

US Army Corps of Engineers Louisville District

# **Solicitation For** Manned/Unmanned Tactical Vehicle Lab

(MUMT), Detroit Arsenal, Detroit, MI

P2: 506474

**Design-Bid-Build** 

# Specifications - Vol 1 of 3 (Div 00-07) Certified Final Design

# 12 May 2025 W912QR25R0052

ARIMS: 200A Disposition: Maintain for 15yrs after construction

SOLICITATION, OFF	ER,	1. SOLICITATION NO.	2. TYI	PE OF : SEALE	SOLICITATION D BID (IFB)	3. DATE ISSUED 12-May-2025	PAGE OF PAGES
(Construction, Alteration, or	r Repair)	W912QR25R0052		NEGOT	IATED (RFP)		1 OF 72
IMPORTANT - The "offer" s	section o	n the reverse must be fully	y comple	eted b	y offeror.	1	
4. CONTRACT NO.		5. REQUISITION/PURCHAS	E REQUE	ST NO		6. PROJECT NO.	
7. ISSUED BY	00	DDE W912QR		8. AD	DRESS OFFER TO	(If Other Than Item 7)	CODE
U. S. ARMY ENGINEER DISTRICT, LOUISVILLE 600 DR. MARTIN LUTHER KING, JR. PLACE ROOM 821 LOUISVILLE KY 40202-2239			S	ee Item 7			
TEL: 502.315.7494	F	FAX:		TEL		FAX:	
9. FOR INFORMATION	A. NAME				B. TELEPHONE N	O. (Include area code)	(NO COLLECT CALLS)
CALL:	STEPHAN	NIE DREES			502-315-3270		
			SOLICI	ΤΑΤΙΟ	N		
NOTE: In sealed bid solici	tations "	offer" and "offeror" mean	"bid" a	nd "bi	dder".		
10. THE GOVERNMENT REQU	IRES PERF	FORMANCE OF THE WORK DES	SCRIBED	IN THE	SE DOCUMENTS	(Title, identifyin	g no., date):
Request for Proposal for the Warren, Ml.	Manned/L	Jnmanned Tactical Vehicle Lab	for the C	Ground	Vehicle Systems (	Center at Detroit Arsenal I	ocated in
The magnitude of construction	on listed in	FAR 36.204(h) is more than \$7	10,000,00	00.00.			
NAICS Code 236220. Size St by the NAICS code. If the ve small business.	andard \$4 endor size	5,000,000. Please note that bu is not listed correctly for a par	isiness si ticular N⁄	ize in tl AICS co	ne System for Aw ode in SAM, the bu	ard Management (SAM) i siness w ill be considere	s determined d other than a
This is a Full and Open procu	irement.						
PLEASE NOTE: SAM is completely free of charge for both registrants and users.							
14 The Caster to the little i	mart.	10 · · ·			850	a alam dan da 🛛 🕅	
11. The Contractor shall begin performance within <u>'</u> calendar days and complete it within <u>obc</u> calendar days after receiving award. X notice to proceed. This performance period is X mandatory performance (See FAR 52 211-10							
12 A. THE CONTRACTOR MUS	ST FURNIS	HANY REQUIRED PERFORMA	NCEANE		IENT BONDS?	12B. CALENDA	RDAYS
(If "YES," indicate within how many calendar days after award in Item 12B.)				10			
A. Sealed offers in original and copies to perform the work required are due at the place specified in Item 8 by (hour) local time 16 Jun 2025 (date). If this is a sealed bid solicitation, offers must be publicly opened at that time. Sealed envelopes containing offers aball he marked to show the offersaria name and address, the solicitation number and the data and time offers are due.							
			ila il Un Tiù		מהים נחיב עמופי מחוע נוו		
C. All offers are subject to the	ns الا e (1) w ork	requirements and (2) other n	rovisione	and cl	auses incornorate	d in the solicitation in full t	text or by reference
<ul> <li>D. Offers providing less than</li></ul>							

SOLICITATION, OFFER, AND AWARD (Continued)										
OFFER					(Must be fu	Alteration, or Repair) (Must be fully completed by offeror)				
14. NAME AND ADDRESS OF OFFEROR (Include ZIP Code)					15. TELEPH	DNE NO. (II	nclude area d	; code)		
					16. REMITTA	NCE ADDRES	SS (Includ	e only if differe	ent than Iten	n 14)
					See Item	14				
CODE		FACILITY CO	DE							
17. The offeror agre	es to perfo	rm the work	required a	at the prices specif	ied below in st	ict accordanc	e w ith the te	rms of this sol	citation, if th	is offer is ater than
the minimum requir	ements sta	ted in Item 1	3D. Failu	re to insert any nur	nber means th	e offeror acce	pts the minin	num in Item 13	D.)	
AMOUNTS SE	E SCHEDU	E OF PRICE	5							
18. The offeror agree	es to furnis	sh any requir	ed perfor	mance and paymer	t bonds.					
		(The offer	or acknowle	19. ACKNOWLE edges receipt of amend	DGMENT OF A	MENDMENTS atation give n	umber and date	of each)		
AMENDMENT NO.										
DATE										
20A. NAME AND TH OFFER (Type or p	LE OF PER®	SON AUTHO	RIZED TO	SIGN	20B. SIGNA	TURE			20C. OFFER	DATE
				AWARD (To be c	ompleted by	Government	)			
21. ITEMS ACCEPTE	D:									
22. AMOUNT		23. ACCOL	INTING AN	ND A PPROPRIATION	IDATA					
24. SUBMIT INVOICE	ES TO ADDR	RESS SHOW	N IN	ITEM	25. OTH	IER THAN FUL	L AND OPEN	COMPETITION	PURSUANT	ТО
(4 copies unless otherv	vise specified	)			<u> </u> 10 l	J.S.C. 2304(c)		41 U.S.C.	253(c)	
26. ADMINISTERED	BY	COD	E		27. PAY	MENT WILL B	EMADEBY:	CODE		
		CONT	RACTING	OFFICER WILL C		M 28 OR 29	AS APPLICA	BLE		
28. NEGOTIATE	DAGREEME	INT (Contr	actor is req	uired to sign this	29.	AWARD (Cor	ntractor is not re	equired to sign th	is document.)	
to furnish and deliver	<i>copie</i> all items or p	s to issuing of erform all work	<i>ice.)</i> Cor , requisitior	tractor agrees is identified	Your off summate	er on this solicit s the contract.	ation, is hereby which consists	accepted as to of (a) the Gover	he items liste nment solicita	d. This award con- tion and
on this form and any o	continuation s	heets for the	consideratio	on stated in this	y our off	er, and (b) this c	ontract award.	No further contra	ictual docume	nt is
contract. The rights and obligations of the parties to this contract shall be			necessa	у.						
representations, certif	ications, and	specifications	or incorpor	ated by refer-						
30A. NAME AND TIT TO SIGN (Type or	LE OF CON	TRACTOR C	R PERSO	NAUTHORIZED	31A. NAM	E OF CONTRACT	ING OFFICER	(Typ	e or print)	
	-	T		_	TEL:		EM	AIL:		
SUD. CICINA I UNE			300. DA TI	=	31B. UN	TED STATES	OF AMERICA		31C. AV	VARD DATE
			BY							

Section 00 10 00 - Solicitation

PRICE BREAKOUT SCHEDULE

00 10 00 PRICE BREAKOUT SCHEDULE

OFFEROR'S NAME:

#### CONTRACT LINE-ITEM SCHEDULE

Line Ite No.	m Description	Unit	Amount	
BASE I	PROPOSAL			
0001.	<b>Primary Facility</b> : All work, materials, and labor required to construct the Manned Unmanned Tactical Vehicle Lab Building; includes all Base Proposal construction work required within a line five feet outside of the building, except that work covered by Item No.0002.	Job	\$	
0002.	<b>Secondary Facility</b> : All work, materials, and labor required to construct Supporting Facilities; includes all Base Proposal construction work required outside a line five feet outside of the building, except that work covered by Item No. 0001.	Job	\$	
		Total Base Proposal	\$	
	тот	AL PROPOSAL	\$	

#### NOTES FOR CONTRACT LINE ITEM (CLIN) SCHEDULE

<u>NOTE NO. 1.</u> To better facilitate the receipt and proposal process, all modifications to proposals are to be submitted on copies of the latest Contract Line Item (CLIN) schedules as published in the solicitation or the latest amendment thereto. In lieu of indicating additions/deductions to line items, all Offerors should state their revised prices for each item.

<u>NOTE NO. 2.</u> Offerors must insert a price on all numbered items including options of the CLIN Schedule. Failure to do so may result in the offer being unacceptable.

--END OF CLIN SCHEDULE-

# DELIVERY INFORMATION

CLIN	DELIVERY DATE	QUA
		· ·

ANTITY SHIP TO ADDRESS

DODAAC / CAGE Section 00 21 00 - Instructions

ELECTRONIC PROPOSAL SUBMISSION

ELECTRONIC PROPOSAL SUBMISSION

**Proposals**: ALL SUBMISSIONS TO THIS PROPOSAL ANNOUNCEMENT SHALL BE SUBMITTED ELECTRONICALLY THROUGH THE PROCUREMENT INTEGRATED ENTERPRISE ENVIRONMENT (PIEE) SOLICITATION MODULE. No paper copies, CD-ROMs or facsimile submissions will be accepted.

Electronic Proposal Submission is required through the PIEE-SOLICITATION MODULE (https://piee.eb.mil/). Instructions for uploading proposals are as follows:

1. Register in PIEE:

- a. Navigate to https://piee.eb.mil/
- b. Select Register [top right]
- c. Select Vendor
- d. Create a User ID and Password and follow the prompts [next]
- e. Create Security Questions [next]
- f. Complete your User Profile Information [next]
- g. Complete your Supervisor or Approving Official Information [next]
- h. Complete Roles
  - i. Step 1. Select SOL-Solicitation
  - ii. Step 2. Select Proposal Manager
  - iii. Step 3. Click Add Roles
  - iv. Step 4. Fill in our Location Code (CAGE Code) [next]
- i. Provide a justification for your registration [next]
- j. Follow the remaining prompts to submit your registration

2. Log into PIEE and select the Solicitation Icon.

3. Enter search criteria to find the solicitation. (Search Criteria can be the complete solicitation number, Solicitation Open Date, Response Due Date, Product or Service Code, NAICS, Set Aside code, Place of Performance Zip Code, Contracting Office DODAAC, or Status)

4. The search results display. Select the Solicitation Number link to open the solicitation.

5. The solicitation displays. The information is view only.

6. Scroll down to see the Contract Information and Attachments. The Attachments can be viewed by selecting the File link. Scroll back up to the top of the screen and click the Offer tab.

7. Click the Offer tab to Add and review current offers on the Solicitation. Click the Add button to add an offer to the Solicitation.

8. Select the applicable Cage Code for which submitting the proposal for. The list is prefiltered based on the Cage in

the Proposal Manager's profile.

9. It is important that interested parties CAREFULLY ensure their electronic files adhere to the following naming convention:

#### a. W912QR25R00052-FIRMNAME-VOLUME I b. W912QR25R00052-FIRMNAME-VOLUME II

Each file name shall begin with the solicitation number followed by the firm's name and a brief file description. Please see examples above.

**File Organization**: Although hard copies are not accepted, each file shall be clearly indexed, and logically assembled. Font size shall be 11 or larger. Pages shall be letter sized (larger page sizes (such as 11x17 foldouts, etc.) will be counted as two pages. Proposals shall be in a narrative format, organized and titled so that each section of the proposal follows the order and format of the factors. Information presented should be organized soas to pertain to only the evaluation factor in the section that the information is presented. Information pertaining to more than one evaluation factor should be repeated in each section for each factor.

**Upload Completion & Deadline**: Interested parties shall submit responses no later than the date specified on the solicitation document. The time & date of proposal receipt will be the upload completion delivery time & date recorded within PIEE-Solicitation. Do not assume that electronic submission will occur instantaneously. Large files (e.g. 10MB or more) will take some time to upload. Offerors should time their upload effort with prudence by not waiting until the last few minutes—this will allow for unexpected delays in the transmittal process. Offerors are encouraged to keep a copy of the upload confirmation for their record. Submissions after the deadline will be considered late and will be processed in accordance with FAR 15.208.

**Electronic Files**: Files shall be in their native format (i.e. doc, xls, ppt, etc.), or if in pdf format, shall be in searchable text. Text and graphics portfolios of the electronic copies shall be in a format readable by Microsoft Office or Adobe applications. Data submitted in a spreadsheet format shall be readable by MS Excel (all cells and formulas should be unlocked). Any information, presented in a proposal that the Offeror wants safeguarded from disclosure to other parties must be identified and labeled in accordance with the requirements of Provision "FAR 52.215-1, Instructions to Offerors – Competitive Acquisition (Nov 2021)," subparagraph (e), which is found in 00 21 00 Instructions of the RFP. The Government will endeavor to honor the restrictions against release requested by Offerors, to the extent permitted under United States law and regulations.

10. Upload the attachments that comprise the proposal by selecting Choose Files link.

11. After entering all necessary information enter a Signature Date an Click the Signature button.

12. The Sign Document pop-up will be displayed requiring the user to enter a Digital Pin and One Time Password (OTP). Click the Sign and Submit button to continue.

13. After successfully adding the Proposal a success message of the submission will be displayed and the proposal displayed collapsed. Users may expand and view all their proposals on a Solicitation. The Procurement Integrated Enterprise Environment (PIEE) help desk may be reached by calling telephone number

The Procurement Integrated Enterprise Environment (PIEE) help desk may be reached by calling telephone numbers 866-618-5988 for assistance.

#### PROJNET INSTRUCTIONS OFFEROR'S QUESTIONS AND COMMENTS

Technical inquiries and questions relating to proposal procedures or bonds are to be submitted via Bidder Inquiry in ProjNet at <u>http://www.ProjNet.org/ProjNet</u>. As noted below, offerors shall not submit their proposals via ProjNet. Offerors shall submit their proposals in accordance with the provisions stated in the solicitation.

To submit and review bid inquiry items, bidders will need to be a current registered user or self-register into system.

The Solicitation Number is: W912QR25R0052

The Bidder Inquiry Key is: **S9E6HC-EW2428** 

#### **Specific Instructions for ProjNet Bid Inquiry Access:**

- 1. From the ProjNet home page linked above, click on Quick Add on the upper right side of the screen.
- 2. Identify the Agency. This should be marked as USACE.
- 3. Key. Enter the **Bidder Inquiry Key** listed above.
- 4. Email. Enter the email address you would like to use for communication.
- 5. Select Continue. A page will then open stating a user account was not found and will ask you to create one using the provided form.
- 6. Enter your First Name, Last Name, Company, City, State, Phone, Email, Secret Question, Secret Answer, and Time Zone. Make sure to remember your Secret Question and Answer as they will be used from this point on to access the ProjNet system.
- 7. Select Add User. Once this is completed you are now registered within ProjNet and are currently logged into the system.

#### Specific Instructions for Future ProjNet Bid Inquiry Access:

- 1. For future access to ProjNet, you will not be emailed any type of password. You will utilize your
- 2. Secret Question and Secret Answer to log in.

- 3. From the ProjNet home page linked above, click on Quick Add on the upper right side of the screen.
- 4. Identify the Agency. This should be marked as USACE.
- 5. Key. Enter the Bidder Inquiry Key listed above.
- 6. Email. Enter the email address you used to register previously in ProjNet.
- 7. Select Continue. A page will then open asking you to enter the answer to your Secret Question.
- 8. Enter your Secret Answer and click Login. Once this is completed you are now logged into the
- 9. system.

From this page you may view all bidder inquiries or add an inquiry.

Bidders will receive an acknowledgement of their question via email, followed by an answer to their question after it has been processed by our technical team.

Offerors are requested to review the specification in its entirety and to review the Bidder Inquiry System for answers to questions prior to submission of a new inquiry.

The call center operates weekdays from 8AM to 5PM U.S. Central Time Zone (Chicago). The telephone number for the Call Center is 800-428-HELP.

Offers will NOT be publicly opened. Information concerning the status of the evaluation and/or award will NOT be available after receipt of proposals.

#### **NOTES:**

- 1. Offerors shall not submit their proposals via ProjNet, but in accordance with the provisions stated in the solicitation. Any questions regarding acceptable means of submitting offers shall be made directly to the Contract Specialist identified in the solicitation.
- 2. Government responses to technical inquiries and questions relating to proposal procedures or bonds that are submitted to ProjNet in accordance with the procedures above are not binding on the Government unless an amendment is issued on Standard Form 30. In the case of any conflicts, the solicitation governs. Any changes or revisions to the solicitation will be made by formal amendment. Government responses will be limited to:
  - (a) Notice that an amendment will be issued; (b) Reference to an existing requirement contained in the solicitation; or (c) Notice that a response is not necessary.
- 3. The ability to enter technical inquiries and questions relating to proposal procedures or bonds will be disabled ten (10) calendar days prior to the closing date stated in the solicitation. No Government responses will be entered into the ProjNet system within five (5) calendar days prior to the closing date stated in the solicitation.

Section 00 22 00 - Supplementary Instructions

#### EVALUATION CRITERIA

#### PROCEDURES FOR SUBMITTAL OF OFFERS AND PROPOSAL EVALUATION CRITERIA

#### 1. Overview.

- 1.1 The intent of this solicitation is to select one contractor for the construction of a new Manned/Unmanned Tactical Vehicle Lab for the Ground Vehicle Systems Center at Detroit Arsenal (DTA), located in Warren, MI. The basis of award is the Best Value Trade-Off Process. The Contracting Officer will award a firm fixed price contract to the responsible offeror whom the Source Selection Authority (SSA) determines conforms to the solicitation, is fair and reasonable, and offers the best overall value to the Government, all factors considered. The Government reserves the right to accept other than the lowest priced offer or to reject all offers.
- 1.2 This project is for the design/bid/build construction of a new Ground Transport Equipment Building to support eight tactical vehicle integration labs. Project includes associated vehicle parking with vehicle integration labs, bench lab, and engineering-design space to enable the integration of technology required for the transformation of current combat systems to manned-unmanned systems to meet the Army's strategic program delivery requirements, information systems, fire pump and alarm systems, Intrusion Detection System (IDS) installation, Cybersecurity and Energy Monitoring Control Systems (EMCS) connection. Sustainability and energy enhancement measures are included. Supporting facilities include site development, utilities and connections, lighting, paving, parking, walks, curbs and gutters, storm drainage, information systems for the entire facility. Measures in accordance with the Department of Defense (DoD) Minimum Antiterrorism for Buildings standards will be provided. Comprehensive building and furnishings related interior design services are required.
- 1.3 The estimated target ceiling for contract award is \$30,000,000 based on the funds made available for this project. The Government cannot guarantee that additional funds will be available for award. Offerors are under no obligation to approach this ceiling.

#### 2. Submittal of offers.

- 2.1 Offerors submitting proposals for this project should limit submissions to data essential for evaluation of proposals so that a minimum of time and monies will have been expended in preparing information required herein. However, in order to be effectively and equitably evaluated, the proposals must include information sufficiently detailed to clearly describe the offeror's capability for successfully completing the solicited project. Requirements stated in this Request for Proposal (RFP) are minimums. Proposals should follow in the order of sequence set forth in the RFP. Information provided out of sequence may not be evaluated and may result in the offeror's disqualification from award.
- 2.2 All submissions to this proposal announcement shall be submitted electronically and shall be submitted no later than the time and date specified in Block 13 of Standard Form 1442. Please refer to and follow the instructions specified in the Electronic Proposal Submission Instructions, attached herein.
- 2.3 Offerors are required to submit a proposal consisting of the information identified in paragraphs 2.4 and 2.5 below. All proposal materials shall be submitted electronically with a table of contents and section dividers. The sections should parallel the submission requirements identified herein.
- 2.4 Volume I shall be submitted electronically in accordance with the Proposal Submission Instructions in Section 00 21 00 and include the following information:
  - Volume I Factor I: Past Performance
  - Volume I Factor II: Management Plan
  - Volume I Factor III: Small Business Participation Plan

\*NOTE: Failure to place the required submission information under the appropriate tab may result in a lower rating if the evaluators cannot readily find the appropriate information. Any specified page limits will be strictly adhered to and enforced. Information submitted that exceeds the specified limit will not be evaluated.

Volume II shall be submitted electronically in accordance with the Proposal Submission Instructions in Section 00 21 00 and include the following information:

- Volume II Tab A: Standard Form 1442 and Price Breakout Schedule
- Volume II Tab B: Joint Venture Agreements •
- Volume II Tab C: Evidence of Ability to Obtain Bonding and Proof of Financial Ability •
- Volume II Tab D: Pre-Award Information •
- Volume II – Tab E: Subcontracting Plan

NOTE: Failure to place the required submission information under the appropriate tab may result in a lower rating if the evaluators cannot readily find the appropriate information.

#### 3. Proposal Evaluation Process.

- 3.1. A Source Selection Evaluation Board (SSEB) comprised of representatives of the Corps of Engineers, User/Customer, and other required personnel will evaluate the proposals. Offerors are advised that the technical evaluation and rating of proposals will be conducted in strict confidence. Technical proposals (Volume I) will be reviewed and rated without knowledge of the price offered. The number and identities of offerors are not revealed to anyone not involved in the evaluation and award process or to other offerors. Proposals will be evaluated based on the factors described herein, and the basis of award is a Best Value Trade-Off, as stated above.
- 3.2 The evaluation process essentially consists of four parts: proposal compliance review and responsibility review, technical evaluation, price evaluation, and price/technical trade-off analysis.
- 3.2.1 Proposal Compliance Review: This is an initial review to ensure that all required forms and certifications are complete and that the offeror is financially capable of sustaining performance under the contract and is able to obtain the required level of performance and payment bonds from an acceptable surety.
- 3.2.2 Technical Evaluation: The SSEB will evaluate and rate the Volume I proposals against the RFP requirements. Factor I – Past Performance will be rated using Tables 1 and 2 below. The rating will be based on overall confidence in performance, with the final confidence assessment rating based on the extent of recent, relevant past experience and the quality of the offeror's performance. Factor II -Management Plan will be rated using Table 3 below. Factor III - Small Business Participation Plan will be rated using Table 4 below.
- 3.2.3 Price Evaluation: The SSEB and Contracting Officer/SSA will evaluate price proposals independent of the technical evaluation. The SSEB will not have access to price information until completion of the technical evaluation.
- 3.2.4 Price/Technical Trade-off Analysis: After all the above evaluations are complete, the Contracting Officer/SSA will compare the relative advantages and disadvantages of technical proposals and compare prices. The Source Selection Authority (SSA) will then consider all factors to select the proposal offering the best value to the Government.

#### 4. Proposal Information and Related Evaluation Factors.

4.1 Proposals will be evaluated in accordance with the factors and sub factors below, listed in relative order of importance. All evaluation factors, other than cost or price, when combined are considered approximately equal to price. The Government intends to evaluate proposals and award a contract without discussions with offerors (except clarifications as described in FAR 15.306(a)). Therefore, the offeror's initial proposal should contain the offeror's best terms from a cost or price and technical

2.5

standpoint. The Government reserves the right to conduct discussions if the Contracting Officer later determines them to be necessary. If the Contracting Officer determines that the number of proposals that would otherwise be in the competitive range exceeds the number at which an efficient competition can be conducted, the Contracting Officer may limit the number of proposals in the competitive range to the greatest number that will permit an efficient competition among the most highly rated proposals.

4.2	Volume	e I – Factor I – Past Performance	1 <sup>st</sup>
4.3	Volume	e I – Factor II –Management Plan	2 <sup>nd</sup>
4.4	Volume	e I – Factor III – Small Business Participation Plan	3 <sup>rd</sup>
4.5	Volume	e II - Price and Pro Forma Information	
	Tab A	Standard Form 1442 and Price Breakout Schedule	Not Rated
	Tab B	Joint Venture Agreement	Not Rated
	Tab C	Evidence of Ability to Obtain Bonding and Proof of Financial Ability	Not Rated
	Tab D	Pre-Award Information	Not Rated
	Tab E	Subcontracting Plan	Acceptable / Unacceptable

# 4.6 Ratings:

Evaluators will apply the adjectival rating for the definition that most closely matches the evaluation.

Past Performance Relevancy Ratings		
Rating	Description	
Very Relevant	Present/past performance effort involved essentially the	
	same scope and magnitude of effort and complexities	
	this solicitation requires.	
Relevant	Present/past performance effort involved similar scope	
	and magnitude of effort and complexities this	
	solicitation requires.	
Somewhat Relevant	Present/past performance effort involved some of the	
	scope and magnitude of effort and complexities this	
	solicitation requires.	
Not Relevant	Present/past performance effort involved little or none	
	of the scope and magnitude of effort and complexities	
	this solicitation requires.	

# TABLE 1

#### TABLE 2

Performance Confidence Assessments		
Rating	Description	
Substantial Confidence	Based on the offeror's recent/relevant performance	
	record, the Government has a high expectation that the	
	offeror will successfully perform the required effort.	
Satisfactory Confidence	Based on the offeror's recent/relevant performance	
	record, the Government has a reasonable expectation	
	that the offeror will successfully perform the required	
	effort.	
Neutral Confidence	No recent/relevant performance record is available or	
	the offeror's performance record is so sparse that no	
	meaningful confidence assessment rating can be	
	reasonably assigned. The offeror may not be evaluated	
	favorably or unfavorably on the factor of past	
	performance.	
Limited Confidence	Based on the offeror's recent/relevant performance	
	record, the Government has a low expectation that the	
	offeror will successfully perform the required effort.	
No Confidence	Based on the offeror's recent/relevant performance	
	record, the Government has no expectation that the	
	offeror will successfully perform the required effort.	

### TABLE 3

Technical / Risk Assessment Ratings		
Adjectival Rating	Description	
Outstanding	Proposal indicates an exceptional approach and understanding of the requirements and contains multiple strengths, and risk of unsuccessful performance is low.	
Good	Proposal indicates a thorough approach and understanding of the requirements and contains at least one strength, and risk of unsuccessful performance is low to moderate.	
Acceptable	Proposal meets requirements and indicates an adequate approach and understanding of the requirements, and risk of unsuccessful performance is no worse than moderate.	
Marginal	Proposal has not demonstrated an adequate approach and understanding of the requirements, and/or risk of unsuccessful performance is high.	
Unacceptable	Proposal does not meet the requirements of the solicitation, and thus, contains one or more deficiencies, and/or risk of unsuccessful performance is unacceptable. Proposal is unawardable.	

#### TABLE 4

Small Business Ratings		
Rating	Description	
Acceptable	Proposal clearly meets the minimum requirements of the solicitation.	
Unacceptable	Proposal does not clearly meet the minimum requirements of the solicitation.	

#### 4.7 Definitions

1. <u>Deficiency</u>. A material failure of a proposal to meet a Government requirement or a combination of significant weaknesses in a proposal that increases the risk of unsuccessful contract performance to an unacceptable level. See FAR 15.001.

2. <u>Strength.</u> An aspect of an offeror's proposal that has merit or exceeds specified performance or capability requirements in a way that will be advantageous to the Government during contract performance.

3. <u>Significant Strength.</u> An aspect of an offeror's proposal that has appreciable merit or appreciably exceeds specified performance or capability requirements in a way that will be appreciably advantageous to the Government during contract performance.

4. <u>Weakness.</u> A flaw in the proposal that increases the risk of unsuccessful contract performance. See FAR 15.001.

5. <u>Significant Weakness</u>. A flaw in the proposal that appreciably increases the risk of unsuccessful contract performance. See FAR 15.001.

6. <u>Uncertainty.</u> Any aspect of a non-cost/price factor proposal for which the intent of the offeror is unclear (e.g., more than one way to interpret the offer or inconsistencies in the proposal indicating that there may have been an error, omission, or mistake).

7. <u>Clarification</u>. Limited exchanges between the Government and offerors that may occur when award without discussions is contemplated. See FAR 15.306(a)(1).

8. <u>Adverse Past Performance</u>. Past performance information that supports a less than satisfactory rating on any evaluation. Adverse past performance that must be addressed with Offerors includes unfavorable comments received from sources such as those received from respondents from past performance questionnaires or interviews that have not been finalized within a formal rating system.

#### 5.0 Volume I – Factor I: Past Performance

#### 5.1 Submission Requirements:

- 5.1.1 Provide descriptions of up to three (3) projects substantially complete or completed by the Prime Contractor within the last five (5) years (from the solicitation issue date) that are similar to this project in size and scope. Projects completed more than five (5) years before the solicitation issue date may be considered for evaluation purposes but may lessen the overall relevancy rating for that project. Projects are considered substantially complete if they can be used for their intended purpose. An Indefinite Delivery Indefinite Quantity (IDIQ) contract may be submitted only if a single task order could be considered similar to this project. Task orders may not be combined in order for the project to be considered similar. NOTE: Renovation projects will NOT be considered similar in size or scope to the solicited requirement.
- 5.1.2 Projects considered similar in size would be new construction of 20,000 square feet or greater
- 5.1.3 Projects considered similar in scope to this project would include the following features:
  - a) New construction of an industrial, research, development, testing, maintenance and/or manufacturing facility that includes associated office/admin space.
  - NOTE: Warehouses and office/admin facilities will NOT be considered similar in scope.
- 5.1.4 The prime contractor must have self-performed at least 15 percent of the direct contract labor (including testing and layout personnel), exclusive of other general conditions or field overhead personnel, material, equipment, or subcontractors to be considered similar.
- 5.1.5 Additional consideration may be given for projects that contain the following features:
  - a) High bay space with bridge cranes to support industrial vehicle research, development, testing, and maintenance activities.
  - b) Previous USACE experience.
- 5.1.6 The following information shall be provided for each project:
  - a) Project Title, Location, and Contract Number/Unique Identifier.
  - b) Current percentage of construction complete and the date it was or will be complete.a. For projects that are not yet complete, provide description of work remaining to be
    - completed.
  - c) Scope of the project, to include purpose/use of facility.
  - d) Size of the project, differentiate square footage of new construction versus renovation if the project includes both.
  - e) Role of firm: Provide a description of the type of work performed and the percentage of work that was self-performed.
  - f) Dollar value of the project.
  - g) Customer primary point of contact (POC) and alternate POC (name, relationship to project, agency/firm affiliation, city, state, current and correct phone number, and current and correct email address).
- 5.1.7 Provide two references for all the projects identified in paragraph 5.1.1, 5.1.2 and 5.1.3. Reference information must include project name, location, owner's name, point of contact, telephone number, and email address.

For this factor, also include any ratings, letters, awards, etc. that support past performance on these projects. Any of this information that is submitted shall clearly identify to which of the submitted projects it pertains. A sample Past Performance Questionnaire is attached for your convenience. If used, the Past Performance Questionnaire must be submitted by the offeror with the proposal submission and **not** sent

directly to the agency from the reference. For each project, the offeror may provide information on problems encountered on the identified contracts and the offeror's respective corrective action.

**NOTE**: For purposes of evaluating past performance, the Prime Contractor is defined as the contractor identified in Block 14 of the Standard Form 1442. Projects performed by contractors other than the offeror, including, but not limited to, teaming partners, subcontractors, sister or parent companies, and affiliates will not be evaluated for past performance, unless those other contractors are part of a joint venture offeror as demonstrated by a signed joint venture agreement. If more than one contractor is listed in Block 14, then a signed joint venture must be submitted with the proposal and the joint venture shall be registered as such in the System for Award Management (SAM). However, each party of the Joint Venture (JV) must submit their own Unique Entity Identifier Number (formerly known as DUNS) with the JV proposal. Projects performed by other contractors than the offeror, such as teaming partners or subcontractors, will not be evaluated for past performance, unless those other contractors are part of a JV offeror as demonstrated by a signed JV agreement. If the offeror represents the combining of two or more companies as a JV for the purpose of this RFP, each company in the JV may submit project examples, but the total submitted by the JV will not exceed three (3).

- 5.2 <u>Evaluation Criteria</u>:
- 5.2.1 The SSEB will first evaluate the relevancy of recent past performance identified in the proposal in response to paragraph 5.1 above. By using the criteria identified above, the SSEB will determine how relevant a past project is when compared to the scope, size, and magnitude of effort and complexities of the solicited project. A relevancy rating will be assigned to each submitted project using the Past Performance Relevancy Ratings table above.
- 5.2.2 The SSEB will next review how well the offeror performed on those projects. The Government reserves the right to check any or all cited references to verify supplied information and to assess owner satisfaction. The Government also reserves the right to not contact the provided references. In addition to the information submitted by the offeror, the Government reserves the right to review any other sources of relevant information for evaluating past performance, including projects other than those submitted by the offeror. The Government reserves the right to review past performance information retrieved through the Past Performance Information Retrieval System (PPIRS), including Contractor Performance Assessment Reporting System (CPARS), using all CAGE/Unique Entity Identifier numbers. Other sources may include, but are not limited to, past performance information retrieved from inquiries of owner representative(s), Federal Awardee Performance and Integrity Information System (FAPIIS), Electronic Subcontract Reporting System (eSRS), and any other known sources not provided by the offeror.
- 5.2.3 The SSEB will review all past performance information collected and determine the quality of the offeror's performance, general trends, and usefulness of the information and incorporate this information into the performance confidence assessment. The SSEB will assign a final, overall Performance Confidence rating, using the ratings in the Performance Confidence Assessment table above, based on the SSEB's assessment of (1) the degree of the offeror's recent, relevant experience, and (2) how well the offeror performed that experience.

#### 6.0 Volume I – Factor II: Management Plan

#### 6.1 **Submission Requirements:**

Provide a management plan narrative that describes how you'll successfully deliver the project. The Management Plan shall at a minimum include the following information:

- Discuss the key members of your project delivery team (e.g. PM, Superintendent, Quality Control Team, SSHO), and how they'll work together to streamline construction and delivery of this project.
- Identify significant challenges/areas of risk specific to this project and provide your plan for mitigating these risk/constraints during contract performance.

