDEC Office (901) 368-7939

B NRC — (800) 424-8802

C USEPA, Region 4 — (404) 562-8700 (NRC will call)

D U.S. Coast Guard, 8th District Marine Safety Office — (901) 544-3912 x2122 (NRC will call)

E Memphis-Shelby Emergency Management Agency / City of Memphis Fire Department — (901) 458-1515 / 911

F City of Memphis' WWTP — (901) 353-2392

G City of Memphis or Shelby County Storm Water Hotline — City at (901) 576-6721 / County at (901) 545-3870



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