- Discuss the key subcontractors you will utilize to accomplish this work and how they will be managed.
- Discuss the key considerations and milestones associated with the construction schedule and how you'll execute the work to deliver the project within the period of performance.
- Discuss plan for managing construction to achieve LEED Silver requirement.

There is a page limit of eight (8) single sided, 8.5" x 11" pages, using a minimum font size of 11 and a minimum margin of one-half inch on all sides for this factor. Any information that exceeds these page limits will not be evaluated.

#### 6.2 **Evaluation Criteria:**

Narratives will be evaluated based on the level of understanding of the work and the involvement the contractor will have in the management, oversight, control, and coordination of the work performed during construction of the project. Narratives that demonstrate a clear understanding of the project requirements and provide a thorough approach for successfully managing the solicited project and/or mitigating project specific risk items, may be rated more favorably by the SSEB.

The offeror's organizational chart will be evaluated based on the clarity, adequacy, capabilities, and strengths for successfully managing the solicited project.

#### 7.0 Volume I – Factor III: Small Business Participation Plan

7.1 Submission Requirements

ALL OFFERORS ARE REQUIRED TO SUBMIT A SMALL BUSINESS PARTICIPATION PLAN. The Small Business Participation Plan shall be based on the offeror's best effort and is required to address each of the following areas individually:

- The extent to which the small business programs listed in FAR 19 (small business, small disadvantaged business, woman-owned small business, HubZone, service disabled veteran owned small business, etc.) are specifically identified in the Small Business Participation Plan.
- The extent of participation of such firms in terms of the value of the total acquisition in %'s for the base year and for each individual option year; the extent of commitment to use such firms (for example, enforceable commitments, i.e., teaming agreements signed, are to be considered more heavily than non-enforceable ones).
- The complexity and variety of the work small firms are to perform on this acquisition.
- The practicality of the Small Business Participation Plan, i.e., aggressive goals.

The Small Business Participation Plan shall be organized as follows:

- (1) Prime Contractor type of business (check all that apply):
  - () Large
  - () Small (also check type of small business)
  - () Small Non-Disadvantaged Business
  - () Small Disadvantaged Business
  - () Woman-Owned Small Business
  - () HUBZone Small Business
  - () Veteran Owned Small Business
  - () Service Disabled, Veteran Owned Small Business
- (2) Percentage of your participation as a prime contractor: \_\_\_\_\_\_%

NOTE: Small Business primes' self-performance counts as Small Business Participation, and small business primes may achieve small business participation goals through their own performance/participation as a prime and/or through subcontracting to other small businesses.

(3) Percentage of total contract value of subcontracts planned for:

	% of Total Contract
	Value
Large	%
Total Small	%
Small Non-Disadvantaged	%
Small Disadvantaged	%
Small Woman Owned	%
Small HUB Zone	%
Small Veteran Owned	%
Small Service Disabled Veteran Owned	%

Each percentage above shall be accompanied by detailed supporting documentation regarding individual commitments.

NOTE: The sum of the percentages of Small Non-Disadvantaged and Small Disadvantaged should equal the entries for the Total Small; however, the sum of all of the percentages need not equal 100% since the prime is not included and individual subcontractors may be counted towards more than one category.

	Name of	Type of
	Company	Service/Supply
Large		
Small Non-Disadvantaged		
Small Disadvantaged		
Small Woman Owned		
Small HUB Zone		
Small Veteran Owned		
Small Service Disabled Veteran Owned		

(4) List principal supplies/services (be specific) to be subcontracted to:

- (5) Prior Performance Information: Provide any information substantiating the offeror's track record of utilizing small business on past contracts.
- (6) For Large *and* Small Businesses provide descriptive information for all small business categories. Any information concerning long-term relationships with Small Business subcontractors, such as mentor-protégé relationships, should be provided.
- (7) Extent of Commitment: Provide documentation regarding enforceable commitments to utilize any small business category as defined in FAR Part 19 as subcontractors.
- (8) Small Business Subcontracting Plan: Each *Large Business Offeror* shall provide a Small Business Subcontracting Plan that contains all of the elements required by FAR Clause 52.219-9 Alt II. This Plan *shall* be submitted separately from the Small Business Participation information required above which applies to both Large and Small Businesses. The Subcontracting Plan is not a requirement for evaluation in source selection but rather a requirement for award to a Large Business. The approved Small Business Subcontracting Plan will be incorporated into any resultant contract(s).

#### 7.2 Evaluation Criteria:

#### ALL OFFERORS ARE REQUIRED TO SUBMIT A SMALL BUSINESS PARTICIPATION PLAN.

The Small Business Participation Plan will be evaluated based on the offeror's best efforts, the level of small business commitment that is being demonstrated for the proposed acquisition, and the prior level of commitment to utilizing small businesses in performance of prior contracts. The Small Business Participation Plan must meet the minimum Total Small Business Participation goal of **15%** of the total contract value (through collective small business participation from any type of small business or subcategory small business).

Pursuant to DFARS PGI 215.304(c), the following elements will be considered in evaluating an offeror's Participation Plan:

- The extent to which such firms, as defined in FAR Part 19, are specifically identified in plans;
- The extent of commitment to use such firms (enforceable commitments will be weighted more heavily than non-enforceable ones);
- The complexity and variety of the work such firms are to perform;
- The realism of the plans;
- Past performance of offerors in complying with the requirements of the Subcontracting Plan Goals for such firms and monetary targets for participation;
- The extent of participation of such firms in terms of the proposed subcontracted value; and

• The extent to which the offeror provides detailed explanations/documentation supporting the proposed participation percentages, or lack thereof. The Department of Defense (DOD) has established small business goals to help ensure small business receives a fair proportion of DOD awards.

#### 8.0 Volume II - Price and Proforma Information

#### 8.1 Tab A - Standard Form 1442 and Proposal Price Breakout Schedule.

#### 8.1.1 <u>Submission Requirements:</u>

The offeror shall complete and submit Standard Form 1442 and Section 00 10 00, Proposal Price Breakout Schedule.

#### 8.1.2 <u>Evaluation Criteria:</u>

The price will be evaluated on base proposal plus all options. The price will be evaluated for fairness and reasonableness through the use of a price analysis. Price will also be checked for unbalancing of line items. Offerors are cautioned to distribute costs appropriately.

#### 8.2 Tab B - Joint Venture Agreements

#### 8.2.1 <u>Submission Requirements</u>:

If more than one contractor is listed in Block 14, or the offeror listed in Block 14 is a joint venture (JV), then a signed JV agreement must be submitted with the proposal and the offeror shall be registered in the System for Award Management (SAM) as a legal entity separate from the individual joint venture members. However, each member of the JV must submit its own Unique Entity Identifier (formally DUNS number) with the proposal. A copy of the offeror's signed joint venture agreement shall be submitted with the proposal.

Small business offerors (e.g., 8(a), HUBZone, SDVOSB) submitting a proposal as a JV or Mentor-Protégé shall submit evidence from the offeror's SBA Servicing Agency that the offeror has notified and discussed the proposed joint venture for this specific project with the appropriate SBA Representative or Business Opportunity Specialist. Joint Venture agreements and approved 8(a) Mentor-Protégé agreements must be submitted with the proposal.

#### 8.2.2 Evaluation Criteria:

This information will be used for the purpose of completing the Pre-Award Survey and will not be rated. Joint Venture Agreements and Mentor-Protégé agreements must comply with the relevant regulations in Title 13 of the Code of Federal Regulations in order for an offeror to be eligible for any small business-related price preference.

#### 8.3 Tab C – Evidence of Ability to Obtain Bonding and Proof of Financial Ability

#### 8.3.1 Submission Requirements:

A. Financial Capability. Submit Proof of Financial Ability (Most recent financial statement covering assets and liabilities). Include the name, address, and telephone number of offeror's banking institution. If the offeror is a joint venture, submit this information for all joint venture members.B. Bonding Capability. Submit information showing offeror's ability to be bonded for this project. Include the name, address, and telephone number of the offeror's bonding company.

#### 8.3.2 <u>Evaluation Criteria:</u>

This information will be used for the purpose of completing the Pre-Award Survey and will not be rated. See FAR Part 28 for information related to bonds.

#### 8.4 Tab D – Pre-Award Information

#### 8.4.1 <u>Submission Requirements:</u>

- A. The offeror shall submit one completed copy of Section 00 45 00, Representations and Certification.
- B. The offeror shall submit the following information:
  - a) Number of years the firm has been in business
  - b) Name, address, and telephone numbers of two credit/trade references
  - c) A list of present commitments, including the dollar value

If the offeror is a joint venture, submit this information for all joint venture members.

#### 8.4.2 <u>Evaluation Criteria:</u>

This information will be used for the purpose of completing the Pre-Award Survey and will not be rated.

#### 8.5 Tab E - Subcontracting Plan

#### 8.5.1 Submission Requirements:

Large business offerors shall submit a Subcontracting Plan in accordance with FAR Clauses 52.219-8 and 52.219-9 Alt II. To be acceptable, plans must adequately address the required statutory elements and provide sufficient information to enable the Contracting Officer to answer affirmatively questions 1 through 13 of Appendix DD, Part 2, AFARS 5119.705-4. The offeror may use the attached sample subcontracting plan as a starting point. Percentage goals apply to the total amount being subcontracted.

#### 8.5.2 Evaluation Criteria:

Submitted information will be evaluated for acceptability in accordance with AFARS 5119.705. To be acceptable, subcontracting plans must:

(a) Adequately address the required statutory elements.

(b) Provide sufficient information to enable the Contracting Officer to answer affirmatively questions 1 through 13 of Appendix DD, Part 2, AFARS 5119.705-4, a copy of which is attached.

(c) To be acceptable, subcontracting plans must meet all of the requirements outlined in Appendix DD, Part 3, AFARS 5119.705. If discussions with offerors are necessary, those areas where the plan is deficient will be reviewed with each offeror with the goal of correcting deficiencies.

NAVFAC/USACE PAST PERFORMANCE QUESTIONNAIRE (Form PPQ-0)			
CONTRACT INFORMATION (Contractor to complete Blocks 1-4)			
1. Contractor Information			
Firm Name:	CAGE Code:		
Address: DUNs Number:			
Phone Number:	Phone Number:		

Email Address:
Point of Contact: Contact Phone Number:
2. Work Performed as:
Percent of project work performed:
11 subcontractor, who was the prime (Name/Phone #):
3. Contract Information
Contract Number: Daliyary/Task Order Number (if annlicable):
Contract Type: $\Box$ Firm Fixed Price $\Box$ Cost Reimbursement $\Box$ Other (Please specify):
Contract TypeThin Tixed TheeCost ReinbursementOuter (Tease speeny).
Contract Location:
Award Date (mm/dd/yy):
Contract Completion Date (mm/dd/yy):
Actual Completion Date (mm/dd/yy):
Explain Differences:
Original Contract Price (Award Amount):
Final Contract Price (to include all modifications, if applicable):
Explain Differences:
4 Project Description.
Complexity of Work High Med Routine
How is this project relevant to project of submission? ( <i>Please provide details such as similar equipment, requirements</i> .
conditions, etc.)
CLIENT INFORMATION (Client to complete Blocks 5-8)
5. Client Information
Name:
Title:
Phone Number:
Email Address:
6. Describe the client's role in the project:
7. Date Questionnaire was completed (mm/dd/yy):
8. Client's Signature:

NOTE: NAVFAC/USACE REQUESTS THAT THE CLIENT COMPLETES THIS QUESTIONNAIRE AND SUBMITS DIRECTLY BACK TO THE OFFEROR. THE OFFEROR WILL SUBMIT THE COMPLETED QUESTIONNAIRE TO USACE WITH THEIR PROPOSAL, AND MAY DUPLICATE THIS QUESTIONNAIRE FOR FUTURE SUBMISSION ON USACE SOLICITATIONS. THE GOVERNMENT RESERVES THE RIGHT TO VERIFY ANY AND ALL INFORMATION ON THIS FORM.

# ADJECTIVE RATINGS AND DEFINITIONS TO BE USED TO BEST REFLECT YOUR EVALUATION OF THE CONTRACTOR'S PERFORMANCE

(E) Exceptional       Performance meets contractual requirements and exceeds many to the Government/Owner's benefit. The contractual performance of the element or sub-element being assessed was accomplished with few minor problems for which corrective actions taken by the contractural requirements and exceeds some to the Government's/Owner's benefit. The contractual performance of the element or sub-element being assessed was accomplished with some minor problems for which corrective actions taken by the Contractor appear or were effective.       An Exceptional rating is appropriate when the Contractors exceessfully performed a significant weaknesses identified.         (VG) Very Good       Performance meets contractual requirements and exceeds some to the Government's/Owner's benefit. The contractors appear or which corrective actions taken by the Contractor socessfully performed a significant weaknesses identified.         (S) Satisfactory       Performance meets minimum contractual requirements. The contractual performance of the element or sub-element contains some minor problems for which corrective actions taken by the Contractor appear or were satisfactory.       A Satisfactory rating is appropriate when the Contractor socessfully performed a significant weaknesses identified. Per DOD policy, a fundamental principle of assigning rating is that Contractors will not be assessed a rating lower than Satisfactory solely for not performing beyond the requirements. The contractual performance of the element or sub-element contains some graper only marginally effective or were not fully implemented.         (M) Marginal       Performance does not meet some contractual requirements of the contractor's proposed actions appear only marginally effective.       An Unsatisfactory rating is appropriate when the contractor had trouble overcoming and t	RATING	DEFINITION	NOTE			
(VG) Very GoodPerformance meets contractual requirements and exceeds some to the Government's/Owner's benefit. The contractual performance of the element or sub- element being assessed was accomplished with some minor problems for which corrective actions taken by the Contractor were effective.A Very Good rating is appropriate when the Contractor successfully performed a significant event that was a benefit to the Government/Owner. There should have been no significant event may minor problems, or major problems that the Contractor requirements. The contractual performance of the element or sub-element contains some minor problems for which corrective actions taken by the Contractor appear or were satisfactory.A Satisfactory rating is appropriate when there were only minor problems, or major problems, or major problems, or major problems, or major problems, or major problems, or major gratings is that Contractors will not be assessed a rating lower than Satisfactory solely for not performing dering the element or sub-element being assessed reflects a serious problem for which the Contractor has not yet identified corrective actions. The Contractor's proposed actions appear only marginally effective or were not fully implemented.A Nutsatisfactory rating is appropriate when mitriple significant events occurred from which the contractor had trouble overcoming and that impacted the contractor had trouble overcoming and that impacted the Government/Owner. A singular problem(s) for which the Contractor's corrective actions appear or were ineffective.A Nutsatisfactory rating is appropriate when mitriple significant events occurred from which the contractor had trouble overcoming and that impacted the Government/Owner. A singular problem, however, could be of such serious magnitude that i alone	(E) Exceptional	Performance meets contractual requirements and exceeds many to the Government/Owner's benefit. The contractual performance of the element or sub-element being assessed was accomplished with few minor problems for which corrective actions taken by the contractor was highly effective.	An Exceptional rating is appropriate when the Contractor successfully performed multiple significant events that were of benefit to the Government/Owner. A singular benefit, however, could be of such magnitude that it alone constitutes an Exceptional rating. Also, there should have been NO significant weaknesses identified.			
(S) SatisfactoryPerformance meets minimum contractual requirements. The contractual performance of the element or sub-element contains some minor problems for which corrective actions taken by the Contractor appear or were satisfactory.A Satisfactory rating is appropriate when there were only minor problems, or major problems that the Contractor recovered from witholut impact to the contract. There should have been NO significant weaknesses identified. Per DOD policy, a fundamental principle of assigning ratings is that Contractors will not be assessed a rating lower than Satisfactory solely for not performing beyond the requirements of the contract.(M) MarginalPerformance does not meet some contractual requirements. The contractual performance of the element or sub-element being assessed reflects a serious problem for which the Contractor has not yet identified corrective actions. The Contractor's proposed actions appear only marginally effective or were not fully implemented.An Unsatisfactory rating is appropriate when multiple significant events occurred from which the contractor had trouble overcoming and that impacted the Government/Owner. A singular problem(s) for which the Contractor's corrective actions appear or were ineffective.An Unsatisfactory rating is appropriate when multiple significant events occurred from which the contractor had trouble overcoming and that impacted the Government/Owner. A singular problem, for which the Contractor's corrective actions appear or were ineffective.(V) Not (N) Not (N) Not (N) Not (N) Not (N) Not (N) Not (N) Not (N) Not 	(VG) Very Good	Performance meets contractual requirements and exceeds some to the Government's/Owner's benefit. The contractual performance of the element or sub- element being assessed was accomplished with some minor problems for which corrective actions taken by the Contractor were effective.	A Very Good rating is appropriate when the Contractor successfully performed a significant event that was a benefit to the Government/Owner. There should have been no significant weaknesses identified.			
(M) MarginalPerformance does not meet some contractual requirements. The contractual performance of the element or sub-element being assessed reflects a serious problem for which the Contractor has not yet identified corrective actions. The Contractor's proposed actions appear only marginally effective or were not fully implemented.A Marginal rating is appropriate when a significant event occurred from which the Contractor had trouble overcoming and that impacted the Government/Owner.(U) UnsatisfactoryPerformance does not meet most contractual requirements and recovery is not likely in a timely manner. The contractor's problem(s) for which the Contractor's corrective actions appear or were ineffective.An Unsatisfactory rating is appropriate when multiple significant events occurred from which the contractor had trouble overcoming and that impacted the Government/Owner. A singular problem(s) for which the Contractor's corrective actions appear or were ineffective.(N) Not ApplicableNo information or did not apply to your contractRating will be neither positive nor negative.	(S) Satisfactory	Performance meets minimum contractual requirements. The contractual performance of the element or sub-element contains some minor problems for which corrective actions taken by the Contractor appear or were satisfactory.	A Satisfactory rating is appropriate when there were only minor problems, or major problems that the Contractor recovered from without impact to the contract. There should have been NO significant weaknesses identified. Per DOD policy, a fundamental principle of assigning ratings is that Contractors will not be assessed a rating lower than Satisfactory solely for not performing beyond the requirements of the contract.			
(U) UnsatisfactoryPerformance does not meet most contractual requirements and recovery is not likely in a timely manner. The contractual performance of the element or sub-element contains serious problem(s) for which the Contractor's corrective actions appear or were ineffective.An Unsatisfactory rating is appropriate when multiple significant events occurred from which the contractor had trouble overcoming and that impacted the Government/Owner. A singular problem, however, could be of such serious magnitude that it alone constitutes an Unsatisfactory rating.(N) NotNo information or did not apply to your contractRating will be neither positive nor negative	(M) Marginal	Performance does not meet some contractual requirements. The contractual performance of the element or sub-element being assessed reflects a serious problem for which the Contractor has not yet identified corrective actions. The Contractor's proposed actions appear only marginally effective or were not fully implemented.	A Marginal rating is appropriate when a significant event occurred from which the Contractor had trouble overcoming and that impacted the Government/Owner.			
(N) Not No information or did not apply to your Rating will be neither positive nor negative	(U) Unsatisfactory	Performance does not meet most contractual requirements and recovery is not likely in a timely manner. The contractual performance of the element or sub-element contains serious problem(s) for which the Contractor's corrective actions appear or were ineffective.	An Unsatisfactory rating is appropriate when multiple significant events occurred from which the contractor had trouble overcoming and that impacted the Government/Owner. A singular problem, however, could be of such serious magnitude that it alone constitutes an Unsatisfactory rating.			
	(N) Not Applicable	No information or did not apply to your contract	Rating will be neither positive nor			

### TO BE COMPLETED BY CLIENT

#### PLEASE CIRCLE THE ADJECTIVE RATING THAT BEST REFLECTS YOUR EVALUATION OF THE CONTRACTOR'S PERFORMANCE.

	E	VG	S	М	TT	N
a) Quality of technical data/report preparation efforts	Е	vu	3	IVI	0	1
b) Ability to meet quality standards specified for technical performance	Е	VG	S	М	U	Ν
c) Timeliness/effectiveness of contract problem resolution without extensive customer guidance	Е	VG	S	М	U	Ν
d) Adequacy/effectiveness of quality control program and adherence to contract quality assurance requirements (without adverse effect on performance)	E	VG	S	М	U	N
2. SCHEDULE/TIMELINESS OF PERFORMANCE:						
a) Compliance with contract delivery/completion schedules including any significant intermediate milestones. <i>(If liquidated damages were assessed or the schedule was not met, please address below)</i>	E	VG	S	М	U	N
b) Rate the contractor's use of available resources to accomplish tasks identified in the contract	Е	VG	S	М	U	Ν
3. CUSTOMER SATISFACTION:						
a) To what extent were the end users satisfied with the project?	Е	VG	S	М	U	Ν
b) Contractor was reasonable and cooperative in dealing with your staff (including the ability to successfully resolve disagreements/disputes; responsiveness to administrative reports; efforts to keep lines of communication open)	E	VG	S	М	U	N
c) To what extent was the contractor cooperative, businesslike, and concerned with the interests of the customer?	Е	VG	S	М	U	Ν
d) Overall customer satisfaction	Е	VG	S	М	U	Ν
4. MANAGEMENT/ PERSONNEL/LABOR						
a) Effectiveness of on-site management, including management of subcontractors, suppliers, materials, and/or labor force?	Е	VG	S	М	U	Ν
b) Ability to hire, apply, and retain a qualified workforce to this effort	Е	VG	S	М	U	Ν
c) Government Property Control	Е	VG	S	М	U	Ν
d) Knowledge/expertise demonstrated by contractor personnel	Е	VG	S	М	U	Ν
e) Utilization of Small Business concerns	Е	VG	S	М	U	Ν
f) Ability to simultaneously manage multiple projects with multiple disciplines	Е	VG	S	М	U	Ν
g) Ability to assimilate and incorporate changes in requirements and/or priority, including planning, execution, and response to Government changes	Е	VG	S	М	U	Ν
h) Effectiveness of overall management (including ability to effectively lead, manage, and control the program)	Е	VG	S	М	U	Ν
5. COST/FINANCIAL MANAGEMENT						
a) Ability to meet the terms and conditions within the contractually agreed price(s)?	Е	VG	S	М	U	Ν
b) Contractor proposed innovative alternative methods/processes that reduced cost, improved maintainability, or other factors that benefited the client	Е	VG	S	М	U	Ν
c) If this is/was a Government cost type contract, please rate the Contractor's timeliness and accuracy in submitting monthly invoices with appropriate back-up documentation, monthly status reports/budget variance reports, compliance	Е	VG	S	М	U	Ν

with established budgets, and avoidance of significant and/or unexplained variances (under runs or overruns)						
d) Is the Contractor's accounting system adequate for management and tracking of costs? <i>If no, please explain in Remarks section.</i>		Yes			No	
e) If a Government contract, has it been partially or completely terminated for default or convenience or are there any pending terminations? <i>Indicate if show cause or cure notices were issued, or any default action in comment section below.</i>	Yes No				No	
f) Have there been any indications that the contractor has had any financial problems? <i>If yes, please explain below.</i>	Yes No					
6. SAFETY/SECURITY						
a) To what extent was the contractor able to maintain an environment of safety, adhere to its approved safety plan, and respond to safety issues? (Includes: following the users rules, regulations, and requirements regarding housekeeping, safety, correction of noted deficiencies, etc.)	E	VG	S	М	U	N
b) Contractor complied with all security requirements for the project and personnel security requirements.	Е	VG	S	М	U	N
7. GENERAL						
a) Ability to successfully respond to emergency and/or surge situations (including notifying the COR, PM, or Contracting Officer in a timely manner regarding urgent contractual issues).	Е	VG	S	М	U	N
b) Compliance with contractual terms/provisions (explain if specific issues)	Е	VG	S	Μ	U	Ν
c) Would you hire or work with this firm again? (If no, please explain below)		Yes			No	
d) In summary, provide an overall rating for the work performed by this Contractor.	Е	VG	S	М	U	Ν

Please provide responses to the questions above (*if applicable*) and/or additional remarks. Furthermore, please provide a brief narrative addressing specific strengths, weaknesses, deficiencies, or other comments that may assist our office in evaluating performance risk (please attach additional pages if necessary):

#### SUBCONTRACTING PLAN

#### AFARS -- Appendix DD Subcontracting Plan Evaluation Guide

#### **DD-100** Purpose.

The guide provides a methodology for uniform and consistent evaluation of subcontracting plans within the Army. It is designed to facilitate compliance with the mandates of 15 U.S.C. § 637(d) to increase opportunities for small and small disadvantaged businesses.

#### **DD-101** Applicability.

In accordance with requirements of FAR 19.705-4, DFARS 219.705-4 and AFARS 5119.705-4, the contracting officer shall use this guide to review all subcontracting plans (except those for commercial items), including those submitted in response to the provisions in FAR 19.705-2(d) and (e). When the contract will require subcontracting plans, use the clauses designated by FAR 19.708(b)(1) and (2) and DFARS 219.708(b)(1)(A) in the solicitation. A copy of the completed evaluation shall be included in the contract file.

#### **DD-102** Goals.

Contracting officers must place special emphasis on negotiating subcontracting goals that are realistic, challenging and attainable. The plan must express goals in terms of percentages of total planned subcontracting dollars and must be comparable to the dollar commitments in the small business participation plan. In accordance with FAR 19.705-4(d), the contracting officer must review enough evidence to determine that the:

1. Offeror can meet subcontracting plan goals;

2. Offeror's goals are consistent with their cost or pricing data or information other than cost or pricing data;

3. Offeror will honor the terms of subcontract agreements (i.e., timely payments of amounts owed, use of firms cited in proposal, etc.); and

4. Offeror's make or buy policy or program does not conflict with the proposed subcontracting plan and is in the Government's best interest.

5. Plan includes the contractor's commitment to adopt and comply with its requirements and goals for small business utilization.

#### **DD-103** Evaluation Rating.

Either the contracting officer, the small business representative, or both, shall evaluate and rate the subcontracting plan as "acceptable" or "unacceptable," in the context of the particular procurement. For instance, in smaller dollar value contracts, or contracts for uniquely manufactured items, it might be impracticable or not cost effective for offerors to take the type of actions that might be appropriate in contracts for larger dollar values or commercial components. To receive an "Acceptable" rating, the contractor must satisfy all objectives in Part 2 and meet each statutory subcontracting plan requirement outlined in Part 3. Failure to receive a subcontracting plan rating of acceptable could jeopardize the offeror's selection for contract award. The contracting officer must document the decisions in the contract file.

#### **DD-104 Modification of Guide.**

Pursuant to AFARS 5101.403, only senior contracting officials may approve individual deviations to this evaluation guide. This approval authority may not be further delegated.

#### **DD-105** Use of Preaward Surveys.

For contracts administered by the Defense Contract Management Agency, obtain information needed to assess contractor compliance with subcontracting plans in current and previous contracts by requesting a preaward survey in accordance with FAR 9.106, DFARS 209.106 and DFARS PGI 209.106.

#### Part 2 - Rating System

#### **DD-201** Acceptable Plans.

Objective: The subcontracting plan meets all of the requirements outlined in Part 3. The offeror has provided details that demonstrate an acceptable approach to assisting, promoting and utilizing small businesses, small disadvantaged businesses, women-owned small businesses, historically underutilized business zone small businesses, veteran-owned small businesses, service disabled veteran-owned small businesses and, for Defense Research Programs, historically black colleges and universities and minority serving institutions. The offeror has demonstrated an ability to meet prior subcontracting plan goals and honor the terms of subcontract agreements. Offeror has outlined an approach utilizing mentor protégé firms, joint venture teams, or other partners. The subcontracting goals are realistic, challenging, and attainable. Clarifications and minor rework of the submission may be required to correct slight omissions that do not prejudice other offers.

#### **DD-202** Unacceptable Plans.

Objective: The subcontracting plan fails to meet a requirement outlined in Part 3. The offeror has not provided an acceptable approach to assisting, promoting, and utilizing small businesses. The offeror has a history of failing to honor subcontract agreements. The offeror did not discuss the establishment of mentor protégé relationships, teaming, or joint venture agreements with other firms. Ensure the proposed subcontracting goals are attainable in light of the contractor's past performance in meeting subcontracting goals. Proposed subcontracting goals reflect less than a good faith effort. Substantial rework of the document is required to correct omissions and establish realistic, challenging, and attainable goals. Failure to receive a rating of acceptable may jeopardize offeror's Eligibility for contract award. See FAR 19.702(a)(1).

#### Part 3 – Subcontracting Plan Requirements

#### **DD-301 Requirements.**

If any of the following are answered "NO", the plan is not acceptable, and the offeror must revise it before contract award. Does the plan:

- 1. Contain a policy statement or evidence of internal guidance to company buyers that commits to complying with the Small Business Act (Public Law 99-661, Section 1207 and Public Law 100-180)?
- 2. Identify separate percentage goals for utilizing small businesses (including Alaska Native Corporations (ANCs) and Indian tribes), veteran-owned small businesses (VOSB), service-disabled veteran-owned small businesses (SDVOSB), historically underutilized business zone small businesses (HUBZone), small disadvantaged businesses (SDB), women-owned small businesses (WOSB), and, for Defense Research Programs, historically black colleges and universities and minority serving institutions where applicable? Negotiated subcontracting goals must correlate with percentages of small business utilization identified in the contractor's small business participation plan, see FAR 15.304 and DFARS 215-304, and/or minimum targets identified in the solicitation or contract modification. FAR 19.704(a)(1).
- Project the total dollars planned to be subcontracted and a separate statement of the total dollars planned to be subcontracted to small business (including ANCs and Indian tribes), VOSB, SDVOSB, HUBZone, SDB, and WOSB concerns? FAR 19.704(a)(2).

- 4. Describe the principal types of supplies and services to be subcontracted and identify the types planned for subcontracting to small business (including ANCs and Indian tribes), VOSB, SDVOSB, HUBZone, SDB and WOSB concerns?
- 5. Describe the method to be used to develop the subcontracting goals? FAR 19.704(a)(4)
- 6. Describe the method for identifying potential sources for solicitation purposes? FAR 19.704(a)(5)
- State if the offeror included indirect costs in establishing subcontracting goals, and a description of the method used to determine the proportionate share of indirect costs to be incurred with small business, VOSB, SDVOSB, HUBZone, SDB (including ANCs and Indian tribes), and WOSB concerns? FAR 19.704(a)(6)
- 8. Identify the name of the employee who will administer the offeror's subcontracting program and describe that person's duties? FAR 19.704(a)(7)
- 9. Provide an approach for ensuring that small businesses, VOSB, SDVOSB, HUBZone, SDB, (including ANCs and Indian tribes) and WOSB concerns will have an equitable opportunity to compete for subcontracts?
- 10. Require the offeror to include the clause at FAR 52.219-8, Utilization of Small Business Concerns in all subcontracts that offer further subcontracting opportunities and require all subcontractors (except small business concerns) that receive subcontracts over \$650,000 (\$1,500,000 for construction) to adopt a plan that complies with the requirements of the clause at FAR 52.219-9 Alt II, Small Business Subcontracting Plan?
- 11. Provide assurances that the offeror will:
  - a. Cooperate in required studies or surveys;

b. Submit periodic reports so that the Government can determine the extent of offeror's compliance with the subcontracting plan;

c. Submit semi-annual Individual Subcontract Reports (ISRs) and/or Summary Subcontract Reports (SSR) in the Electronic Subcontracting Reporting System (eSRS) (http://www.esrs.gov) in accordance with FAR 52.219-9 Alt II or provide other ancillary reports as requested by the contracting officer or Army Small Business Office;

d. Ensure that its subcontractors with subcontracting plans agree to submit the ISRs and/or SSRs using the eSRS;

e. Provide its prime contract number and its DUNS number and the e-mail address of the Government or contractor employee responsible for acknowledging or rejecting the reports, to all first-tier subcontractors with subcontracting plans so they can enter this information into the eSRS when submitting their reports; and

f. Require each subcontractor with a subcontracting plan to provide the prime contract number and its own DUNS number, and the e-mail address of the Government or contractor official responsible for acknowledging or rejecting the reports, to its subcontractors with subcontracting plans? FAR 19.704(10)

12. Describe the types of records that the contractor will maintain concerning procedures adopted to comply with the requirements and goals in the plan, including establishing source lists; and a description of the offeror's efforts to locate small business, VOSB, SDVOSB, HUBZone, SDB, and WOSB concerns and to award subcontracts to them? FAR 19.704(11)

13. Does plan, pursuant to FAR 19.704(11)(c), provide a separate goal for the basic contract and, if applicable, each option?

#### SMALL BUSINESS SUBCONTRACTING PLAN (SAMPLE)

#### **Revised December 2020**

Federal Acquisition Regulation (FAR), paragraph 19.708(b)(1)) prescribes the use of the clause at FAR 52.219-9 Alt II entitled "Small Business Subcontracting Plan." The following is a suggested model for use when formulating such subcontracting plan. While this model plan has been designed to be consistent with FAR 52.219-9 Alt II, other formats of a subcontracting plan may be acceptable. However, failure to include the essential information as exemplified in this model may be cause for either a delay in acceptance or the rejection of a bid or offer where the clause is applicable. Further, the use of this model is not intended to waive other requirements that may be applicable under FAR 52.219-9 Alt II. "SUBCONTRACT," as used in this clause, means any agreement (other than one involving an employer relationship) entered into by a federal government prime contractor or subcontractor calling for supplies or services required for performance of the contract or subcontract.

#### I. IDENTIFICATION DATA:

Company Name:	
Address:	
Date Prepared:	Solicitation Number:
Description:	
Contract Dollar Value:	

#### II. TYPE OF PLAN (circle one)

- A. <u>Individual Plan</u> (All elements developed specifically for this contract and applicable for the full term of this contract, including any option periods.)
- B. <u>Master Plan</u> (Goals developed for this contract; all other elements standard; must be renewed every three years)
- C. <u>Commercial Plan</u> Commercial products/service plan, including goals, <u>covers the offeror's fiscal year</u> and <u>applies to the entire production of commercial items or delivery of services sold by either the entire</u> <u>company</u> or a portion thereof (e.g., division, plant, or product line); this <u>includes planned subcontracting</u> <u>for both commercial and Government business</u>. In accordance with FAR 19.704(d), "A commercial plan (as defined in FAR 19.701) is the preferred type of subcontracting plan for contractors furnishing commercial items." (Contractor sells large quantities of off-the-shelf commodities to many Government agencies. Plans/goals negotiated by a lead agency on a company-wide basis rather than for individual contracts. Plan effective only during the year for which it is approved. The contractor must provide a copy of the lead agency approval.)

#### **III. GOALS:**

(For information purposes only: FAR 19.704(a)(1) requires separate percentage goals for using Small Business, Veteran-Owned Small Business, Service-Disabled Veteran-Owned Small Business, HUBZone Small Business, Small Disadvantaged Business, and Women-Owned Small Business concerns as subcontractors; and a statement of the total dollars planned to be subcontracted to Small Business, Veteran-Owned Small Business, Service-Disabled Veteran-Owned Small Business, HUBZone Small Business, Small Disadvantaged Business, and Women-Owned Small Business concerns. NOTE: The dollar amounts planned for subcontracting must be expressed as percentages of total subcontracting dollars as shown below.)

State separate dollar and percentage goals, expressed in terms of percentages of total subcontracting dollars, for the use of Large Business, Small Business, Veteran-Owned Small Business, Service Disabled Veteran-Owned Small Business, HUBZone Small Business, Small Disadvantaged Business, Woman-Owned Small Business, and Historically Black Colleges and Universities/Minority Institutions concerns as subcontractors. The offeror shall include all subcontracts that contribute to contract performance, and may include a proportionate share of products and services that are normally allocated as indirect costs in the following format. (For a contract with options, provide a separate statement for the basic contract and individual statements for each option year.)

A. **BASE BID ONLY:** The following percentage goals (expressed in terms of a percentage of total planned subcontracting dollars) and dollar amounts are applicable to the contract cited above or to the contract awarded under the solicitation cited. Total Base Bid is \$\_\_\_\_\_.

(i) Total estimated dollar value of all planned subcontracting for an individual contract plan; or the offerors total projected sales, expressed in dollars, and the total value of projected subcontracts to support the sales for a commercial plan; i.e., the sum of a and b above: \$ (100 Percent) \$\_\_\_\_\_ and \_\_\_\_\_\_%

(ii) Total estimated dollar value and percent of planned subcontracting with Small Business (including Veteran-Owned Small Business, Service Disabled Veteran-Owned Small Business, HUBZone Small Business, Small Disadvantaged Business, Woman-Owned Small Business, and Historically Black Colleges and Universities/Minority Institutions concerns): (% of "(i)") \$\_\_\_\_\_ and \_\_\_\_\_%

(iii) Total estimated dollar value and percent of planned subcontracting with large businesses (all business concerns classified as "other than small"): (% of "(i)") \$ and \_\_\_\_\_%

(iv) Total estimated dollar value and percent of planned subcontracting with Small Disadvantaged Business concerns (SDB): \$\_\_\_\_\_\_ and \_\_\_\_\_\_ % of total planned subcontracting dollars under this contract will be awarded to subcontractors who are small concerns owned and controlled by socially and economically disadvantaged individuals and appear on the Small Business Administration's list. (% of "(i)")

(v) Total estimated dollar value and percent of planned subcontracting with Women-Owned Small Business concerns (WOSB): \$\_\_\_\_\_\_ and \_\_\_\_\_ % of total planned subcontracting dollars under this contract will be awarded to subcontractors who are WOSB. (% of "(i)")

(vi) Total estimated dollar value and percent of planned subcontracting with Veteran-Owned Small Business concerns (VOSB): \$\_\_\_\_\_\_ and \_\_\_\_\_ % of total planned subcontracting dollars under this contract will be awarded to subcontractors who are VOSB. (% of "(i)")

(vii) Total estimated dollar value and percent of planned subcontracting with Service-Disabled Veteran-Owned Small Business concerns (SDVOSB): \$\_\_\_\_\_\_ and \_\_\_\_\_ % of total planned subcontracting dollars under this contract will be awarded to subcontractors who are SDVOSB. (% of "(i)") (viii) Total estimated dollar value and percent of planned subcontracting with Historically Black Colleges and Universities/Minority Institutions (HBCU/MI): \$\_\_\_\_\_\_ and \_\_\_\_\_\_ % of total planned subcontracting dollars under this contract will go to HBCU's who are an institution determined by the Secretary of Education to meet the requirements of 34 CFR 608.2, the term also includes any nonprofit research institution that was an integral part of such a college or university before November 14, 1986; or MI's who are an institution of higher education meeting the requirements of Section 1046(3) of the Higher Education Act of 1965 (20 U.S.C. 1135d-5(3)) which, includes a Hispanic-serving institution of higher education as defined in Section 316(b)(1) of the Act (20 U.S.C. 1059c(b)(1)). (% of "(i)")

(ix) Total estimated dollar value and percent of planned subcontracting with HUBZone Small Business concerns: \$\_\_\_\_\_\_\_and \_\_\_\_\_\_% of total planned subcontracting dollars under this contract will go to subcontractors who are small business concerns located in a historically underutilized business zone which is an area located within one or more qualified census tracts, qualified non-metropolitan counties, or lands within the external boundaries of an Indian reservation and appear on the Small Business Administration's HUBZONE web site at <u>www.sba.gov/HUBZONE</u>. (% of "(i)")

The following principal products and/or services will be subcontracted under the Base Bid of this contract, and the distribution among Large Business, Small Business, Veteran-Owned Small Business, Service Disabled Veteran-Owned Small Business, HUBZone Small Business, Small Disadvantaged Business, Woman-Owned Small Business, and Historically Black Colleges and Universities/Minority Institutions is as follows: (Check all that apply)

Subcontractor Name	Product or Service/ Description	Large Business	Small Business	VOSB	SDVOSB	HSB	SDB	WOSB	HBCU/ MI

(ATTACHMENT MAY BE USED IF ADDITIONAL SPACE IS REQUIRED)

- B. **OPTIONS:** You must include a separate goal for each option. See the attached Continuation Sheet for Paragraph A for each option.
- C. The following method was used in developing subcontract goals (i.e., Statement explaining how the product and service areas to be subcontracted were established, how the areas to be subcontracted to Small Business, Veteran-Owned Small Business, Service-Disabled Veteran-Owned Small Business, HUBZone Small Business, Small Disadvantaged Business, and Women-Owned Small Business concerns were determined, and how Small Business, Veteran-Owned Small Disadvantaged Business, Service-Disabled Veteran-Owned Small Business, HUBZone Small Business, HUBZone Small Business, Service-Disabled Veteran-Owned Small Business, and Women-Owned Small Business concerns' capabilities were determined, to include identification of source lists utilized in making those determinations. Also, a statement as to what efforts will be taken to improve on past goals and how SB and SDB firms will be included in areas without previous SB/SDB involvement).

- D. A description of the method used to identify potential SOURCES for solicitation purposes (e.g., whether you used existing company source lists, the System for Award Management (SAM)) of the Small Business Administration (SBA), veterans service organizations, the National Minority Purchasing Council Vendor Information Service, the Research and Information Division of the Minority Business Development Agency in the Department of Commerce, or small, HUBZone, disadvantaged, and women-owned small business trade associations. A firm may rely on the information contained in SAM as an accurate representation of a concern's size and ownership characteristics for the purposes of maintaining a small, veteran-owned, service-disabled veteran-owned, HUBZone small, small disadvantaged and women-owned small business source list. Use of SAM as its source list does not relieve a firm of its responsibilities e.g., outreach, assistance, counseling, and publicizing subcontracting opportunities) in this clause.
- E. Indirect and overhead costs (check one): \_\_\_\_\_ HAVE \_\_\_\_ HAVE NOT been included in the goals specified in Paragraph A and Paragraph B.
- F. If "HAVE" was selected in Paragraph E, explain the method used in determining the proportionate share of indirect and overhead cost to be allocated as subcontracts to Small Business, Veteran-Owned Small Business, Service-Disabled Veteran-Owned Small Business, HUBZone Small Business, Small Disadvantaged Business, and Women-Owned Small Business concerns. (NOTE: Commercial Plans Must Include Indirect Costs).

#### **IV. PROGRAM ADMINISTRATOR:**

(For information purposes only: FAR 19.704(a)(7) requires information about the company employee who will administer the subcontracting program. Please provide the name, title, address, telephone number, fax machine number, email address, position within the corporate structure, and the duties of that employee.)

Name:	 
Title:	 
Position:	
Address:	
Telephone No:	
Fax No:	
Email Address:	

This individual's specific duties, as they relate to the firm's subcontracting program, are as follows: General overall responsibility for this company's Small Business Program, the development, preparation and execution of individual subcontracting plans and for monitoring performance relative to contractual subcontracting requirements contained in this plan, including but not limited to:

- A. Developing and maintaining offerors/bidders lists of small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns from all possible sources. Our firm may rely on the information contained in the SBA Small Business Source System, as an accurate representation of a concern's size and ownership characteristics for the purposes of maintaining a Small Business, Veteran-Owned Small Business, Service-Disabled Veteran-Owned Small Business, HUBZone Small Business, Small Disadvantaged Business, and Women-Owned Small Business source list. The Small Business Administration's (SBA's) list of Small Disadvantaged Businesses and small HUBZone businesses can be accessed through www.sam.gov. Select "Dynamic Small Business Search" to access the SBA small business source system.
- B. Ensuring that procurement packages are structured to permit Small Business, Veteran-Owned Small Business, Service-Disabled Veteran-Owned Small Business, HUBZone Small Business, Small Disadvantaged Business, and Women-Owned Small Business concerns to participate to the maximum extent possible.
- C. Assuring inclusion of Small Business, Veteran-Owned Small Business, Service-Disabled Veteran-Owned Small Business, HUBZone Small Business, Small Disadvantaged Business, and Women-Owned Small Business concerns in all solicitations for products or services that they are capable of providing.
- D. Reviewing solicitations to remove statements, clauses, etc., which may tend to restrict or prohibit Small Business, Veteran-Owned Small Business, Service-Disabled Veteran-Owned Small Business, HUBZone Small Business, Small Disadvantaged Business, and Women-Owned Small Business participation, including recommendations to set aside competitions for SDB's
- E. Ensuring periodic rotation of potential subcontractors on bidders' lists.
- F. Ensuring that the bid proposal review board documents its reasons for not selecting low bids submitted by Small Business, Veteran-Owned Small Business, Service-Disabled Veteran-Owned Small Business, HUBZone Small Business, Small Disadvantaged Business, and Women-Owned Small Business concerns.
- G. Ensuring the establishment and maintenance of records of solicitations and subcontract award activity.

- H. Attending or arranging for attendance of company counselors at Business Opportunity Workshops, Minority Business Enterprise Seminars, Trade Fairs, etc.
- I. Conducting or arranging for conduct of motivational training for purchasing personnel pursuant to the intent of Public Laws 95-507, 99-661, and 100-180.
- J. Monitoring attainment of proposed goals.
- K. Preparing and submitting timely, required subcontract reports
- L. Coordinating contractor's activities during the conduct of compliance reviews by Federal agencies.
- M. Coordinating the conduct of contractor's activities involving its Small Business, Veteran-Owned Small Business, Service-Disabled Veteran-Owned Small Business, HUBZone Small Business, Small Disadvantaged Business, and Women-Owned Small Business subcontracting program.
- N. Ensuring Individual Subcontract Reports (ISRs) and Summary Subcontract Reports (SSRs) are submitted using eSRS (<u>http://www.esrs.gov</u>), following the instructions in the eSRS.
- O. Notifying the Contracting Officer or his representative in writing of any substitutions of firms that are not Small Business, Veteran-Owned Small Business, Service-Disabled Veteran-Owned Small Business, HUBZone Small Business, Small Disadvantaged Business, and Women-Owned Small Business for the firms listed in the subcontracting plan.
- P. Additions to (or deletions from) the duties specified above are as follows:

#### V. EQUITABLE OPPORTUNITY:

(For information purposes only: FAR 19-704(8) requires a description of the efforts the contractor will make to ensure that Small Business, Veteran-Owned Small Business, Service-Disabled Veteran-Owned Small Business, HUBZone Small Business, Small Disadvantaged Business, and Women-Owned Small Business concerns will have an equitable opportunity to compete for subcontracts.)

The following efforts will be taken to assure that Small Business, Veteran-Owned Small Business, Service-Disabled Veteran-Owned Small Business, HUBZone Small Business, Small Disadvantaged Business, and Women-Owned Small Business concerns will have an equitable opportunity to compete for subcontracts, including items not traditionally awarded to SB or SDB firms:

A. Outreach efforts will be made by:

(i) Contacts with minority and small business trade associations such as veterans service organizations, the National Minority Purchasing Council Vendor Information Service, the Research and Information Division of the Minority Business Development Agency in the Department of Commerce.

- (ii) Contacts with business development organizations.
- (iii) Attendance at small and minority business procurement conferences and trade fairs.
- (iv) Sources will be requested from Small Business Administration's small business source system.
(v) Reviews to determine the competence, ability, experience and capacity available from SB and SDB firms and providing technical assistance to same.

(vi) Evaluations of our SB, SDB, WOSB, VOSB, SDVOSB and HUBZone award performance and program effectiveness against goals established company wide.

B. The following internal efforts will be made to guide and encourage buyers:

(i) Workshops, seminars and training programs will be conducted.

(ii) Activities will be monitored to evaluate compliance with this subcontracting plan, evaluating SB, SDB, WOSB, VOSB, SDVOSB and HUBZone award performance and program effectiveness.

(iii) Small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concern source lists, guides and other data identifying small, small disadvantaged and women-owned small business concerns will be maintained and utilized by buyers in soliciting subcontracts.

(iv) Additions to (or deletion from) the above listed efforts are as follows:

#### VI. FLOW DOWN CLAUSE:

(For information purposes only: FAR 19-704(a)(9) requires that your company include FAR 52.219-8, "Utilization of Small Business Concerns," in all subcontracts that offer further subcontracting opportunities. Your company must require all subcontractors, except small business concerns, that receive subcontracts in excess of \$700,000 (\$1,500,000 for construction) to adopt a plan that complies with the requirements of FAR 52.219-9 Alt II, "Small Business Subcontracting Plan.")

The offeror (contractor) agrees that the clause entitled "Utilization of Small Business Concerns" at FAR 52.219-8 will be included in all subcontracts that offer further subcontracting opportunities, and all subcontractors (except small business concerns) who receive subcontracts in excess of \$750,000 (\$1,500,000 for construction) will be required to adopt a subcontracting plan that complies with FAR 52.219-9 Alt II. Such plans will be reviewed by comparing them with the provisions of Public Law 95-507, and assuring that all minimum requirements of an acceptable subcontracting plan have been satisfied. The acceptability of percentage goals shall be determined on a case-by-case basis depending on the supplies/services involved, the availability of potential Small Business, Veteran-Owned Small Business, Service-Disabled Veteran-Owned Small Business, HUBZone Small Business, Small Disadvantaged Business, and Women-Owned Small Business subcontractors, and prior experience. Once approved and implemented, plans will be monitored through the submission of periodic reports, and/or, as time and availability of funds permit, periodic visits to subcontractors facilities to review applicable records and subcontracting program progress.

## VII. REPORTING AND COOPERATION:

(For information purposes only: FAR 19-704(a)(10) requires your company (i) cooperate in any studies or surveys as may be required, (ii) submit periodic reports which show compliance with the subcontracting plan; (iii) submit the Individual Subcontract Report (ISR), and the Summary Subcontract Report (SSR) using the Electronic Subcontracting Reporting System (eSRS);, (iv) ensure that subcontractors with subcontracting plans agree to submit the ISR and/or the SSR using eSRS, (v) provide the prime contract number, DUNS number, and the e-mail address of the offeror's official responsible for acknowledging receipt of or rejecting the ISRs, to all first-tier subcontractors with subcontracting plans so they can enter this information into the eSRS when submitting their ISRs, and (vi) require that each subcontractor with a subcontracting plan provide the prime contract number, its own DUNS number, and the e-mail address of the subcontracting number, and the e-mail address of the subcontracting plans for the subcontractor with a subcontracting plan provide the prime contract number, its own DUNS number, and the e-mail address of the subcontractor's official responsible for

acknowledging receipt of or rejecting the ISRs, to its subcontractors with subcontracting plans.) The offeror/contractor agrees to submit such periodic reports and cooperate in any studies or surveys as may be required by the contracting agency or the Small Business Administration in order to determine the extent of compliance by the offeror/contractor with the subcontracting plan and with the clause entitled "Utilization of Small Business Concerns," contained in the contract. The above reports will include submission of its Individual Subcontracting Report (ISR) and Summary Subcontract Report (SSR)

The offeror/contractor further agrees to ensure that its subcontractors agree to submission of ISRs and SSRs. ISRs and SSRs shall be submitted via the Electronic Subcontracting Reporting System (eSRS) website <u>www.esrs.gov</u>

Reporting Period	Report Due	Due Date
Oct 1 - Mar 31	ISR/SF294	4/30
Apr 1 - Sept 30	ISR/SF294	10/30
Oct 1 – Mar 31	SSR/SF295	4/30 (for contracts with the DOD)
Apr 1 – Sept 30	SSR/SF295	10/30 (for contracts with DOD)
Oct 1 - Sept 30	SSR/SF295	10/30 (for civilian agencies)
Contract Completion	SSR/SF295	30 days after close of contractor's fiscal
		year (Commercial Plan)

The offeror/contractor agrees to ensure that subcontractors with subcontracting plans agree to submit the ISR and/or the SSR using eSRS and to provide the prime contract number, DUNS number, and the e-mail address of the offeror's official responsible for acknowledging receipt of or rejecting the ISRs, to all first-tier subcontractors with subcontracting plans so they can enter this information into the eSRS when submitting their ISRs. The offeror/contractor agrees to require each subcontractor with a subcontracting plan provide the prime contract number, its own DUNS number, and the e-mail address of the subcontractor's official responsible for

# acknowledging receipt of or rejecting the ISRs, to its subcontractors with subcontracting plans.

# VIII. RECORDKEEPING:

(For information purpose only: FAR 19-704(a)(11) requires a list of the types of records your company will maintain to demonstrate the procedures adopted to comply with the requirements and goals in the subcontracting plan.)

The offeror/contractor agrees that he will maintain at least the following types of records to document compliance with this subcontracting plan:

- A. Small Business, Veteran-Owned Small Business, Service-Disabled Veteran-Owned Small Business, HUBZone Small Business, Small Disadvantaged Business, and Women-Owned Small Business concern source lists, guides and other data identifying SB/SDB concerns.
- B. Organizations contacted for Small Business, Veteran-Owned Small Business, Service-Disabled Veteran-Owned Small Business, HUBZone Small Business, Small Disadvantaged Business, and Women-Owned Small Business sources.
- C. On a contract-by-contract basis, records on all subcontract solicitations over \$250,000, indicating on each solicitation (i) whether small business concerns were solicited, and if not, why not; (ii) whether Veteran-Owned Small Business concerns were solicited, and if not, why not; (iii) whether HUBZone Small Business concerns were solicited, and if not, why not; (iv) whether HUBZone Small Business concerns were solicited, and if not, why not; (iv) whether HUBZone Small Business concerns were solicited, and if not, why not; (v) whether Small Disadvantaged business concerns were solicited, and if not, why not; (v) whether Small Business concerns were solicited, and if not, why not; (vi) whether Women-Owned Small Business, veteran-Owned Small Business, Service-Disabled Veteran-Owned Small Business, HUBZone Small Business, Small Business, Small Business, and Women-Owned Small Business concerns to receive the subcontract award.

- D. Records to support other outreach efforts: Contacts with veteran service organizations, Minority and Small Business Trade Associations, etc., and attendance at small and minority business procurement conferences and trade fairs.
- E. Records to support internal activities to guide and encourage buyers: Workshops, seminars, training programs, etc., monitoring activities to evaluate compliance.
- F. On a contract-by-contract basis, records to support subcontract award data to include name and address and business size of each subcontractor. Contractors having commercial plans need not comply with this requirement.
- G. Records to be maintained in addition to the above are as follows:

## **IX. ASSURANCES**

(For information purpose only: FAR 19.704(a)(12-15) requires assurances from your firm)

A. The offeror/contractor will make a good faith effort to acquire articles, equipment, supplies, services, or materials, or obtain the performance of construction work from the small business concerns that the offeror used in preparing the bid or proposal, in the same or greater scope, amount, and quality used in preparing and submitting the bid or proposal. Responding to a request for a quote does not constitute use in preparing a bid or proposal. An offeror used a small business concern in preparing the bid or proposal if--

(i) The offeror identifies the small business concern as a subcontractor in the bid or proposal or associated small business subcontracting plan, to furnish certain supplies or perform a portion of the contract; or

(ii) The offeror used the small business concern's pricing or cost information or technical expertise in preparing the bid or proposal, where there is written evidence of an intent or understanding that the small business concern will be awarded a subcontract for the related work if the offeror is awarded the contract;

- B. The offeror/contractor will provide the contracting officer with a written explanation if the contractor fails to acquire articles, equipment, supplies, services or materials or obtain the performance of construction work as described in (a)(12) of this section. This written explanation will be submitted to the contracting officer within 30 days of contract completion; and
- C. The offeror/contractor will not prohibit a subcontractor from discussing with the contracting officer any material matter pertaining to payment to or utilization of a subcontractor.
- D. The offeror/contractor will pay its small business subcontractors on time and in accordance with the terms and conditions of the subcontract, and notify the contracting officer if the offeror pays a reduced or an untimely payment to a small business subcontractor (see 52.242-5).

# X. SIGNATURES REQUIRED:

This subcontracting plan was SUBMITTED by:		
Signature:	Date:	
Typed Name and Title:		
Phone Number:		
Contracting Officer Approval:	Date:	

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# CONTINUATION OF PARAGRAPH A (SUBMIT ADDITIONAL OPTION PAGES FOR EACH OPTION)

NAME OF OPTION: \_\_\_\_\_

	Dollars	Percentage
1. Total option contract price		
2. Total to be subcontracted (to all types of businesses)		
a. To Large Business		
b. To Small Business		
i. To Veteran-Owned Small Business		
ii. To Service-Disabled Veteran-Owned Small Business		
iii. To HUBZone Small Business		
iv. To Small Disadvantaged Business		
v. To Women-Owned Small Business		

The following principal products and/or services will be subcontracted under Option 1 of this contract, and the distribution among LB, SB, SDB, WOSB, VOSB, SDVOSB, HBCU/MI, and HUBZone SB is as follows: (Check all that apply)

Subcontractor Name	Product or Service/ Description	Large Business	Small Business	VOSB	SDVOSB	HSB	SDB	WOSB	HBCU/ MI

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Section 00 45 00 - Representations and Certifications

REPS AND CERTS REPRESENTATIONS & CERTIFICATIONS COMPANY NAME AND ADDRESS: \_\_\_\_\_

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# Section 00 70 00 - Conditions of the Contract

# CLAUSES INCORPORATED BY REFERENCE

52.202-1	Definitions	JUN 2020
52.203-3	Gratuities	APR 1984
52.203-5	Covenant Against Contingent Fees	MAY 2014
52.203-6	Restrictions On Subcontractor Sales To The Government	JUN 2020
52.203-7	Anti-Kickback Procedures	JUN 2020
52.203-8	Cancellation, Rescission, and Recovery of Funds for Illegal o	rMAY 2014
	Improper Activity	
52.203-10	Price Or Fee Adjustment For Illegal Or Improper Activity	MAY 2014
52.203-12	Limitation On Payments To Influence Certain Federal	JUN 2020
	Transactions	
52.203-13	Contractor Code of Business Ethics and Conduct	NOV 2021
52.203-19	Prohibition on Requiring Certain Internal Confidentiality	JAN 2017
	Agreements or Statements	
52.204-7	System for Award Management	NOV 2024
52.204-8	Annual Representations and Certifications	JAN 2025
52.204-9	Personal Identity Verification of Contractor Personnel	JAN 2011
52.204-10	Reporting Executive Compensation and First-Tier	JUN 2020
	Subcontract Awards	
52.204-13	System for Award Management Maintenance	OCT 2018
52.204-18	Commercial and Government Entity Code Maintenance	AUG 2020
52.204-19	Incorporation by Reference of Representations and	DEC 2014
	Certifications.	
52.204-22	Alternative Line Item Proposal	JAN 2017
52.204-23	Prohibition on Contracting for Hardware, Software, and	DEC 2023
	Services Developed or Provided by Kaspersky Lab Covered	
	Entities	
52.204-24	Representation Regarding Certain Telecommunications and	NOV 2021
	Video Surveillance Services or Equipment	
52.204-25	Prohibition on Contracting for Certain Telecommunications	NOV 2021
	and Video Surveillance Services or Equipment	
52.204-27	Prohibition on a ByteDance Covered Application	JUN 2023
52.209-6	Protecting the Government's Interest When Subcontracting	JAN 2025
	With Contractors Debarred, Suspended, Proposed for	
	Debarment, or Voluntarily Excluded	
52.209-7	Information Regarding Responsibility Matters	OCT 2018
52.209-9	Updates of Publicly Available Information Regarding	OCT 2018
	Responsibility Matters	
52.209-10	Prohibition on Contracting With Inverted Domestic	NOV 2015
	Corporations	
52.210-1	Market Research	NOV 2021
52.211-14	Notice Of Priority Rating For National Defense, Emergency	APR 2008
	Preparedness, and Energy Program Use	
52.211-15	Defense Priority And Allocation Requirements	APR 2008
52.211-15	Defense Priority And Allocation Requirements	APR 2008
52.214-34	Submission Of Offers In The English Language	APR 1991
52.214-35	Submission Of Offers In U.S. Currency	APR 1991
52.215-1	Instructions to OfferorsCompetitive Acquisition	NOV 2021
52.215-2	Audit and RecordsNegotiation	JUN 2020
52.215-10	Price Reduction for Defective Certified Cost or Pricing Data	AUG 2011

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52.215-12 (Dev)	Subcontractor Certified Cost or Pricing Data (DEVIATION 2022-00001)	OCT 2021
52.215-17	Waiver of Facilities Capital Cost of Money	OCT 1997
52.215-19	Notification of Ownership Changes	OCT 1997
52.216-1	Type Of Contract	APR 1984
52.219-4	Notice of Price Evaluation Preference for HUBZone Small	OCT 2022
	Business Concerns	
52.219-9 Alt II	Small Business Subcontracting Plan (JAN 2025) Alternate II	NOV 2016
52.219-16	Liquidated Damages-Subcontracting Plan	SEP 2021
52.219-28	Postaward Small Business Program Rerepresentation	JAN 2025
52.222-3	Convict Labor	JUN 2003
52.222-4	Contract Work Hours and Safety Standards - Overtime	MAY 2018
	Compensation	
52.222-5	Construction Wage Rate RequirementsSecondary Site of the	MAY 2014
	Work	
52.222-6	Construction Wage Rate Requirements	AUG 2018
52.222-7	Withholding of Funds	MAY 2014
52.222-8	Payrolls and Basic Records	JUL 2021
52.222-9 (Dev)	Apprentices and Trainees (DEVIATION 2025-00003)	MAR 2025
52.222-10	Compliance with Copeland Act Requirements	FEB 1988
52.222-11	Subcontracts (Labor Standards)	MAY 2014
52.222-12	Contract Termination-Debarment	MAY 2014
52.222-13	Compliance With Construction Wage Rate Requirements and	MAY 2014
	Related Regulations	
52.222-14	Disputes Concerning Labor Standards	FEB 1988
52.222-15	Certification of Eligibility	MAY 2014
52.222-36	Equal Opportunity for Workers with Disabilities	JUN 2020
52.222-37	Employment Reports on Veterans	JUN 2020
52.222-40	Notification of Employee Rights Under the National Labor Relations Act	DEC 2010
52 222-50	Compating Trafficking in Persons	NOV 2021
52.222-50 52.222-54	Employment Eligibility Verification	IAN 2025
52.222-54	Minimum Wages for Contractor Workers Under Executive	JAN 2023
52.222 55	Order 14026	571112022
52.222-62	Paid Sick Leave Under Executive Order 13706	JAN 2022
52.223-2	Reporting of Biobased Products Under Service and	MAY 2024
	Construction Contracts.	
52.223-5	Pollution Prevention and Right-to-Know Information	MAY 2024
52.223-20	Aerosols	MAY 2024
52.223-21	Foams	MAY 2024
52.225-12	Notice of Buy American Requirement - Construction	MAY 2014
	Materials Under Trade Agreements	
52.225-13	Restrictions on Certain Foreign Purchases	FEB 2021
52.226-7	Drug-Free Workplace	MAY 2024
52.226-8	Encouraging Contractor Policies To Ban Text Messaging	MAY 2024
	While Driving	
52.227-1	Authorization and Consent	JUN 2020
52.227-2	Notice And Assistance Regarding Patent And Copyright	JUN 2020
	Infringement	
52.227-4	Patent Indemnity-Construction Contracts	DEC 2007
52.228-2	Additional Bond Security	OCT 1997
52.228-5	Insurance - Work On A Government Installation	JAN 1997
52.228-11 (Dev)	Individual SuretyPledge of Assets (DEVIATION 2020- 00016)	FEB 2021
52.228-12	Prospective Subcontractor Requests for Bonds	DEC 2022
	- 1	

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52.228-15 (Dev)	Performance and Payment Bonds-Construction. (Deviation 2020-00016)	JUN 2020
52.229-3	Federal, State And Local Taxes	FEB 2013
52.232-5	Payments under Fixed-Price Construction Contracts	MAY 2014
52.232-16 (Dev)	Progress Payments (DEVIATION 2020-00010)	NOV 2021
52.232-17	Interest	MAY 2014
52,232-23	Assignment Of Claims	MAY 2014
52,232-27	Prompt Payment for Construction Contracts	IAN 2017
52.232-33	Payment by Electronic Funds TransferSystem for Award	OCT 2018
02.202 00	Management	0012010
52.232-39	Unenforceability of Unauthorized Obligations	JUN 2013
52.232-40	Providing Accelerated Payments to Small Business	MAR 2023
	Subcontractors	
52.233-1	Disputes	MAY 2014
52.233-2	Service Of Protest	SEP 2006
52.233-3	Protest After Award	AUG 1996
52.233-4	Applicable Law for Breach of Contract Claim	OCT 2004
52.236-2	Differing Site Conditions	APR 1984
52.236-3	Site Investigation and Conditions Affecting the Work	APR 1984
52.236-5	Material and Workmanship	APR 1984
52.236-6	Superintendence by the Contractor	APR 1984
52.236-7	Permits and Responsibilities	NOV 1991
52.236-8	Other Contracts	APR 1984
52.236-9	Protection of Existing Vegetation, Structures, Equipment,	APR 1984
	Utilities, and Improvements	
52.236-10	Operations and Storage Areas	APR 1984
52.236-11	Use and Possession Prior to Completion	APR 1984
52.236-12	Cleaning Up	APR 1984
52.236-13	Accident Prevention	NOV 1991
52.236-14	Availability and Use of Utility Services	APR 1984
52.236-15	Schedules for Construction Contracts	APR 1984
52.236-16	Ouantity Surveys	APR 1984
52.236-17	Lavout of Work	APR 1984
52.236-21	Specifications and Drawings for Construction	FEB 1997
52.236-25	Requirements for Registration of Designers	JUN 2003
52.236-26	Preconstruction Conference	FEB 1995
52.236-28	Preparation of ProposalsConstruction	OCT 1997
52.240-1	Prohibition on Unmanned Aircraft Systems Manufactured or	NOV 2024
	Assembled by American Security Drone ActCovered	
	Foreign Entities	
52.242-5	Payments to Small Business Subcontractors	JAN 2017
52.242-13	Bankruptcy	JUL 1995
52.242-14	Suspension of Work	APR 1984
52.243-4	Changes	JUN 2007
52.244-6 (Dev)	Subcontracts for Commercial Products and Commercial	MAR 2025
	Services (DEVIATION 2025-00003)	
52.246-12	Inspection of Construction	AUG 1996
52.246-21	Warranty of Construction	MAR 1994
52.248-3	Value Engineering-Construction	OCT 2020
52.249-2 Alt I	Termination for Convenience of the Government (Fixed-	SEP 1996
	Price) (Apr 2012) - Alternate I	
52.249-10	Default (Fixed-Price Construction)	APR 1984
52.252-1	Solicitation Provisions Incorporated By Reference	FEB 1998
52.252-5	Authorized Deviations In Provisions	NOV 2020
52.253-1	Computer Generated Forms	JAN 1991

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252.201-7000 252.203-7000	Contracting Officer's Representative Requirements Relating to Compensation of Former DoD	DEC 1991 SEP 2011
202.203 7000	Officials	
252.203-7001	Prohibition On Persons Convicted of Fraud or Other Defense- Contract-Related Felonies	JAN 2023
252.203-7002	Requirement to Inform Employees of Whistleblower Rights	DEC 2022
252.203-7003	Agency Office of the Inspector General	AUG 2019
252.203-7004	Display of Hotline Posters	JAN 2023
252.203-7005	Representation Relating to Compensation of Former DoD	SEP 2022
252 204-7003	Control Of Government Personnel Work Product	APR 1002
252.204-7003	Antiterrorism Awareness Training for Contractors	IAN 2023
252.204-7004	Alternate A Annual Representations and Certifications	OCT 2023
252.204-7007	Compliance With Safeguarding Covered Defense Information	OCT 2024
232.204-7008	Controls	2010
252.204-7012 (Dev)	Safeguarding Covered Defense Information and Cyber	MAY 2024
, , , , , , , , , , , , , , , , , , ,	Incident Reporting (DEVIATION 2024-O0013 REVISION 1)	
252.204-7015	Notice of Authorized Disclosure of Information for Litigation	JAN 2023
252 204-7016	Covered Defense Telecommunications Equipment or Services	DEC 2019
232.204 /010	Representation	DLC 2017
252.204-7017	Prohibition on the Acquisition of Covered Defense	MAY 2021
	Telecommunications Equipment or Services Representation	1
252.204-7018	Prohibition on the Acquisition of Covered Defense	JAN 2023
	Telecommunications Equipment or Services	
252.204-7019	Notice of NIST SP 800-171 DoD Assessment Requirements	NOV 2023
252.204-7020	NIST SP 800-171 DoD Assessment Requirements	NOV 2023
252.205-7000	Provision Of Information To Cooperative Agreement Holders	OCT 2024
252.209-7004	Subcontracting With Firms That Are Owned or Controlled By	MAY 2019
	The Government of a Country that is a State Sponsor of	
252 215 7000	1 errorism	DEC 2022
252.215-7008	Unly One Offer	DEC 2022
252.219-7003	Small Business Subcontracting Plan (DOD Contracts)	DEC 2019
252.222-7006	Restrictions on the Use of Mandatory Arbitration Agreements	JAN 2023
252.225-7006	Hazardous Materials	SEP 2014
252.223-7008	Prohibition of Hexavalent Chromium	JAN 2023
252.225-7012	Preference For Certain Domestic Commodities	APR 2022
252.225-7048	Export-Controlled Items	JUN 2013
252.225-7052	Restriction on the Acquisition of Certain Magnets, Tantalum.	MAY 2024
	and Tungsten.	
252.225-7055	Representation Regarding Business Operations with the	MAY 2022
	Maduro Regime	
252.225-7056	Prohibition Regarding Business Operations with the Maduro	JAN 2023
252 225 2052	Regime	ALIC 2022
252.225-7057	Work in the People's Republic of China	AUG 2022
252.225-7058	Postaward Disclosure of Employment of Individuals Who Work in the People's Republic of China	JAN 2023
252.225-7059	Prohibition on Certain Procurements from the Xiniiang	JUN 2023
202.220 (00)	Uvghur Autonomous Region - Representation	5 51, 2023
252.225-7060	Prohibition on Certain Procurements from the Xinjiang Uyghur Autonomous Region	JUN 2023

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252.225-7966 (Dev)	Prohibition Regarding Russian Fossil Fuel Business	MAR 2024
	Operations - Representation (Deviation 2024-00006).	
252.225-7967 (Dev)	Prohibition Regarding Russian Fossil Fuel Business	MAR 2024
× ,	Operations (Deviation 2024-O0006).	
252.225-7972 (Dev)	Prohibition on the Procurement of Foreign-Made Unmanned	AUG 2024
	Aircraft Systems (DEVIATION 2024-00014)	
252.225-7973 (Dev)	Prohibition on the Procurement of Foreign-Made Unmanned	AUG 2024
	Aircraft Systems - Representation (DEVIATION 2024-	
	O0014)	
252.227-7022	Government Rights (Unlimited)	MAR 1979
252.227-7033	Rights in Shop Drawings	APR 1966
252.232-7003	Electronic Submission of Payment Requests and Receiving	DEC 2018
	Reports	
252.232-7004 (Dev)	DoD Progress Payment Rates (DEVIATION 2020-00010)	MAR 2020
252.232-7010	Levies on Contract Payments	DEC 2006
252.236-7000	Modification Proposals-Price Breakdown	DEC 1991
252.236-7013	Requirement for Competition Opportunity for American Steel	JAN 2023
	Producers, Fabricators, and Manufacturers	
252.243-7001	Pricing Of Contract Modifications	DEC 1991
252.243-7002	Requests for Equitable Adjustment	DEC 2022
252.244-7000	Subcontracts for Commercial Products or Commercial	NOV 2023
	Services	
252.247-7023	Transportation of Supplies by Sea	OCT 2024

# CLAUSES INCORPORATED BY FULL TEXT

# 52.204-21 BASIC SAFEGUARDING OF COVERED CONTRACTOR INFORMATION SYSTEMS (NOV 2021)

(a) Definitions. As used in this clause--

Covered contractor information system means an information system that is owned or operated by a contractor that processes, stores, or transmits Federal contract information.

Federal contract information means information, not intended for public release, that is provided by or generated for the Government under a contract to develop or deliver a product or service to the Government, but not including information provided by the Government to the public (such as on public websites) or simple transactional information, such as necessary to process payments.

Information means any communication or representation of knowledge such as facts, data, or opinions, in any medium or form, including textual, numerical, graphic, cartographic, narrative, or audiovisual (Committee on National Security Systems Instruction (CNSSI) 4009).

Information system means a discrete set of information resources organized for the collection, processing, maintenance, use, sharing, dissemination, or disposition of information (44 U.S.C. 3502).

Safeguarding means measures or controls that are prescribed to protect information systems.

(b) Safeguarding requirements and procedures.

(1) The Contractor shall apply the following basic safeguarding requirements and procedures to protect covered contractor information systems. Requirements and procedures for basic safeguarding of covered contractor information systems shall include, at a minimum, the following security controls:

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(i) Limit information system access to authorized users, processes acting on behalf of authorized users, or devices (including other information systems).

(ii) Limit information system access to the types of transactions and functions that authorized users are permitted to execute.

(iii) Verify and control/limit connections to and use of external information systems.

(iv) Control information posted or processed on publicly accessible information systems.

(v) Identify information system users, processes acting on behalf of users, or devices.

(vi) Authenticate (or verify) the identities of those users, processes, or devices, as a prerequisite to allowing access to

organizational information systems.

(vii) Sanitize or destroy information system media containing Federal Contract Information before disposal or release for reuse.

(viii) Limit physical access to organizational information systems, equipment, and the respective operating environments to authorized individuals.

(ix) Escort visitors and monitor visitor activity; maintain audit logs of physical access; and control and manage physical access devices.

(x) Monitor, control, and protect organizational communications (i.e., information transmitted or received by organizational information systems) at the external boundaries and key internal boundaries of the information systems.

(xi) Implement subnetworks for publicly accessible system components that are physically or logically separated from internal networks.

(xii) Identify, report, and correct information and information system flaws in a timely manner.

(xiii) Provide protection from malicious code at appropriate locations within organizational information systems.

(xiv) Update malicious code protection mechanisms when new releases are available.

(xv) Perform periodic scans of the information system and real-time scans of files from external sources as files are downloaded, opened, or executed.

(2) Other requirements. This clause does not relieve the Contractor of any other specific safeguarding requirements specified by Federal agencies and departments relating to covered contractor information systems generally or other Federal safeguarding requirements for controlled unclassified information (CUI) as established by Executive Order 13556.

(c) Subcontracts. The Contractor shall include the substance of this clause, including this paragraph (c), in subcontracts under this contract (including subcontracts for the acquisition of commercial products or commercial services, other than commercially available off-the-shelf items), in which the subcontractor may have Federal contract information residing in or transiting through its information system.

(End of clause)

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# 52.211-10 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (APR 1984)

The Contractor shall be required to (a) commence work under this contract within 10 calendar days after the date the Contractor receives the notice to proceed, (b) prosecute the work diligently, and (c) complete the entire work ready for use not later than 850 calendar days from Notice to Proceed. The time stated for completion shall include final cleanup of the premises.

(End of clause)

# 52.211-12 LIQUIDATED DAMAGES--CONSTRUCTION (SEP 2000)

(a) If the Contractor fails to complete the work within the time specified in the contract, the Contractor shall pay liquidated damages to the Government in the amount of \$2,385 for each calendar day of delay until the work is completed or accepted.

(b) If the Government terminates the Contractor's right to proceed, liquidated damages will continue to accrue until the work is completed. These liquidated damages are in addition to excess costs of repurchase under the Termination clause.

(End of clause)

#### 52.211-13 TIME EXTENSIONS (SEP 2000)

Time extensions for contract changes will depend upon the extent, if any, by which the changes cause delay in the completion of the various elements of construction. The change order granting the time extension may provide that the contract completion date will be extended only for those specific elements related to the changed work and that the remaining contract completion dates for all other portions of the work will not be altered. The change order also may provide an equitable readjustment of liquidated damages under the new completion schedule.

(End of clause)

#### 52.219-8 UTILIZATION OF SMALL BUSINESS CONCERNS (JAN 2025)

(a) Definitions. As used in this contract--

HUBZone small business concern means a small business concern that meets the requirements described in 13 CFR 126.200, certified by the Small Business Administration (SBA) and designated by SBA as a HUBZone small business concern in the Dynamic Small Business Search (DSBS) and SAM.

Service-disabled veteran-owned small business (SDVOSB) concern means a small business concern--

(1)(i) Not less than 51 percent of which is owned and controlled by one or more service-disabled veterans or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more service-disabled veterans; and

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(ii) The management and daily business operations of which are controlled by one or more service-disabled veterans or, in the case of a service-disabled veteran with permanent and severe disability, the spouse or permanent caregiver of such veteran; or

(2) A small business concern eligible under the SDVOSB Program in accordance with 13 CFR part 128 (see subpart 19.14).

(3) Service-disabled veteran, as used in this definition, means a veteran, as defined in 38 U.S.C. 101(2), with a disability that is service-connected, as defined in 38 U.S.C. 101(16), and who is registered in the Beneficiary Identification and Records Locator Subsystem, or successor system that is maintained by the Department of Veterans Affairs' Veterans Benefits Administration, as a service-disabled veteran.

Service-disabled veteran-owned small business (SDVOSB) concern eligible under the SDVOSB Program means an SDVOSB concern that--

(1) Effective January 1, 2024, is designated in the System for Award Management (SAM) as certified by the Small Business Administration (SBA) in accordance with 13 CFR 128.300; or

(2) Has represented that it is an SDVOSB concern in SAM and submitted a complete application for certification to SBA on or before December 31, 2023.

Service-disabled veteran-owned small business (SDVOSB) Program means a program that authorizes contracting officers to limit competition, including award on a sole-source basis, to SDVOSB concerns eligible under the SDVOSB Program.

Small business concern means a concern, including its affiliates, that is independently owned and operated, not dominant in its field of operation and qualified as a small business under the criteria and size standards in 13 CFR part 121, including the size standard that corresponds to the NAICS code assigned to the contract or subcontract.

Small disadvantaged business concern, consistent with 13 CFR 124.1001, means a small business concern under the size standard applicable to the acquisition, that--

(1) Is at least 51 percent unconditionally and directly owned (as defined at 13 CFR 124.105) by--

(i) One or more socially disadvantaged (as defined at 13 CFR 124.103) and economically disadvantaged (as defined at 13 CFR 124.104) individuals who are citizens of the United States; and

(ii) Each individual claiming economic disadvantage has a net worth not exceeding the threshold at 13 CFR 124.104(c)(2) after taking into account the applicable exclusions set forth at 13 CFR 124.104(c)(2); and

(2) The management and daily business operations of which are controlled (as defined at 13.CFR 124.106) by individuals, who meet the criteria in paragraphs (1)(i) and (ii) of this definition.

Veteran-owned small business concern means a small business concern--

(1) Not less than 51 percent of which is owned and controlled by one or more veterans (as defined at 38 U.S.C. 101(2)) or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more veterans; and

(2) The management and daily business operations of which are controlled by one or more veterans.

Women-owned small business concern means a small business concern--

(1) That is at least 51 percent owned by one or more women, or, in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and

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(2) Whose management and daily business operations are controlled by one or more women.

(b) It is the policy of the United States that small business concerns, veteran-owned small business concerns, service-disabled veteran-owned small business concerns, HUBZone small business concerns, small disadvantaged business concerns, and women-owned small business concerns shall have the maximum practicable opportunity to participate in performing contracts let by any Federal agency, including contracts and subcontracts for subsystems, assemblies, components, and related services for major systems. It is further the policy of the United States that its prime contractors establish procedures to ensure the timely payment of amounts due pursuant to the terms of their subcontracts with small business concerns, veteran-owned small business concerns, service-disabled veteran-owned small business concerns, small disadvantaged business concerns, and women-owned small business concerns.

(c)(1) A joint venture qualifies as a small business concern if--

(i) Each party to the joint venture qualifies as small under the size standard for the solicitation; or

(ii) The protege is small under the size standard for the solicitation in a joint venture comprised of a mentor and protege with an approved mentor-protege agreement under a SBA mentor-protege program. (See 13 CFR 125.9(d).)

(2) A joint venture qualifies as a HUBZone small business concern if it complies with the requirements in 13 CFR 126.616(a) through (c).

(d) The Contractor hereby agrees to carry out this policy in the awarding of subcontracts to the fullest extent consistent with efficient contract performance. The Contractor further agrees to cooperate in any studies or surveys as may be conducted by the United States Small Business Administration or the awarding agency of the United States as may be necessary to determine the extent of the Contractor's compliance with this clause.

(e)(1) Unless the Contractor has reason to question the representation, it may accept a subcontractor's written representations of its size and socioeconomic status as a small business, small disadvantaged business, veteranowned small business, service-disabled veteran-owned small business, or a women-owned small business if the subcontractor represents that the size and socioeconomic status representations with its offer are current, accurate, and complete as of the date of the offer for the subcontract.

(2) Unless the Contractor has reason to question the representation, it may accept a subcontractor's representations of its size and socioeconomic status as a small business, small disadvantaged business, veteran-owned small business, service-disabled veteran-owned small business, or a women-owned small business in the System for Award Management (SAM) if--

(i) The subcontractor is registered in SAM; and

(ii) The subcontractor represents that the size and socioeconomic status representations made in SAM are current, accurate and complete as of the date of the offer for the subcontract.

(3) The Contractor may not require the use of SAM for the purposes of representing size or socioeconomic status in connection with a subcontract.

(4) In accordance with 13 CFR 121.411, 126.900, 127.700, and 128.600, a contractor acting in good faith is not liable for misrepresentations made by its subcontractors regarding the subcontractor's size or socioeconomic status.

(5) The Contractor shall confirm that a subcontractor representing itself as a HUBZone small business concern is certified by SBA as a HUBZone small business concern by accessing SAM or by accessing DSBS at <u>https://web.sba.gov/pro-net/search/dsp\_dsbs.cfm</u>. If the subcontractor is a joint venture, the Contractor shall confirm that at least one party to the joint venture is certified by SBA as a HUBZone small business concern. The Contractor may confirm the representation by accessing SAM.

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(End of clause)

# 52.222-35 EQUAL OPPORTUNITY FOR VETERANS (JUN 2020)

(a) Definitions. As used in this clause--

"Active duty wartime or campaign badge veteran," "Armed Forces service medal veteran," "disabled veteran," "protected veteran," "qualified disabled veteran," and "recently separated veteran" have the meanings given at Federal Acquisition Regulation (FAR) 22.1301.

(b) Equal opportunity clause. The Contractor shall abide by the requirements of the equal opportunity clause at 41 CFR 60-300.5(a), as of March 24, 2014. This clause prohibits discrimination against qualified protected veterans, and requires affirmative action by the Contractor to employ and advance in employment qualified protected veterans.

(c) Subcontracts. The Contractor shall insert the terms of this clause in subcontracts valued at or above the threshold specified in FAR 22.1303(a) on the date of subcontract award, unless exempted by rules, regulations, or orders of the Secretary of Labor. The Contractor shall act as specified by the Director, Office of Federal Contract Compliance Programs, to enforce the terms, including action for noncompliance. Such necessary changes in language may be made as shall be appropriate to identify properly the parties and their undertakings.

(End of clause)

# 52.225-11 BUY AMERICAN--CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS (NOV 2023)

(a) Definitions. As used in this clause--

Caribbean Basin country construction material means a construction material that--

(1) Is wholly the growth, product, or manufacture of a Caribbean Basin country; or

(2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a Caribbean Basin country into a new and different construction material distinct from the materials from which it was transformed.

Commercially available off-the-shelf (COTS) item-

(1) Means any item of supply (including construction material) that is--

(i) A commercial product (as defined in paragraph (1) of the definition of "commercial product" at Federal Acquisition Regulation (FAR) 2.101);

(ii) Sold in substantial quantities in the commercial marketplace; and

(iii) Offered to the Government, under a contract or subcontract at any tier, without modification, in the same form in which it is sold in the commercial marketplace; and

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(2) Does not include bulk cargo, as defined in 46 U.S.C. 40102(4) such as agricultural products and petroleum products.

Component means an article, material, or supply incorporated directly into a construction material.

Construction material means an article, material, or supply brought to the construction site by the Contractor or subcontractor for incorporation into the building or work. The term also includes an item brought to the site preassembled from articles, materials, or supplies. However, emergency life safety systems, such as emergency lighting, fire alarm, and audio evacuation systems, that are discrete systems incorporated into a public building or work and that are produced as complete systems, are evaluated as a single and distinct construction material regardless of when or how the individual parts or components of those systems are delivered to the construction site. Materials purchased directly by the Government are supplies, not construction material.

Cost of components means--

(1) For components purchased by the Contractor, the acquisition cost, including transportation costs to the place of incorporation into the construction material (whether or not such costs are paid to a domestic firm), and any applicable duty (whether or not a duty-free entry certificate is issued); or

(2) For components manufactured by the Contractor, all costs associated with the manufacture of the component, including transportation costs as described in paragraph (1) of this definition, plus allocable overhead costs, but excluding profit. Cost of components does not include any costs associated with the manufacture of the construction material.

Critical component means a component that is mined, produced, or manufactured in the United States and deemed critical to the U.S. supply chain. The list of critical components is at FAR 25.105.

Critical item means a domestic construction material or domestic end product that is deemed critical to U.S. supply chain resiliency. The list of critical items is at FAR 25.105.

Designated country means any of the following countries:

(1) A World Trade Organization Government Procurement Agreement (WTO GPA) country (Armenia, Aruba, Australia, Austria, Belgium, Bulgaria, Canada, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea (Republic of), Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Moldova, Montenegro, Netherlands, New Zealand, North Macedonia, Norway, Poland, Portugal, Romania, Singapore, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Taiwan, Ukraine, or United Kingdom);

(2) A Free Trade Agreement (FTA) country (Australia, Bahrain, Chile, Colombia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Korea (Republic of), Mexico, Morocco, Nicaragua, Oman, Panama, Peru, or Singapore);

(3) A least developed country (Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, Central African Republic, Chad, Comoros, Democratic Republic of Congo, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, Laos, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Nepal, Niger, Rwanda, Samoa, Sao Tome and Principe, Senegal, Sierra Leone, Solomon Islands, Somalia, South Sudan, Tanzania, Timor-Leste, Togo, Tuvalu, Uganda, Vanuatu, Yemen, or Zambia); or

(4) A Caribbean Basin country (Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bonaire, British Virgin Islands, Curacao, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat, Saba, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Sint Eustatius, Sint Maarten, or Trinidad and Tobago).

Designated country construction material means a construction material that is a WTO GPA country construction material, an FTA country construction material, a least developed country construction material, or a Caribbean Basin country construction material.

Domestic construction material means--

(1) For construction material that does not consist wholly or predominantly of iron or steel or a combination of both-

(i) An unmanufactured construction material mined or produced in the United States; or

(ii) A construction material manufactured in the United States, if--

(A) The cost of its components mined, produced, or manufactured in the United States exceeds 60 percent of the cost of all its components, except that the percentage will be 65 percent for items delivered in calendar years 2024 through 2028 and 75 percent for items delivered starting in calendar year 2029. Components of foreign origin of the same class or kind for which nonavailability determinations have been made are treated as domestic. Components of unknown origin are treated as foreign; or

(B) The construction material is a COTS item; or

(2) For construction material that consists wholly or predominantly of iron or steel or a combination of both, a construction material manufactured in the United States if the cost of foreign iron and steel constitutes less than 5 percent of the cost of all components used in such construction material. The cost of foreign iron and steel includes but is not limited to the cost of foreign iron or steel mill products (such as bar, billet, slab, wire, plate, or sheet), castings, or forgings utilized in the manufacture of the construction material and a good faith estimate of the cost of all foreign iron or steel components excluding COTS fasteners. Iron or steel components of unknown origin are treated as foreign. If the construction material contains multiple components, the cost of all the materials used in such construction material is calculated in accordance with the definition of "cost of components".

Fastener means a hardware device that mechanically joins or affixes two or more objects together. Examples of fasteners are nuts, bolts, pins, rivets, nails, clips, and screws.

Foreign construction material means a construction material other than a domestic construction material.

Foreign iron and steel means iron or steel products not produced in the United States. Produced in the United States means that all manufacturing processes of the iron or steel must take place in the United States, from the initial melting stage through the application of coatings, except metallurgical processes involving refinement of steel additives. The origin of the elements of the iron or steel is not relevant to the determination of whether it is domestic or foreign.

Least developed country construction material means a construction material that--

(1) Is wholly the growth, product, or manufacture of a least developed country; or

(2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a least developed country into a new and different construction material distinct from the materials from which it was transformed.

Free Trade Agreement country construction material means a construction material that-

(1) Is wholly the growth, product, or manufacture of a Free Trade Agreement (FTA) country; or

(2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a FTA country into a new and different construction material distinct from the materials from which it was transformed.

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Least developed country construction material means a construction material that-

(1) Is wholly the growth, product, or manufacture of a least developed country; or

(2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a least developed country into a new and different construction material distinct from the materials from which it was transformed.

Predominantly of iron or steel or a combination of both means that the cost of the iron and steel content exceeds 50 percent of the total cost of all its components. The cost of iron and steel is the cost of the iron or steel mill products (such as bar, billet, slab, wire, plate, or sheet), castings, or forgings utilized in the manufacture of the product and a good faith estimate of the cost of iron or steel components excluding COTS fasteners.

Steel means an alloy that includes at least 50 percent iron, between 0.02 and 2 percent carbon, and may include other elements.

United States means the 50 States, the District of Columbia, and outlying areas.

WTO GPA country construction material means a construction material that--

(1) Is wholly the growth, product, or manufacture of a WTO GPA country; or

(2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a WTO GPA country into a new and different construction material distinct from the materials from which it was transformed.

(b) Construction materials.

(1) This clause implements 41 U.S.C. chapter 83, Buy American, by providing a preference for domestic construction material. In accordance with 41 U.S.C. 1907, the domestic content test of the Buy American statute is waived for construction material that is a COTS item, except that for construction material that consists wholly or predominantly of iron or steel or a combination of both, the domestic content test is applied only to the iron and steel content of the construction material, excluding COTS fasteners. (See FAR 12.505(a)(2)). In addition, the Contracting Officer has determined that the WTO GPA and Free Trade Agreements (FTAs) apply to this acquisition. Therefore, the Buy American restrictions are waived for designated country construction materials.

(2) The Contractor shall use only domestic or designated country construction material in performing this contract, except as provided in paragraphs (b)(3) and (b)(4) of this clause.

(3) The requirement in paragraph (b)(2) of this clause does not apply to information technology that is a commercial product or to the construction materials or components listed by the Government as follows:

#### None

(4) The Contracting Officer may add other foreign construction material to the list in paragraph (b)(3) of this clause if the Government determines that--

(i) The cost of domestic construction material would be unreasonable.

(A) For domestic construction material that is not a critical item or does not contain critical components.

(1) The cost of a particular domestic construction material subject to the restrictions of the Buy American statute is unreasonable when the cost of such material exceeds the cost of foreign material by more than 20 percent;

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(2) For construction material that is not a COTS item and does not consist wholly or predominantly of iron or steel or a combination of both, if the cost of a particular domestic construction material is determined to be unreasonable or there is no domestic offer received, and the low offer is for foreign construction material that does not exceed 55 percent domestic content, the Contracting Officer will treat the lowest offer of foreign construction material that is manufactured in the United States and exceeds 55 percent domestic content as a domestic offer and determine whether the cost of that offer is unreasonable by applying the evaluation factor listed in paragraph (b)(4)(i)(A)(1) of this clause.

(3) The procedures in paragraph (b)(4)(i)(A)(2) of this clause will no longer apply as of January 1, 2030.

(B) For domestic construction material that is a critical item or contains critical components.

(1) The cost of a particular domestic construction material that is a critical item or contains critical components, subject to the requirements of the Buy American statute, is unreasonable when the cost of such material exceeds the cost of foreign material by more than 20 percent plus the additional preference factor identified for the critical item or construction material containing critical components listed at FAR 25.105.

(2) For construction material that does not consist wholly or predominantly of iron or steel or a combination of both, if the cost of a particular domestic construction material is determined to be unreasonable or there is no domestic offer received, and the low offer is for foreign construction material that does not exceed 55 percent domestic content, the Contracting Officer will treat the lowest offer of foreign construction material that is manufactured in the United States and exceeds 55 percent domestic content as a domestic offer, and determine whether the cost of that offer is unreasonable by applying the evaluation factor listed in paragraph (b)(4)(i)(B)(1) of this clause.

(3) The procedures in paragraph (b)(4)(i)(B)(2) of this clause will no longer apply as of January 1, 2030.

(ii) The application of the restriction of the Buy American statute to a particular construction material would be impracticable or inconsistent with the public interest; or

(iii) The construction material is not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities of a satisfactory quality.

(c) Request for determination of inapplicability of the Buy American statute.

(1)(i) Any Contractor request to use foreign construction material in accordance with paragraph (b)(4) of this clause shall include adequate information for Government evaluation of the request, including--

(A) A description of the foreign and domestic construction materials;

- (B) Unit of measure;
- (C) Quantity;
- (D) Price;
- (E) Time of delivery or availability;
- (F) Location of the construction project;
- (G) Name and address of the proposed supplier; and

(H) A detailed justification of the reason for use of foreign construction materials cited in accordance with paragraph (b)(3) of this clause.

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(ii) A request based on unreasonable cost shall include a reasonable survey of the market and a completed price comparison table in the format in paragraph (d) of this clause.

(iii) The price of construction material shall include all delivery costs to the construction site and any applicable duty (whether or not a duty-free certificate may be issued).

(iv) Any Contractor request for a determination submitted after contract award shall explain why the Contractor could not reasonably foresee the need for such determination and could not have requested the determination before contract award. If the Contractor does not submit a satisfactory explanation, the Contracting Officer need not make a determination.

(2) If the Government determines after contract award that an exception to the Buy American statute applies and the Contracting Officer and the Contractor negotiate adequate consideration, the Contracting Officer will modify the contract to allow use of the foreign construction material. However, when the basis for the exception is the unreasonable price of a domestic construction material, adequate consideration is not less than the differential established in paragraph (b)(4)(i) of this clause.

(3) Unless the Government determines that an exception to the Buy American statute applies, use of foreign construction material is noncompliant with the Buy American statute.

(d) Data. To permit evaluation of requests under paragraph (c) of this clause based on unreasonable cost, the Contractor shall include the following information and any applicable supporting data based on the survey of suppliers:

Foreign and Domestic Construction Materials Price Comparison

Construction material description	Unit of measure	Quantity	Price (dollars) *
Item 1: Foreign construction material Domestic construction material			
Item 2: Foreign construction material Domestic construction material			······

[\* Include all delivery costs to the construction site and any applicable duty (whether or not a duty-free entry certificate is issued)].

[List name, address, telephone number, and contact for suppliers surveyed. Attach copy of response; if oral, attach summary.]

[Include other applicable supporting information.]

(End of clause)

#### 52.228-14 IRREVOCABLE LETTER OF CREDIT (NOV 2014)

(a) "Irrevocable letter of credit" (ILC), as used in this clause, means a written commitment by a federally insured financial institution to pay all or part of a stated amount of money, until the expiration date of the letter, upon presentation by the Government (the beneficiary) of a written demand therefor. Neither the financial institution nor the offeror/Contractor can revoke or condition the letter of credit.

(b) If the offeror intends to use an ILC in lieu of a bid bond, or to secure other types of bonds such as performance and payment bonds, the letter of credit and letter of confirmation formats in paragraphs (e) and (f) of this clause shall be used.

(c) The letter of credit shall be irrevocable, shall require presentation of no document other than a written demand and the ILC (including confirming letter, if any), shall be issued/confirmed by an acceptable federally insured financial institution as provided in paragraph (d) of this clause, and--

(1) If used as a bid guarantee, the ILC shall expire no earlier than 60 days after the close of the bid acceptance period;

(2) If used as an alternative to corporate or individual sureties as security for a performance or payment bond, the offeror/Contractor may submit an ILC with an initial expiration date estimated to cover the entire period for which financial security is required or may submit an ILC with an initial expiration date that is a minimum period of one year from the date of issuance. The ILC shall provide that, unless the issuer provides the beneficiary written notice of non-renewal at least 60 days in advance of the current expiration date, the ILC is automatically extended without amendment for one year from the expiration date, or any future expiration date, until the period of required coverage is completed and the Contracting Officer provides the financial institution with a written statement waiving the right to payment. The period of required coverage shall be:

(i) For contracts subject to 40 U.S.C. chapter 31, subchapter III, Bonds, the later of--

(A) One year following the expected date of final payment;

(B) For performance bonds only, until completion of any warranty period; or

(C) For payment bonds only, until resolution of all claims filed against the payment bond during the one-year period following final payment.

(ii) For contracts not subject to the Miller Act, the later of--

(A) 90 days following final payment; or

(B) For performance bonds only, until completion of any warranty period.

(d)(1) Only federally insured financial institutions rated investment grade by a commercial rating service shall issue or confirm the ILC.

(2) Unless the financial institution issuing the ILC had letter of credit business of at least \$25 million in the past year, ILCs over \$5 million must be confirmed by another acceptable financial institution that had letter of credit business of at least \$25 million in the past year.

(3) The Offeror/Contractor shall provide the Contracting Officer a credit rating that indicates the financial institutions have the required credit rating as of the date of issuance of the ILC.

(4) The current rating for a financial institution is available through any of the following rating services registered with the U.S. Securities and Exchange Commission (SEC) as a Nationally Recognized Statistical Rating Organization (NRSRO). NRSRO's can be located at the Web site <u>http://www.sec.gov/answers/nrsro.htm</u> maintained by the SEC.

(e) The following format shall be used by the issuing financial institution to create an ILC:

[Issuing Financial Institution's Letterhead or Name and Address]

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Issue Date

IRREVOCABLE LETTER OF CREDIT NO.

Account party's name \_\_\_\_\_

Account party's address \_\_\_\_\_

For Solicitation No. \_\_\_\_\_(for reference only)

TO: [ \_\_\_\_\_ U.S. Government agency]

[ \_\_\_\_ U.S. Government agency's address]

1. We hereby establish this irrevocable and transferable Letter of Credit in your favor for one or more drawings up to United States \$ \_\_\_\_\_\_. This Letter of Credit is payable at [issuing financial institution's and, if any, confirming financial institution's address and, if any, confirming financial institution's address] and expires with our close of business on \_\_\_\_\_\_\_, or any automatically extended expiration date.

2. We hereby undertake to honor your or the transferee's sight draft(s) drawn on the issuing or, if any, the confirming financial institution, for all or any part of this credit if presented with this Letter of Credit and confirmation, if any, at the office specified in paragraph 1 of this Letter of Credit on or before the expiration date or any automatically extended expiration date.

3. [This paragraph is omitted if used as a bid guarantee, and subsequent paragraphs are renumbered.] It is a condition of this Letter of Credit that it is deemed to be automatically extended without amendment for one year from the expiration date hereof, or any future expiration date, unless at least 60 days prior to any expiration date, we notify you or the transferee by registered mail, or other receipted means of delivery, that we elect not to consider this Letter of Credit renewed for any such additional period. At the time we notify you, we also agree to notify the account party (and confirming financial institution, if any) by the same means of delivery.

4. This Letter of Credit is transferable. Transfers and assignments of proceeds are to be effected without charge to either the beneficiary or the transferee/assignee of proceeds. Such transfer or assignment shall be only at the written direction of the Government (the beneficiary) in a form satisfactory to the issuing financial institution and the confirming financial institution, if any.

5. This Letter of Credit is subject to the Uniform Customs and Practice (UCP) for Documentary Credits, International Chamber of Commerce Publication No.
of ILC issuance, e.g., "Publication 600, 2006 edition") and to the extent not inconsistent therewith, to the laws of --[State of confirming financial institution, if any, otherwise State of issuing financial institution].

6. If this credit expires during an interruption of business of this financial institution as described in Article 17 of the UCP, the financial institution specifically agrees to effect payment if this credit is drawn against within 30 days after the resumption of our business.

Sincerely,

[ \_\_\_\_ Issuing financial institution]

(f) The following format shall be used by the financial institution to confirm an ILC:

[Confirming Financial Institution's Letterhead or Name and Address]

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(Date) \_\_\_\_

Our Letter of Credit Advice Number \_\_\_\_\_

Beneficiary: \_\_\_\_ [U.S. Government agency]

Issuing Financial Institution:

Issuing Financial Institution's LC No.:

Gentlemen:

1. We hereby confirm the above indicated Letter of Credit, the original of which is attached, issued by \_\_\_\_ [name of issuing financial institution] for drawings of up to United States dollars \_\_\_\_/U.S. \$ \_\_\_\_ and expiring with our close of business on \_\_\_\_ [the expiration date], or any automatically extended expiration date.

2. Draft(s) drawn under the Letter of Credit and this Confirmation are payable at our office located at \_\_\_\_\_.

3. We hereby undertake to honor sight draft(s) drawn under and presented with the Letter of Credit and this Confirmation at our offices as specified herein.

4. [This paragraph is omitted if used as a bid guarantee, and subsequent paragraphs are renumbered.] It is a condition of this confirmation that it be deemed automatically extended without amendment for one year from the expiration date hereof, or any automatically extended expiration date, unless:

(a) At least 60 days prior to any such expiration date, we shall notify the Contracting Officer, or the transferee and the issuing financial institution, by registered mail or other receipted means of delivery, that we elect not to consider this confirmation extended for any such additional period; or

(b) The issuing financial institution shall have exercised its right to notify you or the transferee, the account party, and ourselves, of its election not to extend the expiration date of the Letter of Credit.

5. This confirmation is subject to the Uniform Customs and Practice (UCP) for Documentary Credits, International Chamber of Commerce Publication No. \_\_\_\_\_\_ -- (Insert version in effect at the time of ILC issuance, e.g., ``Publication 600, 2006 edition") and to the extent not inconsistent therewith, to the laws of \_\_\_\_\_\_ --[State of confirming financial institution].

6. If this confirmation expires during an interruption of business of this financial institution as described in Article 17 of the UCP, we specifically agree to effect payment if this credit is drawn against within 30 days after the resumption of our business.

Sincerely,

[Confirming financial institution]

(g) The following format shall be used by the Contracting Officer for a sight draft to draw on the Letter of Credit:

SIGHT DRAFT

[City, State]

(Date) \_\_\_\_\_

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[Name and address of financial institution]

Pay to the order of \_\_\_ [Beneficiary Agency] \_\_\_ the sum of United States \_\_\_ This draft is drawn under Irrevocable Letter of Credit No. \_\_\_

\_\_\_\_ [Beneficiary Agency]

By: \_\_\_\_

(End of clause)

# 52.236-1 PERFORMANCE OF WORK BY THE CONTRACTOR (APR 1984)

The Contractor shall perform on the site, and with its own organization, work equivalent to at least 20% percent of the total amount of work to be performed under the contract. This percentage may be reduced by a supplemental agreement to this contract if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the Government.

(End of clause)

# 52.236-4 PHYSICAL DATA (APR 1984)

Data and information furnished or referred to below is for the Contractor's information. The Government shall not be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor.

(a) The indications of physical conditions on the drawings and in the specifications are the result of site investigations by:

Cores and soil samples from results of site investigations are available for inspection at various locations in the Louisville area, subject to prior arrangement at the Office of the District Engineer, Engineering Division, Steven Hite, 600 Dr. Martin Luther King, Jr. Place, Louisville, Kentucky 40201, (502) 315-6450.

(b) The Contractor shall make his own investigations as to weather conditions at the site. Data may be obtained from various National Weather Service offices located generally at airports of principal cities, the nearest to this project being: Detroit/Pontiac, MI.

(c) Access ways shall be investigated by the Contractor to satisfy himself as to their existence and allowable use.

(d) Historical Data for all areas may be obtained from: U.S. Department of Commerce National Climatic Center Federal Building Asheville, NC 28801

(End of clause)

52.236-27 SITE VISIT (CONSTRUCTION) (FEB 1995) – ALTERNATE I (FEB 1995)

(a) The clauses at 52.236-2, Differing Site Conditions, and 52.236-3, Site Investigations and Conditions Affecting the Work, will be included in any contract awarded as a result of this solicitation. Accordingly, offerors or quoters are urged and expected to inspect the site where the work will be performed.

- (b) An organized site visit has been scheduled for--29 May 2025 at 10:00AM EST
- (c) Participants will meet at--H-1 LOT
   6501 E Eleven Mile Rd. Warren, MI 48397-0001 USA

(End of provision)

# 52.252-2 CLAUSES INCORPORATED BY REFERENCE (FEB 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es):

The full text of FAR clauses and provisions can be found at this site: <u>https://www.acquisition.gov/browse/index/far</u>

The full text of DFARS clauses and provisions can be found at this site: <u>https://www.acq.osd.mil/dpap/dars/dfarspgi/current/</u>

(End of clause)

# 52.252-6 AUTHORIZED DEVIATIONS IN CLAUSES (NOV 2020)

(a) The use in this solicitation or contract of any Federal Acquisition Regulation (48 CFR Chapter 1) clause with an authorized deviation is indicated by the addition of "(DEVIATION)" after the date of the clause.

(b) The use in this solicitation or contract of any Defense Federal Acquisition Regulation Supplement (48 CFR Chapter 2) clause with an authorized deviation is indicated by the addition of "(DEVIATION)" after the name of the regulation.

(End of clause)

# 252.236-7001 CONTRACT DRAWINGS AND SPECIFICATIONS (AUG 2000)

(a) The Government will provide to the Contractor, without charge, one set of contract drawings and specifications, except publications incorporated into the technical provisions by reference, in electronic or paper media as chosen by the Contracting Officer.

- (b) The Contractor shall--
- (1) Check all drawings furnished immediately upon receipt;

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(2) Compare all drawings and verify the figures before laying out the work;

(3) Promptly notify the Contracting Officer of any discrepancies;

(4) Be responsible for any errors that might have been avoided by complying with this paragraph (b); and

(5) Reproduce and print contract drawings and specifications as needed.

(c) In general--

(1) Large-scale drawings shall govern small-scale drawings; and

(2) The Contractor shall follow figures marked on drawings in preference to scale measurements.

(d) Omissions from the drawings or specifications or the misdescription of details of work that are manifestly necessary to carry out the intent of the drawings and specifications, or that are customarily performed, shall not relieve the Contractor from performing such omitted or misdescribed details of the work. The Contractor shall perform such details as if fully and correctly set forth and described in the drawings and specifications.

(e) The work shall conform to the specifications and the contract drawings identified on the following index of drawings:

G-001

(End of clause)

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Section 00 73 00 - Supplementary Conditions

WAGE DETERMINATION "General Decision Number: MI20250091 04/11/2025

Superseded General Decision Number: MI20240091

State: Michigan

Construction Type: Building

County: Macomb County in Michigan.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

If the contract is entered  . Executive Order 14026
into on or after January 30,   generally applies to the
2022, or the contract is   contract.
renewed or extended (e.g., an  . The contractor must pay
option is exercised) on or   all covered workers at
after January 30, 2022:   least \$17.75 per hour (or
the applicable wage rate
listed on this wage
determination, if it is
higher) for all hours
spent performing on the
contract in 2025.
If the contract was awarded on. Executive Order 13658
or between January 1, 2015 and generally applies to the
January 29, 2022, and the   contract.
contract is not renewed or  . The contractor must pay all
extended on or after January   covered workers at least
30, 2022: \$13.30 per hour (or the
applicable wage rate listed
on this wage determination,
if it is higher) for all
hours spent performing on
that contract in 2025.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for

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performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at http://www.dol.gov/whd/govcontracts.

Modification Number Publication Date

0	01/03/2025
1	02/21/2025
2	03/14/2025
3	04/04/2025
4	04/11/2025

ASBE0025-002 06/01/2023

Rates Fringes

ASBESTOS WORKER/HEAT & FROST INSULATOR.....\$37.98 34.27

# BOIL0169-001 01/01/2025

Rates Fringes

BOILERMAKER.....\$ 43.50 36.74

\* BRMI0001-001 06/01/2024

Rates Fringes

BRICKLAYER	\$ 41.66	26.53
TILE FINISHER	\$ 33.50	23.52
TILE SETTER	\$ 40.53	23.62

CARP0687-003 06/01/2024

Rates Fringes

CARPENTER (Including Acoustical Ceiling Installation, Drywall Hanging, Form Work, Metal Stud Installation & Scaffold Building)......\$ 41.11 30.23

CARP1045-001 06/01/2024

Rates Fringes

CARPENTER (Floor Layer -Carpet, Resilient, & Vinyl Flooring)......\$34.09 20.81

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CARP1102-002 06/01/2024

Rates Fringes

MILLWRIGHT.....\$ 36.47 40.52

ELEC0058-001 07/21/2024

Rates Fringes

ELECTRICIAN (Low Voltage Wiring and Installation of Alarms) Installer.....\$31.64 17.72 Technician.....\$39.93 17.97 ELECTRICIAN.....\$51.32 28.54

ELEV0036-002 01/01/2025

Rates Fringes

ELEVATOR MECHANIC......\$ 65.01 38.435+a+b

FOOTNOTES:

A. PAID HOLIDAYS: New Years Day; Memorial Day; Independence Day; Labor Day; Veterans' Day; Thanksgiving Day; the Friday after Thanksgiving Day; and Christmas Day.

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B. Employer contributes 8% basic hourly rate for 5 years or more of service of 6% basic hourly rate for 6 months to 5 years of service as vacation pay credit.

ENGI0324-017 06/01/2024

Rates Fringes

OPERATOR	R: Power Equipment	
GROUP	1\$ 49.54	25.35
GROUP	2\$ 48.04	25.35
GROUP	3\$ 46.54	25.35
GROUP	4\$ 46.24	25.35
GROUP	5\$ 45.42	25.35
GROUP	6\$ 44.56	25.35
GROUP	7\$ 43.59	25.35
GROUP	8\$ 41.88	25.35
GROUP	9\$ 31.79	25.35

# FOOTNOTES:

Tower cranes: to be paid the crane operator rate determined by the combined length of the mast and the boom. If the worker must climb 50 ft. or more to the work station, \$.25 per hour additional.

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Derrick and cranes where the operator must climb 50 ft. or more to the work station, \$.25 per hour additional to the applicable crane operator rate.

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1: Crane with boom and jib or leads 400' or longer

GROUP 2: Crane with boom and jib or leads 300' or longer

GROUP 3: Crane with boom and jib or leads 220' or longer

GROUP 4: Crane with boom and jib or leads 140' or longer

GROUP 5: Crane with boom and jib or leads 120' or longer

GROUP 6: Regular crane operator, and concrete pump with boom operator

GROUP 7: Backhoe/Excavator/Trackhoe, bobcat/skid Loader, broom/sweeper, bulldozer, grader/blade, highlift, hoist, loader, roller, scraper, tractor & trencher

GROUP 8: Forklift & extend-a-boom forklift

**GROUP 9: Oiler** 

IRON0025-019 06/01/2024

Rates Fringes

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IRONWORKER		
REINFORCING	\$ 33.43	37.15
STRUCTURAL	\$ 35.55	35.83

\* IRON0025-022 06/01/2024

Rates Fringes

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IRONWORKER STRUCTURAL (Metal Building Erection Only).....\$ 27.81 27.53

LABO0259-002 08/01/2024

Rates Fringes

LABORER: Asbestos Abatement (Removal from Floors, Walls & Ceilings).....\$ 36.53 15.92

LABO0334-005 06/01/2024

Rates Fringes

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LABORER: Landscape &	
Irrigation	
GROUP 1\$ 28.60	11.60
GROUP 2\$ 26.34	11.60

## CLASSIFICATIONS

GROUP 1: Landscape specialist, including air, gas and diesel equipment operator, lawn sprinkler installer, skidsteer (or equivalent)

GROUP 2: Landscape laborer: small power tool operator, material mover, truck driver and lawn sprinkler installer tender

LABO1191-002 06/01/2024

Rates Fringes

LABORER Common or General; Grade Checker; Mason Tender -Brick/Cement/Concrete; Pipelayer; Sandblaster.....\$ 35.34 17.75

PAIN0022-003 06/01/2022

Rates Fringes

PAINTER: Brush and Roller......\$ 32.8520.41PAINTER: Drywall20.41Finishing/Taping......\$ 32.8520.41PAINTER: Spray.....\$ 26.8617.66

PAIN0357-002 06/01/2024

Rates Fringes

GLAZIER.....\$ 40.00 25.20

PAID HOLIDAYS: New Year's Day, Decoration Day, Fourth of July, Labor Day, Thanksgiving Day and Christmas Day; provided that the employee has worked the last full regular scheduled work day prior to the holiday, and the first full regular scheduled work day following the holiday, provided the employee is physically able to work.

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PLAS0067-001 04/01/2014

Rates Fringes

CEMENT MASON/CONCRETE FINISHER...\$ 30.63 14.07

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PLAS0067-004 04/01/2014
Rates Fringes
PLASTERER\$ 30.63 14.07
* PLUM0098-001 06/01/2024
Rates Fringes
PLUMBER, Excludes HVAC Pipe and Unit Installation\$ 36.69 32.74
PLUM0636-003 06/05/2023
Rates Fringes
PIPEFITTER, Includes HVACPipe and Unit Installation\$ 44.7035.37
ROOF0149-001 07/01/2024
Rates Fringes
ROOFER\$ 42.68 28.75
SFMI0704-001 01/01/2025
Rates Fringes
SPRINKLER FITTER (Fire Sprinklers)\$ 51.5733.55
SHEE0080-004 06/01/2024
Rates Fringes
SHEET METAL WORKER (Including HVAC Duct Installation; Excluding HVAC System
Installation)
1EAM0247-002 06/01/2024
Rates Fringes
TRUCK DRIVER         GROUP 1         Dump; Flatbed; Pickup\$ 30.35         0.70+a+b         GROUP 2         Semi\$ 30.50         0.70+a+b         GROUP 3         Lowboy\$ 30.60

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PAID HOLIDAYS: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day. If any of the above holidays fall on a Sunday, the following Monday shall be considered the holiday and, if work is performed, the rate shall be double time.

#### FOOTNOTE:

a. \$456.70 per week, plus \$67.10 per day.

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\* SUMI2011-016 02/01/2011

Rates Fringes

INSTALLER - OVERHEAD DOOR......\$ 27.980.00IRONWORKER, ORNAMENTAL.....\$ 18.487.93TRUCK DRIVER: Tractor Haul

Truck.....\$ 13.57 \*\* 1.18

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

\*\* Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 (\$17.75) or 13658 (\$13.30). Please see the Note at the top of the wage determination for more information. Please also note that the minimum wage requirements of Executive Order 14026 are not currently being enforced as to any contract or subcontract to which the states of Texas, Louisiana, or Mississippi, including their agencies, are a party.

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.

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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

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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.

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#### 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
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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.

END OF GENERAL DECISION"

# Certified Final – Project Specifications/Seals

# Manned/Unmanned Tactical Vehicle Lab (MUMT)



September 20, 2024

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#### DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

00 80 00.00 06 04/21 SPECIAL PROVISIONS

DIVISION 01 - GENERAL REQUIREMENTS

01	11	00		08/15,	CHG	2:	08/21	SUMMARY OF WORK
01	32	01.00	06	07/18				PROJECT SCHEDULE
01	33	00		08/18,	CHG	4:	02/21	SUBMITTAL PROCEDURES
01	33	29.00	06	11/17				SUSTAINABILITY REPORTING
01	35	26.00	06					GOVERNMENT SAFETY REQUIREMENTS
01	42	00		02/19				SOURCES FOR REFERENCE PUBLICATIONS
01	45	00.15	10	11/16,	CHG	2:	08/19	RESIDENT MANAGEMENT SYSTEM CONTRACTOR
								MODE (RMS CM)
01	45	04.10	06					CONTRACTOR QUALITY CONTROL
01	45	35		11/20				SPECIAL INSPECTIONS
01	46	00.00	06	04/20				TOTAL BUILDING COMMISSIONING
01	50	00		11/20,	CHG	1:	08/21	TEMPORARY CONSTRUCTION FACILITIES AND
								CONTROLS
01	57	19.00	06	04/20				TEMPORARY ENVIRONMENTAL CONTROLS AND
								PERMITS
01	74	19		02/19,	CHG	3:	11/21	CONSTRUCTION WASTE MANAGEMENT AND
								DISPOSAL
01	78	23		08/15,	CHG	2:	08/21	OPERATION AND MAINTENANCE DATA

#### DIVISION 02 - EXISTING CONDITIONS

02 41 00 05/10, CHG 2: 02/19 DEMOLITION

#### DIVISION 03 - CONCRETE

03	30	00	02/19,	CHG	3:	11/21	CAST-IN-PLACE CONCRETE
03	45	00	05/16,	CHG	2:	11/21	PRECAST ARCHITECTURAL CONCRETE

#### DIVISION 04 - MASONRY

04 20 00 11/15, CHG 2: 05/19 UNIT MASONRY

#### DIVISION 05 - METALS

05 05 23.13 10 08/18 ULTRASONIC INSPECTION OF WELDMENTS 05 05 23.16 08/18 STRUCTURAL WELDING 05 12 00 08/18, CHG 2: 05/21 STRUCTURAL STEEL 05 12 13 07/24 ARCHITECTURALLY EXPOSED STRUCTURAL STEEL 05/15, CHG 1: 08/18 STEEL JOIST FRAMING 05 21 00 05 30 00 05/15, CHG 2: 08/18 STEEL DECKS 05 40 00 05/15, CHG 1: 08/18 COLD-FORMED METAL FRAMING 05 50 13 05/17, CHG 1: 08/18 MISCELLANEOUS METAL FABRICATIONS 05 51 33 02/16, CHG 2: 02/18 METAL LADDERS

# DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

06	10	00	08/16, CHG 2: 11/18	ROUGH CARPENTRY
06	41	16.00 10	08/10, CHG 1: 11/18	PLASTIC-LAMINATE-CLAD ARCHITECTURAL
				CABINETS
06	61	16	08/20	SOLID SURFACING FABRICATIONS

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DIVISION 07 - THERMAL AND MOISTURE PROTECTION

07	05	23	08/19			PRESSURE TESTING AN AIR BARRIER SYSTEM
						FOR AIR TIGHTNESS
07	21	13	02/16,	CHG 2:	08/20	BOARD AND BLOCK INSULATION
07	22	00	02/16,	CHG 3:	11/18	ROOF AND DECK INSULATION
07	27	10.00 10	08/19,	CHG 1:	02/20	BUILDING AIR BARRIER SYSTEM
07	27	19.01	05/17,	CHG 2:	08/20	SELF-ADHERING AIR BARRIERS
07	27	36	05/17,	CHG 2:	08/20	SPRAY FOAM AIR BARRIERS
07	42	13	05/11,	CHG 2:	02/18	METAL WALL PANELS
07	54	19				THERMOPLASTIC POLYOLEFIN (TPO) ROOFING
07	60	00	05/17,	CHG 2:	11/18	FLASHING AND SHEET METAL
07	81	00	02/11			SPRAY-APPLIED FIREPROOFING
07	84	00	05/10,	CHG 1:	08/13	FIRESTOPPING
07	92	00	08/16,	CHG 3:	11/18	JOINT SEALANTS

#### DIVISION 08 - OPENINGS

80	11	13	08/20				STEEL DOORS AND FRAMES
80	14	00	08/16,	CHG	1:	08/18	WOOD DOORS
80	31	00	05/17,	CHG	1:	08/18	ACCESS DOORS AND PANELS
80	33	23	08/20				OVERHEAD COILING DOORS
80	34	73	11/19,	CHG	1:	02/21	SOUND CONTROL DOOR ASSEMBLIES
80	51	13	05/19				ALUMINUM WINDOWS
80	60	45	08/20				TRANSLUCENT PANELS
80	71	00	02/16,	CHG	3:	08/20	DOOR HARDWARE
80	81	00	05/19				GLAZING
80	91	00	08/20				METAL WALL LOUVERS

#### DIVISION 09 - FINISHES

22	00	02/10,	CHG	2:	08/18	SUPPORTS FOR PLASTER AND GYPSUM BOARD
29	00	08/16,	CHG	4:	02/20	GYPSUM BOARD
30	10	08/20				CERAMIC, QUARRY, AND GLASS TILING
51	00	08/20				ACOUSTICAL CEILINGS
62	38	08/17,	CHG	1:	08/18	STATIC-CONTROL FLOORING
65	00	08/10,	CHG	3:	08/18	RESILIENT FLOORING
67	23.15	02/21				FUEL RESISTIVE RESINOUS FLOORING,
						3-COAT SYSTEM
68	00	11/17,	CHG	2:	08/20	CARPETING
84	20	08/16,	CHG	1:	08/18	ACOUSTICAL WALL PANELS
90	00	02/21				PAINTS AND COATINGS
	22 29 30 51 62 65 67 68 84 90	22 00 29 00 30 10 51 00 62 38 65 00 67 23.15 68 00 84 20 90 00	22       00       02/10,         29       00       08/16,         30       10       08/20         51       00       08/20         62       38       08/17,         65       00       08/10,         67       23.15       02/21         68       00       11/17,         84       20       08/16,         90       00       02/21	22       00       02/10, CHG         29       00       08/16, CHG         30       10       08/20         51       00       08/20         62       38       08/17, CHG         65       00       08/10, CHG         67       23.15       02/21         68       00       11/17, CHG         84       20       08/16, CHG         90       00       02/21	22       00       02/10, CHG 2:         29       00       08/16, CHG 4:         30       10       08/20         51       00       08/20         62       38       08/17, CHG 1:         65       00       08/10, CHG 3:         67       23.15       02/21         68       00       11/17, CHG 2:         84       20       08/16, CHG 1:         90       00       02/21	22       00       02/10, CHG 2: 08/18         29       00       08/16, CHG 4: 02/20         30       10       08/20         51       00       08/20         62       38       08/17, CHG 1: 08/18         65       00       08/10, CHG 3: 08/18         67       23.15       02/21         68       00       11/17, CHG 2: 08/20         84       20       08/16, CHG 1: 08/18         90       00       02/21

# DIVISION 10 - SPECIALTIES

11	00	08/20	VISUAL DISPLAY UNITS
14	00.20	08/20	INTERIOR SIGNAGE
21	13	08/20	TOILET COMPARTMENTS
23	10	06/24	GLAZED INTERIOR WALL AND DOOR
			ASSEMBLIES
26	00	08/20	WALL AND DOOR PROTECTION
28	13	08/20	TOILET ACCESSORIES
44	16	11/19	FIRE EXTINGUISHERS
51	13	05/11	METAL LOCKERS
	11 14 21 23 26 28 44 51	11 00 14 00.20 21 13 23 10 26 00 28 13 44 16 51 13	11       00       08/20         14       00.20       08/20         21       13       08/20         23       10       06/24         26       00       08/20         28       13       08/20         44       16       11/19         51       13       05/11

# DIVISION 12 - FURNISHINGS

ROLLER WINDOW SHADES

12 50 00.13 10 08/17, CHG 1: 11/18 FURNITURE AND FURNITURE INSTALLATION 12 59 00 08/17, CHG 1: 08/18 SYSTEMS FURNITURE

# DIVISION 21 - FIRE SUPPRESSION

21	13	13			08/20				WET PIPE SPRINKLER SYSTEMS, FIRE
21	30	00			04/08,	CHG	1:	08/13	FIRE PUMPS
DIV	VISI	ION	22	- PI	LUMBING				
22	00	00			11/15,	CHG	4:	05/21	PLUMBING, GENERAL PURPOSE
DIV	VISI	ION	23	- HI	EATING,	VENT	ILA	TING,	AND AIR CONDITIONING (HVAC)
23	05	93.	00	06	08/16				TESTING, ADJUSTING, AND BALANCING (TAB) OF HVAC
23	07	00			02/13,	CHG	7 <b>:</b>	05/20	THERMAL INSULATION FOR MECHANICAL SYSTEMS
23	08	00.	00	20	02/21,	CHG	1:	05/21	COMMISSIONING OF MECHANICAL AND PLUMBING SYSTEMS
23 23	09 09	00 13			02/19, 11/15,	CHG CHG	3: 2:	05/21 05/21	INSTRUMENTATION AND CONTROL FOR HVAC INSTRUMENTATION AND CONTROL DEVICES FOR HVAC
23	09	23.	02		02/19,	CHG	1:	02/20	BACNET DIRECT DIGITAL CONTROL FOR HVAC AND OTHER BUILDING CONTROL SYSTEMS
23 23	11 23	20 00			05/20 08/21				FACILITY GAS PIPING REFRIGERANT PIPING
23 23	30 35	00 16.	17	10	05/20 05/20				HVAC AIR DISTRIBUTION MECHANICAL ENGINE EXHAUST SYSTEMS
23 23	81 81	00 23			05/18, 11/20	CHG	1:	02/21	DECENTRALIZED UNITARY HVAC EQUIPMENT COMPUTER ROOM AIR CONDITIONING UNITS
DIV	visi	ION	25	- 11	NTEGRATE	D AU	TOM	LATION	
25	05	11	01		05/21				ANDEDGEGIDITY FOD UNAG DDG GVGTEMG
25	05	11.	02		05/21				CYBERSECURITY FOR FIRE & MASS NOTIFICATION CONTROL SYSTEMS
25	05	11.	03		05/21				CYBERSECURITY FOR LIGHTING CONTROL SYSTEMS
25	08	10			05/21				UTILITY MONITORING AND CONTROL SYSTEM TESTING
25	10	10			02/19,	CHG	1:	05/21	UTILITY MONITORING AND CONTROL SYSTEM (UMCS) FRONT END AND INTEGRATION
DIV	VISI	ION	26	- E	LECTRICA	L			
26	05	73			08/23				POWER SYSTEM STUDIES
26	08	00			11/21				APPARATUS INSPECTION AND TESTING
26	11	16			11/21				SECONDARY UNIT SUBSTATIONS
26	13	00			05/21				SF6/HIGH-FIREPOINT FLUIDS INSULATED PAD-MOUNTED SWITCHGEAR
26	20	00			08/19,	CHG	3:	11/21	INTERIOR DISTRIBUTION SYSTEM
26	24	13			08/21	auc	1.	05 /01	SWITCHBOARDS
20	۷9 ۲۱	<u>ک</u> ک			02/20,	CHG	Τ:	U5/21	UNDER 600 VOLTS
⊿0 26	4⊥ 51	00			05/20,	CHG	2:	11/21	INTERIOR LIGHTING

#### DIVISION 27 - COMMUNICATIONS

27 10	00	08/11	BUILDING	TELECOMMUNICATIONS	CABLING
			SYSTEM		

#### DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

28 31	76	08/20	INTERIOR	FIRE	ALARM	AND	MASS
			NOTIFICAT	FION S	SYSTEM,	ADI	DRESSABLE

#### DIVISION 31 - EARTHWORK

31 00 00.00 06 07/18 EARTHWORK

#### DIVISION 32 - EXTERIOR IMPROVEMENTS

32	01	19.61	11/19	SEALING OF JOINTS IN RIGID PAVEMENT
32	05	33	08/17	LANDSCAPE ESTABLISHMENT
32	11	20	08/17	BASE COURSE FOR RIGID AND SUBBASES FOR
				FLEXIBLE PAVING
32	12	13	05/17	BITUMINOUS TACK AND PRIME COATS
32	12	16.16	11/20	ROAD-MIX ASPHALT PAVING
32	13	13.06 06	06/18	PORTLAND CEMENT CONCRETE PAVEMENT FOR
				ROADS AND SITE FACILITIES
32	16	19	05/18	CONCRETE CURBS, GUTTERS AND SIDEWALKS
32	17	23	08/16, CHG 5: 11/18	PAVEMENT MARKINGS
32	92	19	08/17, CHG 1: 08/21	SEEDING
32	93	00	08/17, CHG 1: 08/21	EXTERIOR PLANTS

# DIVISION 33 - UTILITIES

33	05	07.13	02/24	UTILITY DIRECTIONAL DRILLING
33	05	23	08/15, CHG 2: 08/16	TRENCHLESS UTILITY INSTALLATION
33	11	00	02/18	WATER UTILITY DISTRIBUTION PIPING
33	30	00	05/18	SANITARY SEWERAGE
33	40	00	11/21	STORMWATER UTILITIES
33	46	16	05/18	SUBDRAINAGE PIPING
33	71	02	08/21	UNDERGROUND ELECTRICAL DISTRIBUTION
33	82	00	04/06	TELECOMMUNICATIONS OUTSIDE PLANT (OSP)

DIVISION 41 - MATERIAL PROCESSING AND HANDLING EQUIPMENT

 41 22 13.14
 11/19, CHG 1: 02/21 BRIDGE CRANES, OVERHEAD ELECTRIC, TOP RUNNING

 41 24 26
 05/20, CHG 1: 11/20 HYDRAULIC POWER SYSTEMS

-- End of Project Table of Contents --

SECTION 00 80 00.00 06

# SPECIAL PROVISIONS 04/21

#### PART 1 GENERAL

Attachments to this specification are as follows:

Base Access Spreadsheet Construction Project Sign Details Project Submittal Register

#### 1.1 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 C1153 (2015) Standard Practice for Location of Wet Insulation in Roofing Systems Using Infrared Imaging

U.S. ARMY (DA)

AR 530-1

Operation Security

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 (2014) Safety and Health Requirements Manual

ERDC/ITL TR-12-1 (2015) A/E/C Graphics Standard, Release 2.0

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1926.59 Hazard Communication

#### 1.2 SUBMITTALS

Government approval/acceptance is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

SF1413 Statement and Acknowledgement

Radioactive Material/Equipment; G

SD-02 Shop Drawings

Mechanical/Electrical Room Layout; G

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SD-04 Samples

Equipment Warranty Identification Tags; G

SD-05 Design Data

Progress Photographs

SD-07 Certificates

Warranty of Construction

NO ASBESTOS - CONTAINING MATERIAL (ACM) CERTIFICATION; G

Construction Phase:

Certification for each individual product installed and identified to contain mineral fibers that no asbestos-containing materials were installed; G

Documentation to show that the products containing mineral fiber materials have been microscopically examined by an AIHA- or NVLAP-certified laboratory and the lab has determined that the material does not contain asbestos; G

Insurance

Sales and Use Tax

SD-11 Closeout Submittals

Preliminary (Working) As-Built Drawings; G

Final As-Built Drawings; G

CAD Working As-Built Drawings; G

Equipment-in-Place List

Maintenance and Parts Data

Warranty Management Plan; G

Contour Map; G

1.3 COMMENCEMENT, PROSECUTION AND COMPLETION OF WORK

Refer to clause 52.211-12 "LIQUIDATED DAMAGES" in Section 00 70 00 for the amount of Liquidated Damages for the project.

Refer to clause 52.211-10 "Commencement, Prosecution, and Completion of Work" in Section 00 70 00 for a notification of significant contract dates.

1.3.1 Additional Requirements/Clarifications of Work Included Within the Contract

a. The time stated in clause 52.211-10 "Commencement, Prosecution, and Completion of Work" in Section 00 70 00 for completion shall include

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> installation of Government-furnished furniture, if required, as well as as-built drawings, O&M manuals, operational tests/reports/training/instructions, equipment lists.

- b. Those areas of the building receiving Government-furnished furniture and IT/Telecom equipment shall be made available for Government installation to begin no less than 21 calendar days prior to the contractor's accepted scheduled Construction Completion Date updated in accordance with clause 52.211-10 "Commencement, Prosecution, and Completion of Work" in Section 00 70 00.
- c. After approval of the required bonds, the Government will issue an Administrative Notice-to-Proceed (NTP) to allow for preconstruction activities to be initiated in accordance with the contract requirements. The contract period of performance specified in Contract Clause 52.211-10 will begin upon issuance of Administrative NTP. No physical onsite work will be permitted during the Administrative NTP period. All required preconstruction activities and submittals must be submitted and accepted by the Government, where applicable, within the Administrative NTP period of 45 days. The Government will issue a Construction NTP to allow commencement of all other contract work after the Administrative NTP period, or after the contractor's completion of all work specified in the Administrative NTP. Failure to complete all required preconstruction activities may result in the contract being terminated for default in accordance with Contract Clause 52.249.10 Default (Fixed-Price Construction).

1.3.2 Requirements for Completion of Designated Areas Prior to Furniture Installation

- a. The Contractor is responsible for access to the building, security and ownership during the furniture and IT/Telecom equipment installation.
   Facility operation and maintenance during the furniture and IT/Telecom equipment installation is the responsibility of the Contractor.
- b. The Government will be installing IT/Telecom equipment, including the telephone switch and individual telephone sets, during the furniture installation period.
- c. The Contractor shall be responsible for coordination with its subcontractors and the Government furniture and IT/Telecom installation contractors, as necessary, to accommodate the furniture and IT/Telecom equipment installation.
- d. The exterior roads, parking areas, walks, and building entrances shall be sufficiently complete to support the delivery of furniture products by semi-tractor trailers and made available for use to the Government furniture and IT/Telecom installation contractors.
- e. All interior building finishes of areas receiving furniture, including all furniture entries, pathways, staging, and storage areas shall be complete. Completed building finishes shall include all flooring materials and base, interior walls, ceilings, lighting, HVAC systems and controls, doors, doorframes, and trim. All areas are to be cleaned, vacuumed, and an initial waxing applied as appropriate for the installation of furniture.
- f. All utilities and systems serving the building shall be fully operational prior to furniture installation. The HVAC system(s) must

be in operation, fully balanced and commissioned. The elevator(s) shall be operable and certified for use by the approving agency prior to the delivery of the furniture package and must be made available, at no additional cost, for use by the furniture and IT/Telecom equipment installation contractors.

- g. The pre-final building punch inspections shall be performed and punch list items corrected by the Contractor prior to the Government Furniture and IT/Telecom installations.
- h. During installation of the furniture and IT/Telecom, the Contractor shall participate in inspections as noted above in subparagraph (b) of the paragraph entitled "Additional Requirements/Clarifications of Work Included Within the Contract". Repairs to any damaged areas shall be performed at no additional cost to the Government by the appropriate party as determined by the Government during these inspections.
- i. The Contractor shall be responsible for the electrical hookup of the power feed(s) and phone/data wiring to-as well as providing all data/com faceplates and jacks for-all powered modular systems furniture. This work shall be coordinated with the Government Furniture and IT/Telecom installation contractors to occur while they continue their installations.
- j. The Contractor shall perform the final buffing and waxing of areas that are receiving furniture after the furniture and IT/Telecom installation contractors have indicated either installation in those areas is complete or that the final buffing and waxing shall be performed in certain areas prior to the placement of furniture. The final buffing and waxing of corridors and other areas not receiving furniture shall be performed by the Contractor after the furniture and IT/Telecom installation contractors have indicated installation is complete for the building.
- k. After furniture and IT/Telecom installation by the Government, the Contractor shall perform a complete Final Cleaning in all impacted areas, as defined in the paragraph entitled "Final Cleaning" in this specification. Final Inspection and Acceptance may occur only after all furniture and IT/Telecom installation by the Government is complete.
- 1.4 NOT USED
- 1.5 NOT USED
- 1.6 CONTRACT DRAWINGS AND SPECIFICATIONS

In addition to DFARS 252.236-7001 "Contract Drawings and Specifications" in Section 00 70 00 the following will apply:

a. After Award or no later than Notice to Proceed (NTP), the Government will furnish the Contractor a compact disk containing all technical contract documents in electronic media only. This disk will include a complete set of drawing files and technical specification files which have all amendments included. The disk will contain drawing files in PDF format along with technical specifications in PDF format. These PDF files are the contract documents that represent the construction requirements of the contract, and are being provided for the Contractor's use in printing paper copies of contract documents.

- b. In addition, native CAD files(this includes, but not limited to, all source files, models, custom fonts and linestyles, plot files, and images used to create the contract drawings) are provided in accordance with the "AS-BUILT DOCUMENTS" paragraph for the Contractor's use in maintaining and preparing as-built plans. If another CAD Program is used other than the Using Agency's System, all native CAD files that were generated with that software and all support files will also be included. Only native files are to be used for As-Built preparation and information.
- c. Native files are to be used for As-Built preparation only. The PDF files are the contract documents that represent the construction requirements of the contract.
- 1.7 AS-BUILT DOCUMENTS FOR DESIGN BID BUILD PROJECTS

#### 1.7.1 General

This section covers the completion of final as-built drawings, as a requirement of the contract. The Contractor is responsible for maintaining paper copy working as-built drawings during the construction phase. These paper copy drawings will be used by the Contractor to prepare, maintain and submit the final as-built drawings

#### 1.7.1.1 As-Built Drawings

An as-built drawing is a contract construction drawing revised to reflect the final as-built conditions of the project because of modifications, changes, corrections to the project design required during construction, submittals and extensions of design. The terms "drawings," "contract drawings," "drawing files," "working as-built drawings" and "final as-built drawings" refer to contract drawings that are revised to be used for the "RECORD DRAWING AS-BUILTS".

#### 1.7.1.2 Government-Furnished Files

- a. The Contractor will be provided electronic files at the beginning of construction for use during the construction phase which are to be maintained during construction for the preparation of as-builts. The Contractor shall be responsible to print two full size paper copies. The Contractor shall enter changes and corrections on two sets of paper full size construction plans on a weekly basis in accordance with Paragraph "Maintenance of Working As-Built Drawings" in this section.
- b. The Contractor is required to prepare final as-built drawings utilizing the native files provided by the Government. If translation is required, the original design models (CAD) shall be updated to As-Built conditions and then appropriately translated. Updating translated drawings will not be accepted. The contractor shall update the CAD working as-built drawings, in accordance with paragraph "Maintenance of Working As-Built Drawings", on a quarterly basis and submit them to the COR for independent Government review. Both paper and electronic documents shall be available at all times and shall be provided promptly to the Contracting Officer's Representatives when requested. The Contractor shall be responsible for backup of electronic files during construction and for controlling release of information.

#### 1.7.2 Withholding

Maintenance of working as-builts is considered part of the value of the facilities being constructed and will not be paid for as a separate line item. All costs in conjunction with periodic as-built maintenance and final preparation shall be considered a subsidiary obligation of the Contractor.

# 1.7.2.1 Failure to Maintain

If the Contractor fails to maintain the working as-built drawings as specified herein, the Contracting Officer will deduct from the monthly progress payment an amount up to 10% or which, in the Contracting Officer's judgment, represents the estimated cost of bringing the as-built documents up to date. This monthly deduction will continue until an agreement can be reached between the Contracting Officer and the Contractor regarding the accuracy and completeness of working as-built documents. This includes conversion of submittals and other miscellaneous documents.

#### 1.7.2.2 As-Builts Prepared by Contractor

The Contractor is required to prepare and provide final as-built drawings. The Contractor shall include an activity in the cost-loaded schedule for the final As-Built drawing submittal in the amount defined in the following paragraph. See Section 01 32 01.00 06, PROJECT SCHEDULE, para "Basis for Payment and Cost Loading". This amount shall be withheld and not paid until the final As-Built drawing submittal has been accepted by the Government.

Withholding for the final as-built drawing submittal shall be in the amount of: 1% for contract awards less than \$5,000,000; \$50,000 for contracts awarded from \$5,000,000 to \$10,000,000; or \$100,000 for contracts awarded greater than \$10,000,000. Withholding shall be withheld until the final as-built drawing submittal has been approved and accepted by the Government.

# 1.7.3 Maintenance of Working As-Built Drawings

The Contractor shall revise two (2) sets of paper drawings by red-line process to show the as-built conditions during the prosecution of the project. These as-built marked drawings shall be kept current on a weekly basis and available on the jobsite at all times. Changes in the work from the contract or additional information which is uncovered in the course of construction shall be accurately and neatly recorded as they occur by means of details and notes. <u>Changes must be reflected on all sheets that</u> <u>the change affects</u>. The working as-built marked drawings will be jointly reviewed for accuracy and completeness by the Contracting Officer and the Contractor before submission of each monthly pay estimate. The working as-built drawings shall show the following information if applicable to the project, but not be limited thereto:

a. The actual location, kinds and sizes of all sub-surface utility lines. In order that the location of these lines and appurtenances may be determined in the event the surface openings or indicators become covered over or obscured, the as-built drawings shall show, by offset dimensions to two permanently fixed surface features, the end of each run including each change in direction. Valves, splice boxes

and similar appurtenances shall be located by dimensioning along the utility run from a reference point. The average depth below the surface of each run shall also be recorded.

- b. The location and dimensions of any changes within the building structure.
- c. The correct alignments, grade elevations, typical cross section, earthwork, structures or utilities if any changes were made from contract plans.
- d. Additional as-built information that exceeds the detail shown on the Contract Drawings. These as-built conditions include those that reflect structural details, fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment foundations and layouts, equipment, sizes, mechanical and electrical room layouts and other extensions of design, that were not shown in the original contract documents because the exact details were not known until after the time of approved shop drawings. It is recognized that the shop drawing submittals (revised showing as-built conditions) will serve as the as-built record without actual incorporation into the contract drawings. The final as-built construction drawing shall reference the shop drawing file that includes the as-built information. In turn, the shop drawing shall reference the applicable construction as-built drawing. All such shop drawing submittals must include the paper copy and PDF of the drawings.
- e. The invert elevations and grades of any drainage structures or ditches installed or affected as part of the project construction.
- f. Changes or modifications which result from the final inspection.
- g. Contour map of the final borrow pit or spoil area with spot elevations as necessary if: borrow material is from sources on Government property; Government property is used as a spoil area; or, if excavated soil materials are placed in approved locations other than a landfill.
- h. Where contract drawings present options, only the option selected for construction shall be shown on the final as-built drawings.
- i. Systems designed or enhanced by the Contractor, such as HVAC controls, fire alarms, fire sprinklers, fire protection, fire detection and irrigation systems and other related systems in this project, shall be incorporated into the as-built drawings to include detailed information for all aspects of the systems including wiring, piping, and equipment drawings.
- j. Room numbers shown on the contract drawings are selected for design convenience and may not represent the actual numbers intended for use by the end user. Final as-built drawings shall reflect actual room numbers adopted by the end user.
- k. Contract modification (change order price) shall include the Contractor's cost to change working and final as-built drawings to reflect modifications and compliance with the following procedures (See "Markings and Indicators"):
  - (1) Directions in the modification for posting descriptive changes

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shall be followed.

- (2) A Revision Triangle shall be placed at the location of each deletion.
- (3) For new details or sections which are added to a drawing, a Revision Triangle shall be placed by the detail or section title.
- (4) For minor changes, a Revision Triangle shall be placed by the area changed on the drawing (each location).
- (5) For major changes to a drawing, a Revision Triangle shall be placed by the title of the affected plan, section, or detail at each location.
- (6) For changes to schedules or drawings, a Revision Triangle shall be placed either by the schedule heading or by the change in the schedule.
- 1.7.4 Preliminary (Working) As-Built Drawings

Six (6) weeks before Contract Completion Date, the Contractor shall submit one (1) set of the original paper working as-built drawings to the Contracting Officer for review and approval. These working as-built marked drawings shall be neat, legible and accurate. The review by Government personnel will be expedited to the maximum extent possible. If upon review, the working as-built drawings are found to contain errors and/or omissions, they will be returned to the Contractor for corrections. The Contractor shall complete the corrections and return the working as-built marked drawings to the Contracting Officer within fourteen (14) calendar days. Upon approval, the working as-built drawings will be returned to the Contractor for use in preparation of final as-built drawings.

1.7.5 Preparation of Final As-Built Drawings

The contract drawings shall be modified as may be necessary to correctly show the features of the project as it has been constructed by bringing the contract drawings into agreement with approved working as-built drawings, adding such additional drawings as may be necessary.

These final as-built drawings are part of the permanent records of the project and the Contractor shall be responsible for the protection and safety thereof until returned to the Contracting Officer. Any drawings damaged or lost by the Contractor shall be satisfactorily replaced by the Contractor at no expense to the Government.

When electronic CAD files are a part of the as-built process, a set of files shall be provided to the Government as a part of the Final As-Built submittal for a review to verify the correctness of the as-built markups and that all changes have been incorporated into the electronic files. Should errors be determined, the Contractor shall update the files and provide a corrected set of files within fourteen (14) calendar days of receipt of comments. An independent Government review, by the Louisville district As-Built Coordinator (CELRL-CDM-Q), will be made on the accepted files to determine compliance with the As-Built requirements of this section, National CAD Standards, and the AEC CAD Standards; and to verify graphic changes were done properly in preparing the electronic files. This review will require submission of electronic files, containing all the files needed to reproduce the contract drawings, a full size set of

contract drawings in PDF format, all shop drawings in PDF format, a scanned set of the paper markups and the paper markups. Upon receipt of any comments from this independent review, the contractor shall update the electronic files and provide a corrected set of files within fourteen (14) calendar days of receipt of the comments.

In the event the Contractor accomplishes additional work which changes the as-built conditions of the facility, after submission and approval of the working as-built drawings, the Contractor shall be responsible for the addition of these changes to the working as-built drawings and also to the final as-built documents.

# 1.7.6 Markings and Indicators

Changes shall be annotated in accordance with ERDC/ITL TR-12-1 "A/E/C Graphics Standard\_Release 2.0" at the following locations:

- a. Bottom of the revised detail.
- b. Right hand and bottom border aligned with the revised detail.
- c. The revision block of the title block.

Separate markings shall be made for each modification negotiated into the contract.

#### 1.7.7 Construction Contract Specifications

Submit final PDF file record construction contract specifications, including revisions thereto, with submission of final as-built drawings.

1.7.8 Preparation of Other As-Built Documents

All other non-electronic documents which may include, for example, design analysis, catalog cuts, or certification documents that are not available in native electronic format shall be scanned and provided in an organized manner in Adobe PDF format.

1.7.9 Submittal of Final As-Built Documents

Within fourteen (14) calendar days of Final Acceptance meeting of the project, Final As-Built documents shall be provided to the Contracting Officer in the formats described in paragraph "Electronic File Use". The final as-built document submittal shall also include the approved preliminary paper working as-built drawings.

#### 1.7.10 Partial Occupancy

For projects where portions of construction are to be occupied or activated before overall project completion, including portions of utility systems, as-built drawings for those portions of the facility being occupied or activated shall be supplied at the time the facility is occupied or activated. This same as-built information previously furnished must also be shown on the final set of as-built drawings at project completion.

#### 1.7.11 Electronic File Use

Only personnel proficient in the preparation of CAD drawings shall be employed to modify the electronic contract drawings or prepare additional new electronic drawings. Additions and corrections to the contract

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drawings shall be equal in quality to that of the originals. Line work, line weights, lettering, layering conventions, and symbols shall be the same as the original line work, line weights, lettering, layering conventions, and symbols. If additional drawings are required, they shall be prepared using the specified electronic file format applying the same guidance specified for original drawings. Three dimensional (3D) elements shall be placed in files in their proper locations when using 3D files with spatially correct elements. If the Designer of Record used a different software than that requested by the Using Agency, the Designer of Record's files will be used for as-built purposes and then translated and/or exported, by the Contractor, to the Using Agency's system. The title block and drawing border to be used for any new final as-built drawings shall be identical to that used on the contract drawings. Additions and corrections to the contract drawings shall be accomplished using CAD media files supplied by the Government. All work by the Contractor shall be done on files in the format in which they are provided. Translation of files to a different format, for the purpose of As-Built production, and then retranslating back to the format originally provided, will not be acceptable. The original electronic files provided by the Government will be provided in the format compatible with the Using Agency. The Using Agency uses Autodesk AutoCAD Release 2020.

- a. When final revisions have been completed, the cover sheet drawing shall show the wording "RECORD DRAWING AS-BUILT" followed by the name of the Contractor in letters at least 5 mm 3/16 inch high. All other contract drawings shall be marked in the bottom right-hand corner of each drawing either "AS-BUILT" drawing denoting no revisions on the sheet, or "REVISED AS-BUILT" denoting one or more revisions. As-Built drawings shall be dated with the Contract Completion Date in the revision block.
- b. After receipt by the Contractor of the approved working as-built drawings and the original contract drawings files the Contractor shall, within sixty (60) calendar days, make the final as-built submittal. This submittal shall consist of 2 sets of completed final as-built drawings on separate media consisting of both (compatible with the Using Agency's system on electronic storage media identical to that supplied by the Government) and full size set in PDF format and the return of the approved marked up working as-built drawings. They shall be complete in all details and identical in form and function to the contract drawing files supplied by the Government. Any translations or adjustments necessary to accomplish this are the responsibility of the Contractor. The Government reserves the right to reject any files it deems incompatible with the required CAD software system. All paper drawings, drawing files and storage media submitted will become the property of the Government upon final approval. Failure to submit final as-built drawing files and marked drawings as specified shall be cause for withholding any payment due the Contractor under this contract. Approval and acceptance of final as-built drawings shall be accomplished before final payment is made to the Contractor.
- 1.8 NOT USED
- 1.9 EQUIPMENT DATA, O&M, & REPAIR MANUALS WITH FIELD TRAINING REQUIREMENTS
- 1.9.1 Real Property Equipment

OPTION #1 Equipment-in-Place Data

Contractor shall be required to make an Equipment-in-Place list of all installed equipment furnished under this contract. This list shall include all information usually listed on manufacturer's name plate. The Form is part of SPECIAL PROVISIONS and is included following the SPECIAL PROVISIONS, so to positively identify the piece of property. The list shall also include the cost of each piece of installed property F.O.B. construction site. For each of the items which are specified herein to be guaranteed for a specified period from the date of acceptance thereof, the following information shall be given: The name, serial and model number address of equipment supplier, or manufacturer originating the guaranteed item. The Contractor's guarantee to the Government of these items will not be limited by the terms of any manufacturer's guarantee to the Contractor. Furnish the list in as one (1) reproducible and three (3) copies, and in electronic format on CD to the Contracting Officer thirty (30) calendar days before completion of any segment of the contract work which has an incremental completion date.

#### Maintenance and Parts Data

The Contractor will be required to furnish a brochure, catalog cut, parts list, manufacturer's data sheet or other publication which will show detailed parts data on all other equipment subject to repair and maintenance procedures not otherwise required in Operations and Maintenance Manuals specified elsewhere in this contract. Distribution of directives shall follow the same requirements as listed in paragraph above.

#### 1.9.2 O&M and Repair Manuals

#### OPTION #1 Withholding & Copies

The Contractor shall provide 6 complete copies of the Equipment Operating, Maintenance, and Repair Manuals unless the Technical Specification indicates otherwise. The manuals shall be prepared electronically in PDF format containing bookmarks for each table of contents item. The PDF file shall be referenced in a separate column or linked worksheet in the equipment data excel spreadsheet. Separate manuals shall be provided for each utility system as defined per the Technical Specification. Operations and Maintenance manuals shall be accepted/approved before field training or ninety (90) calendar days before substantial completion (whichever occurs earlier). An amount of \$20,000 shall be withheld until submittal and acceptance/ approval of O&M manuals is complete. A draft outline and table of contents shall be submitted for acceptance/ approval at 50% contract completion See paragraph "EQUIPMENT DATA, O&M, & REPAIR MANUALS WITH FIELD TRAINING REQUIREMENTS" for detail O&M and Repair Manual format.

#### 1.9.3 Field Training

#### 1.9.3.1 Training Course

Contractor shall conduct a training course for the operating staff for each particular component and system. Where the training period is not identified by the technical specification, a minimum of 1 hour of training shall be provided for that component or system. Training shall only occur after the Manuals have been approved/ accepted by the Government and during normal working time, and shall start after the system or component is functionally completed. The field instructions shall cover all of the items contained in the Equipment Operating, Maintenance and Repair Manuals as identified per individual Technical Specifications. The training will

include both classroom and "hands-on" training. The Contractor shall submit a lesson plan outlining the information to be discussed during training periods. This lesson plan will be submitted ninety (90) calendar days before contract completion and accepted/approved before the field training occurs. Training shall be documented by the Contractor and a list of attendees shall be furnished to the Government. Training audio/ video shall be digitally recorded on CDs or DVDs and shall be furnished to the Government within ten (10) calendar days following training.

# 1.9.3.2 Training Recording

The Contractor shall provide all equipment, materials, and trained personnel required to visually and audibly record all site operations and maintenance (O&M) training sessions. The video technician/trainer shall be employed by a video production company that has been in business for a minimum of 2 years. The Contractor shall submit for acceptance by the Government, the resume of the technician/trainer and the video production company, and the proposed video format. The video format shall be one in wide use, and any software necessary to view the video shall be provided to the Government. Video shall be provided to the Government on DVD. Audio shall be adjusted, filtered or otherwise controlled to ensure the presenter can be understood at all times. Each system or piece of equipment shall be covered on a single DVD or set of DVDs, which shall be identified with a type written label showing the name of the project, equipment or system, and contract number. This same information shall be provided as an introduction on each DVD. When two or more DVDs are provided for a single system or piece of equipment, they shall be packaged as a set in an appropriate storage case. Provide three copies of each DVD(s) for each training session. Training DVDs shall be furnished to the Government within ten (10) working days following training.

# 1.10 AVAILABILITY OF UTILITIES

#### a. Availability and Use of Utility Services

The Government will not furnish any utilities or sanitary facilities to the contractor for their use even if available at the work site. The contractor is responsible for procuring and/or providing these items themselves or obtaining them from a private entity (utility company). During furniture and IT/Telecom equipment installation and until the facility is turned over to the Government, the Contractor shall maintain electric service to the construction site for the operation of HVAC, lighting and electrical power.

#### 1.10.1 Alterations to Utilities

Where changes and relocations of utility lines are noted to be performed by others, the Contractor shall give the Contracting Officer at least thirty (30) calendar days written notice in advance of the time that the change or relocation is required. In the event that, after the expiration of thirty (30) calendar days after the receipt of such notice by the Contracting Officer, such utility lines have not been changed or relocated and delay is occasioned to the completion of the work under contract, the Contractor may be entitled to a time extension equal to the period of time lost by the Contractor after the expiration of said thirty (30) calendar day period.

# 1.10.2 Interruptions of Utilities

- a. No utility services shall be interrupted by the Contractor to make connections, to relocate, or for any purpose without approval of the Contracting Officer.
- b. Request for Permission to shut down services shall be submitted in writing to the Contracting Officer not less than seventeen (17) working days before date of proposed interruption. The request shall give the following information:
  - (1) Nature of Utility. (Gas, L.P. or H.P., Water, etc.)
  - (2) Size of line and location of shutoff.
  - (3) Buildings and services affected.
  - (4) Hours and date of shutoff.
  - (5) Estimated length of time services will be interrupted.
- c. Services shall not be shut off until receipt of approval of the proposed hours and date from the Contracting Officer.
- d. Shutoffs which will cause interruption of Government work operations as determined by the Contracting Officer shall be accomplished during regular non-work hours or on non-work days of the Using Agency without any additional cost to the Government.
- e. Operation of valves on water mains will be by persons of that utility. Where shutoff of water lines interrupts service to fire hydrants or fire sprinkler systems, the Contractor shall arrange his operations and have sufficient material and personnel available to complete the work without undue delay or to restore service without delay in event of emergency.
- f. Flow in gas mains which have been shut off shall not be restored until the Government inspector has determined that all items serviced by the gas line have been shut off.
- 1.11 NOT USED
- 1.12 PERFORMANCE OF WORK BY THE CONTRACTOR

a. For Full and Open ProcurementThe requirements found in Section 00 70 00, clause 52.236-1 "Performance of Work By the Contractor" apply, unless the awardee is a certified HUBZone small business concern, in which case the requirements found in Section 00 70 00, clause 52.219-4 "Notice of Price Evaluation Preference for HUBZone Small Business Concerns" shall apply.

b. For purposes of Section 00 70 00, clause 52.236-1, only, "WORK BY THE CONTRACTOR" is defined as prime Contractor direct contract labor (including testing and layout personnel), exclusive of other general condition or field overhead personnel, material, equipment, or subcontractors. The "TOTAL AMOUNT OF WORK" is defined as total direct contract labor (including testing and layout personnel), exclusive of other general condition or field overhead personnel, material, or equipment.

c. Within seven calendar days after the award of any subcontract at any tier, either by himself or a subcontractor, the Contractor shall submit to the Contracting Officer a completed Standard Form SF1413 Statement and

Acknowledgement (available at the GSA Forms Library, https://www.gsa.gov/reference/forms#). The form shall include the subcontractor's acknowledgement of the inclusion in his subcontract of the clauses in Section 00 70 00 of this contract entitled 52.222-4 "Contract Work Hours and Safety Standards - Overtime Compensation"; 52.222-8 "Payrolls and Basic Records"; 52.222-7 "Withholding of Funds"; 52.222-14 "Disputes Concerning Labor Standards"; 52.222-13 "Compliance with Construction Wage Rate Requirements and Related Regulations"; 52.222-6 "Construction Wage Rate Requirements" (formerly named "Davis-Bacon Act"); 52.222-9 "Apprentices and Trainees"; 52.222-10 "Compliance with Copeland Act Requirements"; 52.222-11 "Subcontracts (Labor Standards); 52.222-12 "Contract Termination - Debarment"; 52.222-15 "Certification of Eligibility". Nothing contained in this contract shall create any contractual relation between any subcontractor and the Government.

d. Veterans Employment Emphasis for U.S. Army Corps of Engineers Contracts

In addition to complying with the requirements outlined in Subpart 22.13, provision 52.222-38, clause 52.222-35, clause 52.222-37, DFARS Subpart 222.13 and United States Department of Labor regulations, U.S. Army Corps of Engineers (USACE) contractors and subcontractors at all tiers are encouraged to promote the training and employment of U.S. veterans while performing under a USACE contract. While no set-aside, evaluation preference, or incentive applies to the solicitation or performance under the resultant contract, USACE contractors are encouraged to seek out highly qualified veterans to perform services under this contract. The following resources are available to assist USACE contractors in their outreach efforts:

(1) U.S. Department of Labor Veterans' Employment and Training Service (VETS): https://www.dol.gov/vets/

(2) Federal veteran employment information: https://www.fedshirevets.gov/

(3) Veterans Opportunity to Work (VOW) Program: https://benefits.va.gov/vow/

(4) U.S. Army Warrior Transition Command Employment Index: http://wct.army.mil/modules/employers/index.html

(5) Hiring Our Heroes: https://www.uschamberfoundation.org/hiring-our-heroes

#### 1.13 SUPERINTENDENCE OF SUBCONTRACTORS

a. The Contractor shall be required to furnish the following, in addition to the superintendence required by clause 52.236-6 - "Superintendence By The Contractor" in Section 00 70 00.

(1) If more than 50 percent and less than 70 percent of the value of the contract work is subcontracted, one superintendent shall be provided at the site and on the Contractor's payroll to be responsible for coordinating, directing, inspecting and expediting the subcontract work.

(2) If 70 percent or more of the value of the work is subcontracted, the Contractor shall be required to furnish two such superintendents to be responsible for coordinating, directing, inspecting and

expediting the subcontract work.

b. If the Contracting Officer, at any time after 50 percent of the subcontracted work has been completed, finds that satisfactory progress is being made, he may waive all or part of the above requirements for additional superintendence subject to the right of the Contracting Officer to reinstate such requirement if at any time during the progress of the remaining work he finds that satisfactory progress is not being made.

1.14 IDENTIFICATION OF EMPLOYEES.

a. The Contractor shall be responsible for furnishing an identification badge/card to each employee prior to the employees work on-site, and for requiring each employee engaged on the work to display identification as may be approved and directed by the Contracting Officer. All prescribed identification shall immediately be delivered to the Contracting Officer for cancellation upon release of the employee.

b. The Contractor is required to provide the information indicated in the "Base Access Spreadsheet" for each individual that will be working on this contract. A copy of the "Base Access Spreadsheet" is attached at the end of this section.

- c. Foreign Nationals are prohibited.
- 1.15 NO ASBESTOS CONTAINING MATERIAL (ACM) CERTIFICATION
- 1.15.1 Not Used
- 1.15.2 Construction Phase

Before final payment to the contractor, the contractor's project engineer/manager will sign and submit to the Government, on the contracting firm's letterhead, a dated copy of the following statement:

I hereby certify that to the best of my knowledge no asbestos-containing material (ACM) was used as a building material during this project. Furthermore, I understand that the building owner presumes that all materials marked "May Contain mineral fibers" are considered asbestos unless I either:

- (1) Submit a certification for each individual product installed and identified to contain mineral fibers that no asbestos-containing materials were installed.
- (2) Submit documentation to show that the products containing mineral fiber materials have been microscopically examined by an AIHA- or NVLAP-certified laboratory and the lab has determined that the material does not contain asbestos.

#### 1.16 WARRANTY OF CONSTRUCTION

a. In addition to the requirements found in clause 52.246-21 Alt.I " WARRANTY OF CONSTRUCTION" in Section 00 70 00 the following shall be included:

(1) This warranty shall continue for a period of 1 year from the date of final acceptance of the work. If the Government takes possession of any part of the work before final acceptance, this warranty shall

continue for a period of 1 year from the date the Government takes possession.

As a part of the nine month warranty inspection, the Contractor shall conduct an infrared roof survey on any project involving a membrane roofing system. This survey will be conducted in accordance with ASTM C1153, "Standard Practice for Location of Wet Insulation in Roofing Systems Using Infrared Imaging". The Contractor shall be required to replace all damaged materials and to locate and repair sources of moisture penetration.

(2) Provide names, addresses, and telephone numbers of all subcontractors, equipment suppliers, or manufacturers with specific designation of their area of responsibilities if they are to be contacted directly on warranty corrections.

- b. Warranty Management
  - (1) Warranty Management Plan

The Contractor shall develop a warranty management plan which shall contain information relevant to the clause "Warranty of Construction" in clause 52.246-21 Alt.I in Section 00 70 00. At least thirty (30) calendar days before the planned pre-warranty conference, the Contractor shall submit the warranty management plan for Government approval. The warranty management plan shall include all required actions and documents to assure that the Government receives all warranties to which it is entitled. The plan shall be in narrative form and contain sufficient detail to render it suitable for use by future maintenance and repair personnel, whether tradesmen, or of engineering background, not necessarily familiar with this contract. The term "status" as indicated below shall include due date and whether item has been submitted or was accomplished. Warranty information made available during the construction phase shall be submitted to the Contracting Officer for approval prior to each monthly pay estimate. Approved information shall be assembled in a binder and shall be turned over to the Government upon acceptance of the work. The construction warranty period shall begin on the date of project acceptance and shall continue for the full product warranty period. A joint 4 month and 9 month warranty inspection shall be conducted, measured from time of acceptance, by the Contractor, Contracting Officer and the Customer Representative. Information contained in the warranty management plan shall include, but shall not be limited to, the following:

(a) Roles and responsibilities of all personnel associated with the warranty process, including points of contact and telephone numbers within the organizations of the Contractors, subcontractors, manufacturers or suppliers involved.

(b) Listing and status of delivery of all Certificates of Warranty for extended warranty items, to include roofs, HVAC balancing, pumps, motors, transformers, and for all commissioned systems such as fire protection and alarm systems, sprinkler systems, lightning protection systems, etc.

(c) A list for each warranted equipment, item, and feature of construction or system indicating:

- 1. Name of item.
- 2. Model and serial numbers.
- 3. Location where installed.
- 4. Name and phone numbers of manufacturers or suppliers.
- 5. Names, addresses and telephone numbers of sources of spare parts.
- 6. Warranties and terms of warranty. This shall include one-year overall warranty of construction. Items which have extended warranties shall be indicated with separate warranty expiration dates.
- 7. Cross-reference to warranty certificates as applicable.
- 8. Starting point and duration of warranty period.
- 9. Summary of maintenance procedures required to continue the warranty in force.
- 10. Cross-reference to specific pertinent Operation and Maintenance manuals.
- 11. Organization, names and phone numbers of persons to call for warranty service.
- 12. Typical response time and repair time expected for various warranted equipment.

(d) The Contractor's plans for attendance at the 4 and 9 month post-construction warranty inspections conducted by the Government.

(e) Procedure and status of tagging of all equipment covered by extended warranties.

(f) Copies of instructions to be posted near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

# c. Performance Bond

(1) The Contractor's Performance Bond will remain effective throughout the construction warranty period and warranty extensions.

(2) In the event the Contractor or his designated representative(s) fails to commence and diligently pursue any work required, and in a manner pursuant to the requirements thereof, the Contracting Officer shall have a right to demand that said work be performed under the Performance Bond by making written notice on the surety. If the surety fails or refuses to perform the obligation it assumed under the Performance Bond, the Contracting Officer shall have the work performed by others, and after completion of the work, may make demand for reimbursement of any or all expenses incurred by the Government while performing the work, including, but not limited to administrative expenses.

(3) In the event sufficient funds are not available to cover the construction warranty work performed by the Government at the Contractor's expense, the Contracting Officer will have the right to recoup expenses from the bonding company.

(4) Following oral or written notification of required warranty repair work, the Contractor will respond as dictated by para. 1.16e "Contractor's Response to Warranty Service Requirements". Written verification will follow oral instructions. Failure of the Contractor to respond will be cause for the Contracting Officer to proceed against the Contractor as outlined in the paragraph 1.16c(2) and/or (3) above.

#### d. Pre-Warranty Conference

Prior to contract completion and at a time designated by the Contracting Officer, the Contractor shall meet with the Contracting Officer to develop a mutual understanding with respect to the requirements of this clause. Communication procedures for Contractor notification of warranty defects, priorities with respect to the type of defect, reasonable time required for Contractor response, and other details deemed necessary by the Contracting Officer for the execution of the construction warranty shall be established/reviewed at this meeting. In connection with these requirements and at the time of the Contractor's quality control completion inspection, the Contractor will furnish the name, telephone number and address of a licensed and bonded company which is authorized to initiate and pursue warranty work action on behalf of the Contractor. This point of contact will be located within the local service area of the warranted construction, will be continuously available, and will be responsive to Government inquiry on warranty work action and status. This requirement does not relieve the Contractor of any of his responsibilities in connection with other portions of this provision.

e. Contractor's Response to Warranty Service Requirements.

Following oral or written notification by the Contracting Officer or an authorized representative of the installation designated in writing by the Contracting Officer, the Contractor shall respond to warranty service requirements in accordance with the "Warranty Service Priority List" and the three categories of priorities listed below. The Contractor shall submit a report on any warranty item that has been repaired during the warranty period. The report shall include the cause of the problem, date reported, corrective action taken, and when the repair was completed. If the Contractor does not perform the construction warranty within the timeframe specified, the Government will perform the work and backcharge the construction warranty payment item established.

(1) First Priority Code 1 Perform on-site inspection to evaluate situation, determine course of action, initiate work within 24 hours and work continuously to completion or relief.

(2) Second Priority Code 2 Perform on-site inspection to evaluate situation, determine course of action, initiate work within 48 hours and work continuously to completion or relief.

(3) Third Priority Code 3 All other work to be initiated within (5) five work days and work continuously to completion or relief.

(4) The "Warranty Service Priority List" is as follows:

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P2#: 506474 - Manned/Unmanned Tactical Vehicle Lab (MUMT) Detroit Arsenal, MI
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Code 1 Air Conditioning System a. Buildings with computer equipment. Code 2 Air Conditioning Systems a. Air conditioning leak in part of building, if causing damage. b. Air conditioning system not cooling properly Code 1 Doors a. Overhead doors not operational. Code 1 Electrical a. Power failure (entire area or any building operational after 1600 hours). b. Security lights c. Smoke detectors and fire alarm systems Code 2 Electrical a. Power failure (no power to a room or part of building). b. Receptacle and lights. Code 3 Electrical a. Street, parking area lights Code 1 Gas a. Leaks and breaks. Code 1 Heat a. Area power failure affecting heat. Code 3 Interior a. Floor damage b. Paint chipping or peeling Code 2 Intrusion Detection Systems Code 2 Plumbing a. Flush valves not operating properly b. Fixture drain, supply line commode, or water pipe leaking. c. Commode leaking at base. Code 3 Plumbing a. Leaking faucets Code 1 Roof Leaks Temporary repairs will be made where major damage to property is occurring. Code 2 Roof Leaks Where major damage to property is not occurring, check for location of leak during rain and complete repairs on a Code 2 basis. Code 1 Sprinkler System All sprinkler systems, valves, manholes, deluge

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- Systems, and air systems to sprinklers. Code 2 Water (Exterior) No water to facility.
- Code 2 Water, Hot No hot water in portion of building.

(5) Should parts be required to complete the work and the parts are not immediately available, the Contractor shall have a maximum of 12 hours after arrival at the job site to provide the Contracting Officer or an authorized representative of the installation designated in writing by the Contracting Officer, with firm written proposals for emergency alternatives and temporary repairs for Government participation with the Contractor to provide emergency relief until the required parts are available on site for the Contractor to perform permanent warranty repair. The Contractors proposals shall include a firm date and time that the required parts shall be available on site to complete the permanent warranty repair. The Contracting Officer or an authorized representative of the installation designated in writing by the Contracting Officer, will evaluate the proposed alternatives and negotiate the alternative considered to be in the best interest of the Government to reduce the impact of the emergency condition. Alternatives considered by the Contracting Officer or an authorized representative of the installation designated in writing by the Contracting Officer will include the alternative for the Contractor to "Do Nothing" while waiting until the required parts are available to perform permanent warranty repair. Negotiating a proposal which will require Government participation and the expenditure of Government funds shall constitute a separate procurement action by the using service.

f. Equipment Warranty Identification Tags

(1) The Contractor at the time of installation shall provide warranty identification tags on all Contractor and Government furnished equipment which he has installed.

(a) The tags shall be suitable for interior and exterior locations, resistant to solvents, abrasion, and to fading caused by sunlight, precipitation, etc. These tags shall have a permanent pressure-sensitive adhesive back, and they shall be installed in a position that is easily (or most easily) noticeable. Contractor furnished equipment that has differing warranties on its components will have each component tagged.

(b) Sample tags shall be submitted for Government review and approval. These tags shall be filled out representative of how the Contractor will complete all other tags.

(c) Tags for Warrantied Equipment: The tag for this equipment shall be similar to the following. Exact format and size will be as approved.

# EQUIPMENT WARRANTY CONTRACTOR FURNISHED EQUIPMENT MFG NAME MODEL NO. SERIAL NO. CONTRACT NO. CONTRACTOR NAME CONTRACTOR WARRANTY EXPIRES MFG WARRANTY(IES) EXPIRE MFG WARRANTY(IES) EXPIRE

EQUIPMENT WARRANTY GOVERNMENT FURNISHED EQUIPMENT					
MFG NAME	MODEL NO.				
SERIAL NO.					
CONTRACT NO.					
CONTRACTOR NAME					
CONTRACTOR WARRANTY EXPIRES					
MFG WARRANTY(IES) EXPIRE					

(d) If the manufacturer's name (MFG), model number and serial number are on the manufacturer's equipment data plate and this data plate is easily found and fully legible, this information need not be duplicated on the equipment warranty tag. The Contractor warranty expires (warranty expiration date) and the final manufacturer's warranty expiration date will be determined as specified by clause 52.246-21 Alt.I "WARRANTY OF CONSTRUCTION" in Section 00 70 00.

(2) Execution. The Contractor will complete the required information on each tag and install these tags on the equipment by the time of and as a condition of final acceptance of the equipment.

(3) Payment. The work outlined above is a subsidiary portion of the contract work, and has a value to the Government approximating 5% of the value of the Contractor furnished equipment. The Contractor will assign a value of that amount in the breakdown for progress payments mentioned in the clause 52.232-5 "Payments Under Fixed-Price Construction Contracts" in Section 00 70 00.

(4) Equipment Warranty Tag Replacement. The Contractor's warranty with respect to work repaired or replaced shall run for one year from the date of repair or replacement. Such activity shall include an updated warranty identification tag on the repaired or replaced equipment. The tag shall be furnished and installed by the Contractor, and shall be identical to the original tag, except that the Contractor's warranty expiration date will be one year from the date of acceptance of the repair or replacement.

1.17 NOT USED

- 1.18 NOT USED
- 1.19 PROJECT SIGN

a. General. The Contractor shall furnish and erect at the location directed one project sign. The sign shall be lettered on one side only and shall conform to the details shown as an attachment at the end of this specification section.

Project nomenclature shall be: Ground Transportation Equipment Building

Architect-Engineer name shall be: Benham-Mead&Hunt

b. Materials.

Sign Panels can be constructed using either of the materials below:

(1) The sign panels shall be constructed of good sound materials suitable for the purpose. Lumber shall be salt treated softwood of No. 2 grade or better. Sizes shown are nominal. Plywood shall be 1/2-inch, B-B, marine grade and with dimensional lumber uprights and bracing. Screws shall be of commercial quality and of sizes shown.

(2) The sign Panels shall be fabricated using premium, furniture-grade exterior plywood laminated on both sides with factory-baked polyester painted aluminum surfaces and with dimensional lumber uprights and bracing. Screws shall be commercial quality and of the sizes shown.

c. Maintenance. The signs shall be maintained in good condition until completion of the contract, shall remain the property of the Contractor, and shall be removed from the site upon completion of work under the contract.

d. Logos. The Corps of Engineers and the Army Star Logo, andthe local sponsor or CFSC logo will be provided by the Contracting Officer. All legends shall be provided in the sizes and styles as specified by the graphic formats shown at the end of this section.

e. Painting. The sign and posts shall be given one prime coat and two finish coats of gloss exterior-type enamel paint, either as specified in the Base Architectural Compatibility Guide or as approved by the COR.

Paint colors shall be as follow:

Black - Federal Standard 595a Color Number 27038 White - Federal Standard 595a Color Number 27875 Red - PANTONE 032

f. Payment. No separate payment will be made for furnishing and erecting the project sign(s) as specified and costs thereof shall be considered a subsidiary obligation of the Contractor.

1.20 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER

This provision specifies the procedure for the determination of time extensions for unusually severe weather in accordance with the clause 52.249-10 "Default (Fixed-Price Construction)" in Section 00 70 00. In

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order for the Contracting Officer to award a time extension under this clause, the following conditions must be satisfied:

The weather experienced at the project site during the contract period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month.

Indicate the location of the National Weather Service office closest to the site. See: <u>https://www.weather.gov/srh/nwsoffices</u> The Contractor shall make his own investigations and determinations as to weather conditions at the site. Data may be obtained from various National Weather Service offices located generally at airports of principal cities, the nearest to this project being: Detroit/Pontiac, MI.

The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the Contractor.

The following schedule of monthly anticipated adverse weather delays is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the project location and will constitute the base line for monthly weather time evaluations. The Contractor's progress schedule must reflect these anticipated adverse weather delays in weather dependent activities.

MONTHLY ANTICIPATED ADVERSE WEATHER DELAY WORK DAYS BASED ON FIVE (5) DAY WORK WEEK

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
15	11	5	4	6	4	5	4	4	4	4	9

Upon acknowledgment of the Notice to Proceed (NTP) and continuing throughout the contract, the Contractor will record on the daily CQC report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the Contractor's scheduled work day. The number of actual adverse weather delay days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather of days anticipated listed above, the Contracting Officer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days, and issue a modification in accordance with the clause 52.249-10

"Default (Fixed-Price Construction)" in Section 00 70 00.

# 1.21 INTERFERENCE WITH TRAFFIC AND PUBLIC AND PRIVATE PROPERTY

a. The Contractor at all times shall dispose his plant and conduct the work in such manner as to cause as little interference as possible with private and public travel. Damage (other than that resulting from normal wear and tear) to roads, shall be repaired to as good a condition as they were prior to the beginning of work and to the satisfaction of the Contracting Officer.

1.22 NOT USED

1.23 NOT USED

1.24 COMPLIANCE WITH POST/BASE REGULATIONS

a. The site of the work is on a military reservation and all rules and regulations issued by the Commanding Officer covering general safety, security, sanitary requirements, pollution control and traffic regulations, shall be observed by the Contractor. Information regarding these requirements may be obtained by contacting the Contracting Officer, who will provide such information or assist in obtaining same from appropriate authorities.

b. Contractor personnel shall park only in areas authorized by the Contracting Officer.

c. The standard workweek shall be Monday through Friday 0700-1600.

#### 1.25 COST PRINCIPLES AND PROCEDURES FOR MODIFICATION

Cost principles and procedures for any modifications processed under this contract will follow all applicable contract clauses, laws, regulations, policies, and guidance. See, for example: FAR Part 31, FAR Part 15 and EP 1110-1-8, Construction Equipment Ownership and Operating Expense Schedule (region dependent on project location), available at https://publications.usace.army.mil.

# 1.26 ENGLISH-SPEAKING REPRESENTATIVE

At all times when any performance of the work at any site is being conducted by any employee of the Contractor or his subcontractors, the Contractor shall have a representative present at each site who has the capability of receiving instructions in the English language, fluently speaking the English language and explaining the work operations to persons performing the work, in the language that those performing the work are capable of understanding. The Contracting Officer shall have the right to determine whether the proposed representative has sufficient technical bilingual capabilities, and the Contractor shall immediately replace any individual not acceptable to the Contracting Officer.

#### 1.27 SALES and USE TAX

Some states have tax exemptions for certain aspects of work when done for the federal government and the Contractor shall check with the state where the project is located for more information. If a sales tax exemption is applicable, the contractor is responsible for obtaining any required exemption certification.

#### 1.28 CONTRACTOR SECURITY TRAINING/FACILITY ACCESS REQUIREMENTS

a. All contractor employees, to include subcontractor employees, shall complete AT Level 1 awareness training within seven (7) calendar days after commencing work on the site. The contractor shall submit a roster for each affected contractor employee and subcontractor employee to the COR or to the Contracting Officer within seven (7) calendar days after completion of training by all employees and subcontractor personnel. AT Level 1 awareness training is available at the following website: https://jko.jten.mil/courses/atl1/launch.html

b. All contractor employees, to include subcontractor employees, shall comply with applicable installation, facility and area commander installation/facility access and local security policies and procedures (provided by government representative). The contractor shall also provide all information required for background checks to meet installation access requirements to be accomplished by installation Provost Marshal Office, Director of Emergency Services or Security Office. Contractor workforce must comply with all personal identity verification requirements as directed by DOD, HQDA and/or local policy. In addition to the changes otherwise authorized by clause 52.243-4 - "Changes" in Section 00 70 00 of this contract, should the Force Protection Condition (FPCON) at any individual facility or installation change, the Government may require changes in contractor security matters or processes.

For contractors requiring Common Access Card (CAC). Before CAC issuance, the contractor employee requires, at a minimum, a favorably adjudicated National Agency Check with Inquiries (NACI) or an equivalent or higher investigation in accordance with Army Directive 2014-05. The contractor employee will be issued a CAC only if duties involve one of the following: (1) Both physical access to a DoD facility and access, via logon, to DoD networks on-site or remotely; (2) Remote access, via logon, to a DoD network using DoD-approved remote access procedures; or (3) Physical access to multiple DoD facilities or multiple non-DoD federally controlled facilities on behalf of the DoD on a recurring basis for a period of 6 months or more. At the discretion of the sponsoring activity, an initial CAC may be issued based on a favorable review of the FBI fingerprint check and a successfully scheduled NACI at the Office of Personnel Management.

For contractors that do not require CAC, but require access to a DoD facility or installation. Contractor and all associated sub-contractors employees shall comply with adjudication standards and procedures using the National Crime Information Center Interstate Identification Index (NCIC-III) and Terrorist Screening Database (TSDB) (Army Directive 2014-05/AR 190-13), applicable installation, facility and area commander installation/facility access and local security policies and procedures (provided by government representative), or, at OCONUS locations, in accordance with status of forces agreements and other theater regulations.

c. Per AR 530-1, Operations Security, all contractor employees and associated subcontractor employees must complete Level 1 OPSEC Training within thirty (30) calendar days of commencing work. Additionally, all contractor employees and associated subcontractor employees must complete annual OPSEC awareness training.

d. Refer to clause 52.222-54: "Employment Eligibility Verification" in Section 00 70 00 for e-Verify requirements.

e. The contractor and all associated sub-contractors shall brief all employees on the local iWATCH program (training standards provided by the requiring activity ATO). This locally developed training will be used to inform employees of the types of behavior to watch for and instruct employees to report suspicious activity to the COR. This training shall be completed within 30 calendar days of contract award and within 05 calendar days of new employees commencing performance with the results reported to the COR NLT 30 calendar days after contract award.

#### 1.29 INSURANCE--WORK ON A GOVERNMENT INSTALLATION

In addition to the requirements of clause 52.228-5 "Insurance - Work on a Government Installation" found in Section 00 70 00 the following shall be provided:

- a. Coverage complying with State laws governing insurance requirements, such as those requirements pertaining to Workman's Compensation and Occupational Disease Insurance. Employer's Liability Insurance shall be furnished in limits of not less than \$100,000.00 except in states with exclusive or monopolistic funds.
- b. Comprehensive Automobile Liability Insurance for both bodily injury and property damage, shall be furnished in limits of not less than \$200,000.00 per person, \$500,000.00 per accident for bodily injury, and \$20,000.00 per accident for property damage. When the Financial Responsibility or Compulsory Insurance Law of the State, requires higher limits, the policy shall provide for coverage of at least those higher limits.
- c. Within seven calendar days after the award of contract, the Contractor shall submit to the Contracting Officer Evidence of Insurance for all insurance coverages. Dates of coverage shall be entered into RMS and maintained thru the contract duration. If and when new insurance is obtained because of expiration or renewal, new certificates shall be submitted to the Contracting Officer within seven days of obtainment and the new coverage information and dates entered into RMS.
- 1.30 AVAILABILITY OF SAFETY AND HEALTH REQUIREMENTS MANUAL (EM 385-1-1)

As covered by clause 52.236-13 "Accident Prevention" in Section 00 70 00, compliance with EM 385-1-1 is a requirement for this contract. Copies may be downloaded from the following website: https://www.publications.usace.army.mil/USACE-Publications/Engineer-Manuals/

- 1.31 NOT USED
- 1.32 RADIOACTIVE MATERIAL/EQUIPMENT

All equipment (e.g. nuclear density gauges) or items containing radioactive material brought onto any military or private installation must be licensed by the Nuclear Regulatory Commission, and or State/Local authorities having jurisdiction. Some locations are considered a non-agreement sites with respect to reciprocity with State permits and special permitting may be required prior to accessing the site with the equipment. Be aware that there may be several week review and processing periods that vary from location to location. Permitting for each site must be evaluated, with a copy of any obtained permit or license submitted to the Contracting Officer and uploaded into RMS.

#### 1.33 CONSTRUCTION HAZARD COMMUNICATION

The Contractor is required to comply with the requirements of the OSHA Hazard Communication Standard in alignment with the Globally Harmonized System (GHS) (29 CFR 1926.59). This standard is designed to inform workers of safe and appropriate methods of working with hazardous substances in the workplace. The standard has five requirements, and every hazardous or potentially hazardous substance used or stored in the work area is subject to all five. They are:

(1) Hazard Classification. Any company which produces or imports a chemical or compound must conduct a hazard classification of the substance to determine its potential health or physical hazard. The hazard evaluation consists of an investigation of all the available scientific evidence about the substance. The Contractor is required to assure that all producers (manufacturer/distributors) have performed these classifications and transmit the required information with any hazardous materials being used or stored on the project site. From the hazard classification, a substance may be classified as a health hazard or a physical hazard. These classifications are then further broken down into hazard categories according to the severity of the effect:

Health Hazards	Physical Hazards
Carcinogens	Combustible liquids
Irritants	Compressed gases
Sensitizers	Explosives
Corrosives	Flammables
Toxic substances	Organic peroxides
Highly toxic substances	Unstable substances
Substances harmful to specific organs or parts of the body	Water-reactive substances

(2) Warning Labels. If a chemical is hazardous or potentially hazardous, the producer or importer must affix a label to every container of that chemical before it leaves his facility. The Contractor must assure these labels are attached and legible. The label must identify the hazard symbol/pictograms, signal words, hazard statements, product name or identifier (identify hazardous ingredients, where appropriate), precautionary statements and pictograms, supplier identification, and supplemental information. If the hazardous substance is transferred to another container, that container must then be labeled, tagged, or marked with the name of the chemical and the appropriate hazard warning. Warning labels shall be replaced immediately if they are defaced or removed.

(3) Safety Data Sheets. The producer or importer must also supply a safety data sheet (SDS) that follows the 16 heading format as defined by GHS. The Contractor must keep these available in the work area where the substance is used, so that the people using the substance can easily review important safety and health information, such as:

- (i) Emergency procedures for leaks, spills, fire and first aid.
- (ii) Precautions necessary for use, handling, and storage.

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(iii) Useful facts about the substance's physical or chemical properties.

(iv) Regulatory information and any other pertinent information including information on preparation and revision of the SDS.

(4) Work Area Specific Training. Because of hazardous substance may react differently depending on how it is used or the environment of the work area, the Contractor must conduct work area specific training; special training which takes the Contractor's operations, environment, and work policies into consideration. Work area training presents:

The hazardous substances which are present in the work place and the hazards they pose.

Ways to protect against those hazards, such as protective equipment, emergency procedures, and safe handling.

Where the SDS's are kept, and an explanation of the labeling system.

Where the Contractor's written Hazard Communication Program is located.

(5) The Written Hazard Communication Program. In accordance with OSHA and the EM 385-1-1 requirements, the Contractor must prepare a written Hazard Communication Program. This document will be included in the Contractor's Accident Prevention Plan. This document states the hazardous or toxic agent inventory, how the Contractor plans to ensure that hazardous materials are appropriately labeled, how and where SDS's will be maintained, and how employees will be provided with specific information and training.

#### 1.34 MECHANICAL/ELECTRICAL ROOM LAYOUT

Detailed mechanical/electrical room layout drawings shall be submitted for approval in accordance with Section 01 33 00 SUBMITTAL PROCEDURES. Layout drawings shall show location and maintenance clearances for all mechanical/electrical room equipment, and all utility runs/chases for mechanical, electrical, telephone and other similar systems. Drawings shall be submitted at the same time as the submittals for the equipment to be located within the mechanical/electrical room.

# 1.35 RED ZONE MEETING

Approximately forty-two (42) calendar days prior to anticipated furniture installation , the Contractor and the Government's project delivery team will conduct what is known as the Red Zone Meeting to discuss the close-out process, to schedule the events and review responsibilities for actions necessary to produce a timely physical, as well as fiscal, project close-out. The Red Zone meeting derives its name from the football term used to describe the team effort to move the ball the last 20 yards into the end zone. The close-out of a construction project sometimes can be equally as hard and most definitely requires the whole team's efforts.

#### 1.36 PARTNERING

In order to most effectively accomplish this contract, the Government proposes to form a partnership with the Contractor to develop a cohesive building team. It is anticipated that this partnership would involve Project Delivery Team members from the Corps of Engineers, Program Sponsor, facility user representatives, the Contractor, primary subcontractors, and the designers. The partnership will draw upon the strength of each organization in an effort to achieve a project that is without any safety mishaps, conforms to the Contract, stays within budget and on schedule.

The Government encourages partnering to be initiated near the beginning of the Contract and endure through the life of the Contract. This partnership would be bilateral in membership and participation will be completely voluntary.

#### 1.37 PROGRESS PHOTOGRAPHS

Monthly digital photography shall be performed between the first and fifth of each month, delivered no later than the 10th of each month taken as described herein. A minimum of six views from different positions shall be taken as directed to show, inasmuch as possible, work accomplished during the previous month, and a minimum of six views shall be taken of the completed work. Additional views and positions may be required by the Contracting Officer to depict the work done.

Contractor is required to obtain local permit prior to photographing at Detroit Arsenal.

Digital photographs shall be at least 4 megapixels and in JPEG format, uploaded to RMS no later than 48 hours following obtainment of photography.

Each photograph shall be identified with the date made, contract title and number, location of work, as well as a brief description of work depicted.

No separate payment will be made for these services and all costs in connection thereto shall be considered a subsidiary obligation of the Contractor.

#### 1.38 DAMAGE TO WORK

The responsibility for damage to any part of the permanent work shall be as set forth in clause 52.236-7 "Permits And Responsibilities" in Section 00 70 00. Except as herein provided, damage to all work (including temporary construction), utilities, materials, equipment and plant shall be repaired to the satisfaction of the Contracting Officer at the Contractor's expense, regardless of the cause of such damage.

- 1.39 NOT USED
- 1.40 NOT USED
- 1.41 NOT USED
- 1.42 NOT USED
- 1.43 NOT USED
- 1.44 NOT USED
- 1.45 FINAL CLEANING

Clean the premises in accordance with clause 52.236-12 "Cleaning Up" in Section 00 70 00 and additional requirements state here. Remove stains, foreign substances, and temporary labels from surfaces. Vacuum carpet and soft surfaces. Clean equipment and fixtures to a sanitary condition. Clean or replace filters of operating equipment if cleaning is not possible or practicable. Remove debris from roofs, drainage systems, gutters, and downspouts. Sweep paved areas and rake clean landscaped areas. Remove waste, surplus materials, and rubbish from the site. Remove all temporary structures, barricades, project signs, fences and construction facilities. A list of completed clean-up items shall be submitted on the day of final inspection.

1.46 BASIS FOR SETTLEMENT OF PROPOSALS

See FAR Section 31.105(d)(2)(i) for establishing the cost of construction equipment.

- 1.47 NOT USED
- PART 2 PRODUCTS NOT USED
- PART 3 EXECUTION NOT USED

-- End of Section --
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A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		00 80 00.00 06	SD-01 Preconstruction Submittals														
			SF1413 Statement and	1.12													
			Acknowledgement														
			Radioactive Material/Equipment	1.32	G												
			SD-02 Shop Drawings														
			Mechanical/Electrical Room	1.34	G												
			Layout														
			SD-04 Samples														
			Equipment Warranty Identification	1.16	G												
			Tags														
			SD-05 Design Data														
			Progress Photographs	1.37													
			SD-07 Certificates														
			Warranty of Construction	1.16													
			NO ASBESTOS - CONTAINING	1.15	G												
			MATERIAL (ACM)														
			CERTIFICATION														
			Certification for each individual	1.15.2	G												
			product installed and identified to														
			contain mineral fibers that no														
			asbestos-containing materials														
			were installed		ļ												
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		00 80 00.00 06	Documentation to show that the	1.15.2	G												
			products containing mineral fiber														
			materials have been														
			microscopically examined by an														
			AIHA- or NVLAP-certified														
			laboratory and the lab has														
			determined that the material doe	\$													
			not contain asbestos														
			Insurance	1.29													
			Sales and Use Tax	1.27													
			SD-11 Closeout Submittals														
			Preliminary (Working) As-Built	1.7.4	G												
			Drawings														
			Final As-Built Drawings	1.7.1	G												
			CAD Working As-Built Drawings	1.7.1.2	G												
			Equipment-in-Place List	1.9.1													
			Maintenance and Parts Data	1.9.1													
			Warranty Management Plan	1.16	G												
			Contour Map	1.7.3	G												
		01 11 00	SD-01 Preconstruction Submittals														
			Utility Outage Requests	1.7.1													
			Utility Connection Requests	1.7.1													
		01 32 01.00 06	SD-01 Preconstruction Submittals														
			Preliminary Project Schedule	3.4.1	G												
			Project Schedule	3.4	G												
			Periodic Schedule Updates	3.4.4	G												

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		01 32 01.00 06	Narrative Report	3.5.2	G												
			Schedule Reports	3.5.4	G												
		01 33 00	SD-01 Preconstruction Submittals														
			Submittal Register	1.9	G												
		01 33 29.00 06	SD-01 Preconstruction Submittals														
			Sustainability Action Plan	1.5.1.1	G AE												
			LEED Implementation Plan	1.5.1.4	G AE												
			LEED Implementation Plan	1.7.2	G AE												
			LEED Implementation Plan	3.1	G AE												
			Indoor Air Quality Plan	1.6.5	G AE												
			LEED AP BD+C	1.4	G AE												
			SD-09 Manufacturer's Field														
			Reports														
			Sustainability Progress Report	1.5.1.4	G AE												
			SD-11 Closeout Submittals														
			Final Sustainability eNotebook	1.5.1.2	G AE												
			Amended Final Sustainability	1.5.1.2	G AE												
			eNotebook														
			Final High Performance and	1.5.1.2	G AE												
			Sustainable Building Checklist														
			LEED Plaque and Certificate	3.2	G AE												
		01 35 26.00 06	SD-01 Preconstruction Submittals														
			Accident Prevention Plan (APP)	1.7													
			Fatigue Management Plan	1.7													
			Bloodborne Pathogen Plan	1.7													
			Exposure Control Plan	1.7													

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		01 35 26.00 06	Automatic External Defibrillator	1.7													
			(AED) Program														
			Site Layout Plan	1.7													
			Access/Haul Road Plan	1.7													
			Hearing Conservation Program	1.7													
			Respiratory Protection Plan	1.7													
			Health Hazard Control Program	1.7													
			Hazard Communication Program	1.7													
			Process Safety Management	1.7													
			Plan														
			Lead Compliance Plan &	1.7													
			Specifications														
			Asbestos Abatement Plan &	1.7													
			Specifications														
			Heat Stress Monitoring Plan	1.7													
			Cold Stress Monitoring Plan	1.7													
			Indoor Air Quality Management	1.7													
			Plan														
			Mold Remediation Plan	1.7													
			Chromium (VI) Exposure	1.7													
			Evaluation														
			Crystalline Silica Assessment	1.7													
			Lighting Plan for Night Operations	1.7													
			Traffic Control Plan	1.7													
			Fire Prevention Plan	1.7													
			Wild Land Fire Management Plan	1.7													

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		01 35 26.00 06	Arc Flash Hazard Analysis	1.7													
			Assured Equipment Grounding	1.7													
			Control Program (AEGCP)														
			Hazardous Energy Control Plan	1.7													
			Standard Pre-Lift Plan (LHE)	1.7													
			Critical Lift Plan - LHE	1.7													
			Fall Protection and Prevention	1.7													
			Plan														
			Demolition/Renovation Plan (to	1.7													
			include engineering survey)														
			Rope Access Work Plan	1.7													
			Excavation/Trenching Plan	1.7													
			Fire Prevention & Protection Plan	1.7													
			for Underground Construction														
			Compressed Air Plan for	1.7													
			Underground Construction														
			Erection and Removal Plan for	1.7													
			Formwork and Shoring														
			PreCast Concrete Plan	1.7													
			Lift-Slab Plans	1.7													
			Masonry Bracing Plan	1.7													
			Steel Erection Plan	1.7													
			Tree Felling/Maintenance	1.7													
			Program														
			Site Safety and Health Plan	1.7													
			(HTRW)														

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		01 35 26.00 06	Confined Space Entry	1.7													
			Procedures														
			Confined Space Program	1.7													
			Activity Hazard Analysis (AHA)	1.8	G RO												
			Site Safety and Health Officer	1.5.1.1	G RO												
			Qualifications(SSHO)														
			Certified Safety	1.3	G RO												
			Professional/Certified Industrial														
			Hygienist Qualifications														
			Proof of qualification for Crane	1.12.7	G RO												
			Operators														
			Critical Lift Plan	1.12.7	G RO												
			SD-06 Test Reports														
			Reports	1.12													
			Accident Reports	1.12.1													
			Monthly Exposure Reports	1.12.3													
			Crane Reports	1.12.5													
			Regulatory Citations and	1.12.4													
			Violations														
			SD-07 Certificates														
			Confined Space Entry Permit	1.12.8													
			Hot work permit	1.13													
			Crane Certificate of Compliance	1.12.6													
		01 45 04.10 06	SD-01 Preconstruction Submittals														
			Construction Quality Control Plan	3.3	G RO												
		01 45 35	SD-01 Preconstruction Submittals														

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		01 45 35	Written NDT Practices	3.1.2													
			SD-06 Test Reports														
			Daily Reports	3.1.2													
			Biweekly Reports	3.1.1													
			SD-07 Certificates														
			AISC Certified Steel Fabricator	2.1													
			Steel Joist Institute Membership	2.1													
			Certified Plant	2.1													
			Certificate of Compliance	2.1													
			Special Inspector	1.5	G												
			Qualification Records	3.1.2													
			SD-11 Closeout Submittals														
			Interim Report	3.1.2	G												
			Comprehensive Final Report	3.1.2	G												
		01 46 00.00 06	SD-01 Preconstruction Submittals														
			Commissioning Specialists	1.4	G DO												
			Commissioning Specialists	1.4.4	G DO												
			Project Schedule	1.9	G DO												
			SD-06 Test Reports														
			Construction Phase	3.1.4	G DO												
			Commissioning Plan														
			Building Envelope Inspection	3.1.6.2	G DO												
			Checklists														
			Building Envelope Inspection	3.1.6.2	G DO												
			Checklists														
			Pre-Functional Checklists	3.1.6.3	G DO												

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		01 46 00.00 06	Issues Log	1.7													
			Commissioning Report	3.7	G DO												
			Post-Construction	3.8	G DO												
			Commissioning Report														
			Monthly Monitoring Based	3.8.1	G DO												
			Commissioning Update														
			Monitoring Based Commissioning	3.8.1	G DO												
			Report														
			SD-07 Certificates														
			Certificate of Readiness	1.8	G DO												
			SD-10 Operation and Maintenance														
			Data														
			Systems Training	3.2	G DO												
			Training Plan	3.3	G RO												
			Training Attendance Rosters	3.3	G RO												
			Systems Manual	3.4	G DO												
			Post-Construction Systems	3.8	G DO												
			Manual														
			Maintenance and Service Life	3.5	G DO												
			Plans														
			SD-11 Closeout Submittals														
			Final Commissioning Report	1.6	S DO												
			Final Construction Phase	1.6	S	1											
			Commissioning Plan	-													
		01 50 00	SD-01 Preconstruction Submittals														
			Construction Site Plan	1.3	G												

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		01 50 00	Traffic Control Plan	3.4.1	G												
			Haul Road Plan	2.2.1	G												
			Contractor Computer	1.6.1.4	G												
			Cybersecurity Compliance														
			Statements														
			Contractor Temporary Network	1.6.6	G												
			Cybersecurity Compliance														
			Statements														
			SD-03 Product Data														
			Backflow Preventers	1.4	G												
			SD-06 Test Reports														
			Backflow Preventer Tests	3.5													
			SD-07 Certificates														
			Backflow Tester	1.4.1													
			Backflow Preventers	1.4													
		01 57 19.00 06	SD-01 Preconstruction Submittals														
			Preconstruction Survey	1.6.1													
			Solid Waste Management Permit	1.11	G												
			Regulatory Notifications	1.6.2	G												
			Environmental Protection Plan	1.7	G												
			Dirt and Dust Control Plan	1.7.9.1	G												
			Employee Training Records	1.6.5	G												
			Environmental Manager	1.6.4	G												
			Qualifications														
			Notice Of Soil Treatment	3.13	G												

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		01 57 19.00 06	Stormwater Pollution Prevention	3.2.1	G	_											
			Plan (Swppp)			_											
			SD-06 Test Reports			_											
			Inspection Reports	3.2.2.2	-												
			Solid Waste Management Report	3.7.2.1	G	_											
			SD-07 Certificates		-	_											
			Employee Training Records	1.6.5	G	_											
			Certificate of Competency	1.6.5.1		_											
			Erosion and Sediment Control	1.6.5		_											
			Inspector			_											
			SD-11 Closeout Submittals		-	_											
			Stormwater Pollution Prevention	3.2.2.3	G	_											
			Plan Compliance Notebook		-	_											
			Stormwater Notice of Termination	3.2.2.4	G	_											
			Waste Determination	3.7.1	G												
			Documentation		-	_											
			Disposal Documentation for	3.7.4.6	G	_											
			Hazardous and Regulated Waste		-	_											
			Assembled Employee Training	1.6.5	G	_											
			Records		_	_											
			Solid Waste Management Permit	1.11	G	_											
			Solid Waste Management Report	3.7.2.1	G				<b> </b>								
			Hazardous Waste/Debris	3.7.4.1	G												
			Management				ļ		<b> </b>					<u> </u>			
			Regulatory Notifications	1.6.2	G	_			<b> </b>								
			Sales Documentation	3.7.2.1	G												

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A C T V I T Y O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G # A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		01 57 19.00 06	Contractor Certification	3.7.2.1													
			As-Built Topographic Survey	3.2.2.4													
		01 74 19	SD-01 Preconstruction Submittals														
			Construction Waste Management	1.7	G AE												
			Plan														
			SD-06 Test Reports														
			Quarterly Reports	1.9.2													
			Annual Report	1.9.3													
			SD-11 Closeout Submittals														
			Final Construction Waste	1.10	S												
			Diversion Report														
		01 78 23	SD-10 Operation and Maintenance														
			Data														
			O&M Database	1.3	G												
			Training Plan	3.1.1	G												
			Training Outline	3.1.3	G												
			Training Content	3.1.2	G												
			SD-11 Closeout Submittals														
			Training Video Recording	3.1.4	G												
			Validation of Training Completion	3.1.6	G												
		02 41 00	SD-01 Preconstruction Submittals														
			Demolition Plan	1.2.2	G												
			Existing Conditions	1.9													
			SD-07 Certificates														
			Notification	1.6	G												
		03 30 00	SD-01 Preconstruction Submittals														

TITLE	AND	LOCATION				CONTRAC	TOR										
Det	roit A	Arsenol MUMT	JV														
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A C T I V I T Y N O	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASS-F-CAT-ON	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		03 30 00	Concrete Curing Plan	1.7.3.1	G												
			Quality Control Plan	1.7.5	G												
			Quality Control Personnel	1.7.6	G												
			Certifications														
			Quality Control Organizational	1.7.6													
			Chart														
			Laboratory Accreditation	1.7.8	G												
			SD-02 Shop Drawings														
			Reinforcing Steel	1.7.2.1	G AE												
			SD-03 Product Data														
			Joint Sealants	2.4.5	S												
			Joint Filler	2.4.4	G												
			Formwork Materials	2.1													
			Cementitious Materials	2.3.1	S												
			Vapor Barrier	2.4.6													
			Concrete Curing Materials	2.4.1													
			Reinforcement	2.6	S												
			Liquid Chemical Floor Hardeners	2.4.3.1	S												
			and Sealers														
			Admixtures	2.3.4													
			Mechanical Reinforcing Bar	2.6.2													
			Connectors														
			Biodegradable Form Release	2.2.2													
			Agent														
			Pumping Concrete	1.7.3.2													
			Finishing Plan	1.7.3.3													

TITLE	AND	LOCATION				CONTRAC	FOR										
Det	roit A	rsenol MUMT J	V														
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A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACT-ON CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		03 30 00	Nonshrink Grout	2.4.2													
			Environmental Product	1.9.1	S												
			Declarations														
			Embodied Carbon Optimization	1.9.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.9.3.1	S												
			Bio-Based Materials	1.9.3.2	S												
			Recycled Content Materials	1.9.3.4	S												
			Local/Regional Materials	1.9.5	S												
			Low-Emitting Materials	1.9.6	S												
			Material Ingredient Reporting	1.9.4	S												
			SD-05 Design Data														
			Concrete Mix Design	1.7.1.1	G AE												
			SD-06 Test Reports														
			Concrete Mix Design	1.7.1.1	G AE												
			Fly Ash	1.7.4.1													
			Pozzolan	1.7.4.1													
			Slag Cement	1.7.4.2													
			Aggregates	1.7.4.3													
			Tolerance Report	3.9.2.1	G												
			Compressive Strength Tests	3.12.3.3	G AE						1						
			Chloride Ion Concentration	3.12.3.5													
			Air Content	3.12.3.4							1						
			Slump Tests	3.12.3.1													
			Water	2.3.2													
			SD-07 Certificates	-													

TITLE /	AND I	LOCATION				CONTRACT	TOR										
Detro	oit A	rsenol MUMT J	IV														
					G	C SC	ONTRACTO	R: TES		NTRACTOR ACTION		APF	ROVING AU	THOR	RITY		
A C T V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G # A G R A P H	OVT OR A/E REVWR CLASS-F-CAT-ON	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		03 30 00	Reinforcing Bars	2.6.1													
			Welder Qualifications	1.10													
			VOC Content for Form Release	1.7.3.4	S												
			Agents, Curing Compounds, and														
			Concrete Penetrating Sealers														
			Safety Data Sheets	1.7.3.5													
			Certified Wood	1.9.3.3	S												
			Field Testing Technician and	1.7.6.2													
			Testing Agency														
			SD-08 Manufacturer's Instructions														
			Liquid Chemical Floor Hardeners	2.4.3.1													
			and Sealers														
			Joint Sealants	2.4.5													
			Curing Compound	2.4.1													
		03 45 00	SD-01 Preconstruction Submittals														
			Pre-Installation Meeting	1.13.5													
			SD-02 Shop Drawings														
			Precast Drawings	1.13.1	G AE												
			SD-03 Product Data														
			Cast-In Embedded Items And	2.3	G AE												
			Connectors														
			Connection Devices	2.3.2	G AE												
			Admixtures	2.2.5			1										
			Gasket	2.5			1										
			Bearing Pads	2.6			1										
			¥														

TITLE	AND	LOCATION				CONTRAC	TOR										
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A C T - V - T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		03 45 00	Environmental Product	1.5.1	S												
			Declarations														
			Embodied Carbon Optimization	1.5.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.5.3.1	S												
			Local/Regional Materials	1.5.5	S												
			Material Ingredient Reporting	1.5.4	S												
			Recycled Content Of	2.2.4	S												
			Cementitious Materials														
			Recycled Content For Insulation	2.7.1	S												
			SD-04 Samples														
			Concrete Wall Panel Surface	1.13.2	G AE												
			Finish														
			Mock-up	1.13.4													
			Full Size Sample Wall Panel	1.13.2													
			SD-05 Design Data														
			Design Calculations	1.7.4	G AE												
			Contractor-Furnished Mix Design	2.1.1	G AE												
			Repair of Surface Defects	2.4.9	G AE												
			Thermal Calculations	1.7.5	G AE												
			SD-06 Test Reports														
			Strength Tests	1.12.2	G AE												
			Slump	1.12.2													
			Air Content	1.12.2													
			Test for Concrete Materials	1.12.1													
			Water	2.2.6													

TITLE	AND	LOCATION				CONTRAC	TOR										
Detr	oit A	Arsenol MUMT J	IV														
					G	C SC	CONTRACTO	R: TES		NTRACTOR ACTION		APF	ROVING AU	THOF	RITY		
A C T V T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASS-F-CAT-ON	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		03 45 00	Testing Precast Units for Strength	3.6.4													
			SD-07 Certificates														
			Manufacturer's Qualifications	1.6	G AE												
			Fabricator Quality Certifications	1.10.1													
			Erector Certification	1.11													
			SD-08 Manufacturer's Instructions														
			Installation	3.3	G												
			Cleaning	3.8	G												
			SD-11 Closeout Submittals														
			Batch Ticket Information	1.13.3	G												
		04 20 00	SD-02 Shop Drawings														
			Cut CMU	3.3.2.1	G AE												
			Detail Drawings	3.4.1.1	G AE												
			SD-03 Product Data														
			Hot Weather Procedures	1.7.1	G AE												
			Cold Weather Procedures	1.7.2	G AE												
			Cement	2.2.2.2.1	G AE												
			Cementitious Materials	2.4.1.1	G AE												
			Environmental Product	1.4.1	S												
			Declarations														
			Embodied Carbon Optimization	1.4.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.4.3.1	S												
			Recycled Content	2.2.2.2.2	S												
			Local/Regional Materials	1.4.5	S												
			Material Ingredient Reporting	1.4.4	S												

Det	roit A	Arsenol MUMT J	V			CONTRAC	IOR										
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A C T I V I T Y NO	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		04 20 00	Low-Emitting Materials	1.4.6	S	_											
			SD-04 Samples			_											
			Concrete Masonry Units (CMU)	2.2.2.2	G AE	_											,
			Admixtures for Masonry Mortar	2.4.1.2	G	_											
			Anchors, Ties, and Bar	2.6.2	G AE												
			Positioners	0.0.0	0.45												
				2.6.3	G AE	_											
			SD-05 Design Data	040													
			Masonry Compressive Strength	2.1.2	G AE												
			Fire-Rated Concrete Masonry	2.2.2.3													
			SD-06 Test Reports	0.0.0.0													
			Fire-Rated Concrete Masonry	2.2.2.3													
			Utills	2644							<u> </u>						
			Field Testing of Grout	3.6.1.1		-											
			Single-Wythe Masonry Wall	3.0.1.2		_											
			Water Penetration Test			_											
			SD-07 Certificates	4 5 4		_											
			Special Masonry Inspector	1.5.1		_											
			Concrete Masonry Units (CMU)	2.2.2.2													
			Precast Concrete Units	2.2.3					<u> </u>					<u> </u>			
				2.4.1.1													
			Admixtures for Masonry Mortar	2.4.1.2													
			Admixtures for Grout	2.4.2.2													
									1		1						

TITLE	AND	LOCATION			CONTRAC	TOR				•							
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A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		04 20 00	Anchors, Ties, and Bar	2.6.2													
			Positioners														
			Joint Reinforcement	2.6.3													
			SD-08 Manufacturer's Instructions														
			Admixtures for Masonry Mortar	2.4.1.2													
			Admixtures for Grout	2.4.2.2													
			SD-10 Operation and Maintenance														
			Data														
			Take-Back Program	3.8													
		05 05 23.13 10	SD-01 Preconstruction Submittals														
			Personnel Qualification	1.4.1	G												
			Procedure description	2.1.1	G												
			SD-03 Product Data														
			Equipment and accessories	2.1.1													
			SD-06 Test Reports														
			Equipment Qualifications	1.4.5													
			Inspection Test Reports	3.4.1													
		05 05 23.16	SD-01 Preconstruction Submittals														
			Welding Quality Assurance Plan	3.2	G												
			SD-03 Product Data														
			Welding Procedure Qualifications	1.3	G												
			Welder, Welding Operator, and	1.3.4													
			Tacker Qualification														
			Previous Qualifications	1.3.2													
			Pre-Qualified Procedures	1.3.3	G												
			Welding Electrodes and Rods	2.2													

TITLE	AND	LOCATION				CONTRAC	TOR										
Deti	roit A	Arsenol MUMT J	IV														
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A C T I V I T Y NO	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASS-F-CAT-ON	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		05 05 23.16	SD-06 Test Reports														
			Nondestructive Testing	3.3	G												
			Weld Inspection Log	3.2													
			SD-07 Certificates														
			Certified Welding Procedure	1.3.1	G												
			Specifications (WPS)														
			Certified Brazing Procedure	1.3.1													
			Specifications (BPS)														
			Certified Procedure Qualification	1.3.1													
			Records (PQR)														
			Certified Welder Performance	1.3.1													
			Qualifications (WPQ)														
			Certified Brazer Performance	1.3.1													
			Qualifications (BPQ)														
			Certified Welding Inspector	1.3.5													
			Nondestructive Testing Personnel	1.3.5													
		05 12 00	SD-02 Shop Drawings														
			Fabrication Drawings	1.6.1	G AE												
			SD-03 Product Data														
			Shop Primer	2.6.2													
			Welding Electrodes and Rods	2.4.1			1										
			Direct Tension Indicator Washers	2.3.2.3	Ī		1										
			Non-Shrink Grout	2.4.2			1										
			Tension Control Bolts	2.3.3													
			Recycled Content for Structural	2.2.1	S												
			Steel	1			1										

TITLE	AND	LOCATION				CONTRAC	TOR										
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		05 12 00	Recycled Content for Structural	2.2.2	S												
			Steel Tubing														
			Recycled Content for Steel Pipe	2.2.3	S												
			Environmental Product	1.4.1	S												
			Declarations														
			Embodied Carbon Optimization	1.4.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.4.3.1	S												
			Local/Regional Materials	1.4.5	S												
			Material Ingredient Reporting	1.4.4	S												
			SD-06 Test Reports														
			Class B Coating	2.6.2													
			Bolts, Nuts, and Washers	2.3													
			Weld Inspection Reports	3.7.1.2	G												
			Direct Tension Indicator Washer	3.7.2.1													
			Inspection Reports														
			Bolt Testing Reports	3.7.3.1													
			Embrittlement Test Reports	3.7.4													
			SD-07 Certificates														
			Steel	2.2													
			Bolts, Nuts, and Washers	2.3													
			Galvanizing	2.5													
			AISC Structural Steel Fabricator	1.5	G AE												
			Quality Certification														
			AISC Structural Steel Erector	1.5	G AE												
			Quality Certification														

TITLE	AND	LOCATION				CONTRAC	TOR										
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A C T I V I T Y O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		05 12 00	Welding Procedures and	1.6.2.1													
			Qualifications														
			Welding Electrodes and Rods	2.4.1													
			Certified Welding Inspector	3.7.1.1													
			NDT Technician	3.7.1.2													
			Welding Procedure Specifications	3.4													
			(WPS)														
			Overhead, Top Running Crane	1.6.2.2													
			Rail Beam, Supporting Column														
			and Rail Beam Support Bracket														
		05 21 00	SD-01 Preconstruction Submittals														
			Welder Qualification	1.3.2													
			SD-02 Shop Drawings														
			Steel Joist Framing	1.3.1	G AE												
			SD-03 Product Data														
			Recycled Content Of Steel	2.3	S												
			Products														
			SD-05 Design Data														
			Design Calculations	2.2	G AE												
			SD-06 Test Reports														
			Erection Inspection	3.3													
			Welding Inspections	3.3													
			SD-07 Certificates														
			Certification of Compliance	1.3.2													
		05 30 00	SD-02 Shop Drawings														
			Fabrication Drawings	1.5.4	G AE												

Detroit Arsenol MUMT JV   Approximation   Approximation <t< th=""><th>TITLE AND</th><th>LOCATION</th><th></th><th></th><th></th><th>CONTRAC</th><th>TOR</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></t<>	TITLE AND	LOCATION				CONTRAC	TOR										
T   T   A   A   A   A   A   APPROVINALITIONTY   APPROVINALITIONTY     A	Detroit /	Arsenol MUMT J	IV														
A   C   T   C   T   C   T   A   C   T   A   C   T   A   C   T   A   C   T   C   A   C   T   C   A   C   T   C   A   C   T   C   A   C   T   C   A   C   T   C   D   DATE PND					G	C SC	CONTRACTO	R: TES		NTRACTOR ACTION		APF	PROVING AU	THOF	RITY		
(a) (b) (c) (d) (e) (f) (g) (h) (	T R A N S M I T T A L A C T I V I T A L N O	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	VT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
05 30 00   SD-03 Product Data	(a) (b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(0)	(p)	(q)	(r)
Accessories2.2II <t< td=""><td></td><td>05 30 00</td><td>SD-03 Product Data</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>		05 30 00	SD-03 Product Data														
Deck Units2.1G AEImage: Constraint of the sector of the s			Accessories	2.2													
Galvanizing Repair Paint2.1.5CCC </td <td></td> <td></td> <td>Deck Units</td> <td>2.1</td> <td>G AE</td> <td></td>			Deck Units	2.1	G AE												
Image: constraint of the second systemImage: constraint of the second systemImage: constraint of the second systemImage: constraint of the second system1.5.2Image: constraint of the second systemImage: constraint of the second systemImage: constraint of the second system1.5.2Image: constraint of the second systemImage: constraint of the second systemImage: constraint of the second system1.5.2Image: constraint of the second systemImage: constraint of the second systemImage: constraint of the second system1.5.2Image: constraint of the second systemImage: constraint of the second systemImage: constraint of the second system1.4.1SImage: constraint of the second systemImage: constraint of the second systemImage: constraint of the second system1.4.1SImage: constraint of the second systemImage: constraint of the second systemImage: constraint of the second systemImage: constraint of the second system1.4.2SImage: constraint of the second systemImage: constraint of the second systemImage: constraint of the second system1.4.5SImage: constraint of the second systemImage: constraint of the second systemImage: constraint of the second system1.4.5SImage: constraint of the second systemImage: constraint of the second systemImage: constraint of the second system1.4.5SImage: constraint of the second systemImage: constraint of the second systemImage: constraint of the second system1.4.5SImage: constraint of the second systemImage: constrai			Galvanizing Repair Paint	2.1.5													
Sound Absorbing Materials2.1.2Image: Constraint of the second seco			Touch-Up Paint	2.1.5													
Welding Equipment1.5.2Image: constraint of the second secon			Sound Absorbing Materials	2.1.2													
Welding Rods and Accessories1.5.2Image: constraint of the second constraint of the seco			Welding Equipment	1.5.2													
Image: constraint of Steel2.1Image: constraint of Steel2.1Image: constraint of Steel2.1Image: constraint of SteelImage: constraint of Steel <th< td=""><td></td><td></td><td>Welding Rods and Accessories</td><td>1.5.2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>			Welding Rods and Accessories	1.5.2													
ProductsProductsImage: Constraint of the second seco			Recycled Content of Steel	2.1													
Image: constraint of the second sec			Products														
DeclarationsImage: Constraint of the second sec			Environmental Product	1.4.1	S												
Image: constraint of the system1.4.2SImage: constraint of the systemImage: constraint of the systemImage: constraint of the systemImage: constraint of the systemReport/Action PlanImage: constraint of the systemImage: con			Declarations														
Report/Action PlanImage: Constraint of the systemImage: Constraint of the systemImage: Constraint of the systemImage: Constraint of the systemExtended Producer Responsibility1.4.3.1SImage: Constraint of the systemImage:			Embodied Carbon Optimization	1.4.2	S												
Extended Producer Responsibility1.4.3.1SImage: Sector of the sector of			Report/Action Plan														
Local/Regional Materials 1.4.5 S Image: Constraints Image: Constand traints Image: Constraints			Extended Producer Responsibility	1.4.3.1	S												
Low-Emitting Materials 1.4.6 S Image: Constraint of the second sec			Local/Regional Materials	1.4.5	S												
Material Ingredient Reporting 1.4.4 S			Low-Emitting Materials	1.4.6	S												
			Material Ingredient Reporting	1.4.4	S												
SD-04 Samples			SD-04 Samples														
Metal Roof Deck Units 2.1.1			Metal Roof Deck Units	2.1.1													
SD-05 Design Data			SD-05 Design Data														
Deck Units 2.1 G AE		1	Deck Units	2.1	G AE												
SD-07 Certificates			SD-07 Certificates	1													
Welder Qualifications 1.5.2			Welder Qualifications	1.5.2													
Welding Procedures 1.5.2			Welding Procedures	1.5.2													
Fire Safety 1.5.3.1			Fire Safety	1.5.3.1													

TITLE	AND	LOCATION				CONTRAC	TOR										
Det	roit A	Arsenol MUMT J	IV														
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A C T I V I T Y NO	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(0)	(p)	(q)	(r)
		05 30 00	Wind Storm Resistance	1.5.3.2													
			Manufacturer's Certificate	1.5.1													
		05 40 00	SD-02 Shop Drawings														
			Framing Components	1.8.1	G AE												
			SD-03 Product Data														
			Studs, Joists	2.1	G AE												
			Recycled Content of Steel	2.1	S												
			Products														
			Environmental Product	1.4.1	S												
			Declarations														
			Embodied Carbon Optimization	1.4.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.4.3.1	S												
			Local/Regional Materials	1.4.5	S												
			Material Ingredient Reporting	1.4.4	S												
			SD-05 Design Data														
			Metal Framing Calculations	1.8.2	G AE												
			SD-07 Certificates														
			Welds	3.1.1													
		05 50 13	SD-02 Shop Drawings	-													
			Bollards/Pipe Guards	2.4			I										
			Roof Hatches	2.5	G												
			SD-03 Product Data				I										
			Recycled Content	2.1	S		1										
			Environmental Product	1.4.1	S		1										
			Declarations														

TITLE	AND	LOCATION				CONTRAC <sup>®</sup>	TOR										
Det	roit A	Arsenol MUMT J	IV														
					G	C SC	ONTRACTO	R: TES				APF	ROVING AU	тног	RITY		
A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	VT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		05 50 13	Embodied Carbon Optimization	1.4.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.4.3.1	S												
			Local/Regional Materials	1.4.5	S												
			Material Ingredient Reporting	1.4.4	S												
		05 51 33	SD-02 Shop Drawings														
			Ladders	2.3													
			SD-03 Product Data														
			Ladders	2.3													
			Ladder Safety Devices	2.3.2													
			Environmental Product	1.4.1	s												
			Declarations														
			Embodied Carbon Optimization	142	S												
			Report/Action Plan		Ŭ												
			Extended Producer Responsibility	1431	s												
			Recycled Content Materials	1432	s												
			Local/Regional Materials	145	s												
			Material Ingredient Reporting	1 1 1	s												
			SD-07 Certificates	1.7.7	5												
			Eabricator Cortification for Shine	1 5													
			Ladder Assembly	1.5													
		06 10 00	SD 03 Product Data														
			Fire retardant Treatment	1 10													
				1.10													
			Autresives	2.4.2	G AE												
				1.4.1	3												
			Declarations														

TITLE	AND	LOCATION				CONTRAC	TOR										
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A C T I V I T Y NO	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACT-ON CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(o)	(p)	(q)	(r)
		06 10 00	Embodied Carbon Optimization	1.4.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.4.3.1	S												
			Recycled Content Materials	1.4.3.3	S												
			Local/Regional Materials	1.4.5	S												
			Material Ingredient Reporting	1.4.4	S												
			SD-06 Test Reports														
			Preservative-treated	1.6.3													
			SD-07 Certificates														
			Certified Sustainably Harvested	2.2.1	S												
			Framing Lumber														
			Certified Sustainably Harvested	2.3.1.1	S												
			Plywood for Other Uses														
			Preservative Treatment	1.9													
			Indoor Air Quality for Aerosol	2.4.2	S												
			Adhesives														
			Indoor Air Quality for Non-aerosol	2.4.2	S												
			Adhesives														
			Indoor Air Quality For Plywood	2.3.1.1	S												
		06 41 16.00 10	SD-02 Shop Drawings														
			Shop Drawings	1.9.2													
			Shop Drawings	2.11													
			Installation	3.1													
			SD-03 Product Data														
			Wood Materials	2.1													
			Finish Schedule	2.11.7.3													

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A C T I V I T Y N O	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	A C T I O N C O D E	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	A C T I O N C O D E	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(o)	(p)	(q)	(r)
		06 41 16.00 10	Environmental Product	1.5.1	S												
			Declarations														
			Embodied Carbon Optimization	1.5.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.5.3.1	S												
			Bio-Based Materials	1.5.3.2	S												
			Recycled Content Materials	1.5.3.3	S												
			Local/Regional Materials	1.5.5	S												
			Material Ingredient Reporting	1.5.4	S												
			SD-04 Samples														
			Plastic Laminates	2.3													
			Cabinet Hardware	2.7													
			SD-07 Certificates														
			Quality Assurance	1.9													
			Laminate Clad Casework	3.1													
			Certified Sustainably Harvested	2.1.1	S												
			Lumber														
			Certified Sustainably Harvested	2.1.2.1	S												
			Plywood														
			Indoor Air Quality For Plywood	2.1.2.1	S												
			Indoor Air Quality For	2.1.2.2	S												
			Particleboard														
			Indoor Air Quality For Medium	2.1.2.3	S												
			Density Fiberboard														
			Indoor Air Quality For	2.9.1	S												
			Non-Aerosol Adhesives														

TITLE	AND	LOCATION			CONTRAC <sup>®</sup>	TOR											
Det	roit A	Arsenol MUMT J	V														
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A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	A C T I O N C O D E	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(0)	(p)	(q)	(r)
		06 41 16.00 10	Indoor Air Quality For Aerosol	2.9.1	S												
			Adhesives														
		06 61 16	SD-02 Shop Drawings														
			Detail Fabrication Drawings	1.5.2	G												
			Installation	3.1	G												
			SD-03 Product Data														
			Solid Polymer	2.1.1	G												
			Indoor air quality for solid surface	2.2.2	S												
			seam and sealant products														
			Environmental Product	1.6.1	S												
			Declarations														
			Embodied Carbon Optimization	1.6.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.6.3.1	S												
			Recycled Content Materials	1.6.3.2	S												
			Local/Regional Materials	1.6.5	S												
			Material Ingredient Reporting	1.6.4	S												
			SD-04 Samples														
			Material	2.1	G												
			Counter Tops	2.3.5	G												
			SD-06 Test Reports														
			Test Report Results	2.1.1													
			SD-07 Certificates														
			Qualifications	1.5.1													
			Indoor Air Quality for solid	2.1.1	S												
			surface fabrication products														

TITLE	AND	LOCATION				CONTRAC	TOR										
Det	roit A	Arsenol MUMT J	IV														
					G	C SC	CONTRACTO	R: TES		NTRACTOR ACTION		APF	PROVING AU	THOF	RITY		
A C T - V - T Y NO	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(o)	(p)	(q)	(r)
		06 61 16	SD-10 Operation and Maintenance														
			Data														
			Solid Polymer	2.1.1	G												
		07 05 23	SD-01 Preconstruction Submittals														
			Work Plan	1.4	G												
			SD-03 Product Data														
			Thermal Imaging Camera	2.2	G												
			SD-05 Design Data														
			Envelope Surface Area	3.2	G												
			Calculations														
			SD-07 Certificates														
			Pressure Test Agency	1.6.2.1													
			Thermographer Qualifications	1.6.2.2													
			Test Instruments	1.6.3													
			Date Of Last Calibration	1.6.3													
			SD-06 Test Reports														
			Pressure Test Procedures	3.5	G												
			Air Leakage Test Report	1.6.4	G AE												
			Air Leakage Test Report	3.5.7	G AE												
			Diagnostic Test Report	1.6.4	G AE												
			Diagnostic Test Report	3.6.5	G AE												
		07 21 13	SD-03 Product Data														
			Manufacturer's Standard Details	1.5	G AE												
			Block or Board Insulation	2.1	G AE												
			Accessories	2.2	G AE												

TITLE	AND	LOCATION				CONTRAC	TOR										
Det	roit A	rsenol MUMT J	IV														
					G	C SC	CONTRACTO	R: TES		NTRACTOR ACTION		APF	PROVING AU	THOF	RITY		
A C T I V I T Y NO	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(0)	(p)	(q)	(r)
		07 21 13	Recycled Content for Block or	2.1.3	S												
			Board Insulation														
			Environmental Product	1.4.1	S												
			Declarations														
			Embodied Carbon Optimization	1.4.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.4.3.1	S												
			Local/Regional Materials	1.4.5	S												
			Material Ingredient Reporting	1.4.4	S												
			SD-07 Certificates														
			Block or Board Insulation	2.1	G AE												
			Special Warranties	1.7	G												
			Special Warranties	1.7	G												
			SD-08 Manufacturer's Instructions														
			Block or Board Insulation	2.1													
			Adhesive	2.2.1													
		07 22 00	SD-02 Shop Drawings														
			Insulation Board Layout	1.5	G AE												
			Verification of Existing Conditions	1.5	G												
			SD-03 Product Data														
			Insulation	2.1	G AE												
			Cover Board	1.6	G AE												
			Fasteners	2.3	G												
			Recycled Content For Insulation	2.1.2	S												
			Environmental Product	1.4.1	S												
			Declarations														

TITLE	AND	LOCATION			CONTRAC <sup>®</sup>	TOR											
Detr	oit A	rsenol MUMT J	V														
					G	C SC	ONTRACTO	R: TES		NTRACTOR ACTION		APF	ROVING AU	тног	RITY		
A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	A C T I O N C O D E	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		07 22 00	Embodied Carbon Optimization	1.4.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.4.3.1	S												
			Bio-Based Materials	1.4.3.2	S												
			Local/Regional Materials	1.4.5	S												
			Material Ingredient Reporting	1.4.4	S												
			SD-06 Test Reports														
			Flame Spread Rating	1.9.1	G												
			SD-07 Certificates														
			Installer Qualifications	1.8	G												
			Indoor Air Quality For Insulation	2.1.3	S												
			SD-08 Manufacturer's Instructions														
			Fasteners	2.3	G												
			Insulation	2.1	G												
		07 27 10.00 10	SD-02 Shop Drawings														
			Air Barrier System Shop	2.1	G AE												
			Drawings														
			SD-03 Product Data														
			Air Barrier System Product Data	2.1	G AE												
			SD-04 Samples														
			Mock-Up	3.1.2	G AE												
			Material Samples For Air Barrier	2.1	G												
			System														
			SD-06 Test Reports														
			Testing and Inspection	3.1.3	G												
			SD-07 Certificates														

TITLE	AND	LOCATION				CONTRAC	TOR										
Deti	roit A	rsenol MUMT J	V														
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A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASS-F-CAT-ON	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		07 27 10.00 10	Air Barrier Inspector	1.7	G RO												
		07 27 19.01	SD-01 Preconstruction Submittals														
			Qualifications of Manufacturer	1.8.1	G												
			Qualifications of Installer	1.8.2	G												
			SD-02 Shop Drawings														
			Self-adhering Air Barrier	1.4	G AE												
			SD-03 Product Data														
			Self-adhering Air Barrier	1.4	G AE												
			Primers, Adhesives, and Mastics	2.2	G AE												
			Safety Data Sheets	1.4.2	G AE												
			SD-04 Samples														
			Self-adhering Air Barrier	1.4	G												
			SD-06 Test Reports														
			Field Peel Adhesion Test	1.6	G												
			Flame Propagation of Wall	1.4.4	G												
			Assemblies														
			Flame Spread and Smoke	1.4.4	G												
			Developed Index Ratings														
			Site Inspections and Testing	3.4.1	G												
			SD-07 Certificates														
			Self-adhering Air Barrier	1.4	G												
			SD-08 Manufacturer's Instructions														
			Self-adhering Air Barrier	1.4	G												
			Primers, Adhesives, and Mastics	2.2	G												
		07 27 36	SD-01 Preconstruction Submittals														
			Qualification of Manufacturer	1.10.1	G												

TITLE	AND	LOCATION			CONTRAC	TOR											
Det	roit A	Arsenol MUMT J	IV														
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A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACH-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		07 27 36	Qualification of Installer	1.10.2	G												
			Quality Control Plan	1.11	G												
			Safety Plan	1.11	G												
			Fire Prevention Plan	1.9.1	G												
			Respirator Plan	1.9.2	G												
			SD-02 Shop Drawings														
			Spray Foam Air Barrier	1.5													
			Foam Air Barrier System	1.11	G AE												
			Fire-Rated Assemblies	1.5.1	G AE												
			SD-03 Product Data														
			Closed Cell	2.1.2	G AE												
			Transition Membrane	2.2	G AE												
			Primers, Adhesives, and Mastics	2.3	G AE												
			Sealants	2.5	G AE												
			Safety Data Sheets	1.5.2	G AE												
			Thermal Barrier Materials	2.1.1	G AE												
			Accessories	2.1.6	G AE												
			Recycled Content for Closed Cell	2.1.2	S												
			Spray Foam Air Barrier														
			SD-04 Samples														
			Spray Foam Air Barrier	1.5	G												
			SD-06 Test Reports														
			Field Peel Adhesion Test	1.5.4	G												
			Thermographic Test	3.4.5.1	G												
			Air Barrier Test	1.8	G												
			Primers	1.5.3	G												

TITLE	AND	LOCATION				CONTRAC	TOR										
Det	oit A	rsenol MUMT J	IV														
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A C T - V - T Y NO	TRANSMITAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		07 27 36	Fire-Ratings Of Thermal Barrier	1.5.4	G												
			Materials														
			Flame Spread And Smoke	1.5.4	G												
			Developed Index Ratings Of SPF	1													
			Products		_												
			Flame Propagation Of Wall	1.5.4	G												
			Assemblies														
			Site Inspections	3.4.1	G												
			SD-07 Certificates														
			Closed cell	2.1.2	G												
			Transition Membrane	2.2	G												
			Indoor Air Quality for Spray Foam	2.1.5	S												
			Air Barrier														
			SD-08 Manufacturer's Instructions														
			SPF Handling, Storage, and	1.6.1	G												
			Spray Procedures														
			Substrate Preparation	3.2.1	G												
			Thermal Barrier	1.5.1	G												
			Transition Membrane	2.2	G												
			Primers, Adhesives, and Mastics	2.3	G												
			SD-09 Manufacturer's Field														
			Reports														
			Core Samples	1.11													
			Daily Work Record	3.3.3													
			Visual Inspection and Thermal	3.4.5													
			Scanning														

TITLE	AND	LOCATION				CONTRAC	TOR										
Det	roit A	Arsenol MUMT J	IV														
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A C T I V I F Y NO	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACT-ON CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		07 42 13	SD-01 Preconstruction Submittals														
			Qualification of Manufacturer	1.7.3	G												
			Qualification of Installation	1.7.4	G												
			Contractor														
			Warranty	1.10	G AE												
			SD-02 Shop Drawings														
			Installation Drawings	1.7.1.1	G AE												
			SD-03 Product Data														
			Environmental Product	1.6.1	S												
			Declarations														
			Embodied Carbon Optimization	1.6.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.6.3.1	S												
			Recycled Content For Insulation	2.2.3	S												
			Local/Regional Materials	1.6.5	S												
			Material Ingredient Reporting	1.6.4	S												
			Wall Panels	2.2.1	G AE												
			Factory Color Finish	2.2.4													
			Closure Materials	1.7.5													
			Pressure Sensitive Tape	2.5.4.4													
			Sealants and Caulking	2.5.4.1													
			Accessories	1.7.5													
			Accessories	2.5													
			SD-04 Samples														
			Wall Panels	2.2.1	G AE												
			Fasteners	1.7.3.1	G AE												

TITLE	AND	LOCATION				CONTRAC <sup>®</sup>	TOR										
Det	roit A	rsenol MUMT J	V														
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A C T I V I F Y NO	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G # A G R A P H	OVT OR A/E REVWR CLASS-F-CAT-ON	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		07 42 13	Metal Closure Strips	2.5.3	G AE												
			Color chart	2.2.4.5	G AE												
			SD-05 Design Data														
			Wind load design analysis	1.7.1.2	G AE												
			SD-06 Test Reports														
			Leakage Tests	3.7.2	G												
			Wind Load Tests	1.3.2	G												
			Coating	2.2.4.6	G												
			Chalking	2.2.4.6	G												
			SD-07 Certificates														
			Coil Stock	1.7.3.1	G												
			Fasteners	1.7.3.1	G												
			SD-08 Manufacturer's Instructions														
			Installation	3.3	G												
			SD-09 Manufacturer's Field														
			Reports														
			Manufacturer's Field Reports	3.8.1	G												
			SD-11 Closeout Submittals														
			Warranty	1.10	G												
			Maintenance Instructions	1.7.6	G												
			20 year 'No Dollar Limit' warranty	1.10.1													
			for labor and material														
		07 54 19	SD-02 Shop Drawings														
			Detail Drawings	1.8	G AE												
			Roof Plan	1.8	G AE												
			SD-03 Product Data														

TITLE	AND	LOCATION				CONTRAC	TOR				•						
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A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		07 54 19	TPO Roofing Membrane	3.2.2	G AE												
			Energy Star Label for roof	2.1.2	S												
			membrane														
			Heat Island Reduction	2.1.3	S												
			Environmental Product	1.6.1	S												
			Declarations														
			Embodied Carbon Optimization	1.6.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.6.3.1	S												
			Recycled Content Materials	1.6.3.2	S												
			Local/Regional Materials	1.6.5	S												
			Material Ingredient Reporting	1.6.4	S												
			Bonding Adhesive	2.1.4													
			Flashing	1.7.4													
			Flashing	3.2.2.1													
			Membrane Fasteners and Plates	2.1.7													
			Roof Insulation	2.1.9													
			Pre-Manufactured Accessories	2.1.8													
			Water Cutoffs	3.6.1													
			Information Card	2.1.1													
			SD-05 Design Data														
			Wind Uplift Resistance	1.3.2	G AE												
			SD-07 Certificates														
			Qualification of Manufacturer	1.7.1													
			Qualifications of Applicator	1.7.2													
TITLE	AND	LOCATION			CONTRAC	TOR											
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Detr	oit A	rsenol MUMT J	IV														
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A C T - V - T Y N O	FRANSM-FFAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		07 54 19	Qualification of Engineer of	1.7.3													
			Record														
			Wind Uplift Resistance	1.3.2													
			Fire Resistance	1.3.1													
			Sample	1.12	G AE												
			SD-08 Manufacturer's Instructions														
			Application Method	3.2	G												
			Membrane Flashing	2.1.6	G AE												
			Membrane Flashing	3.3.2	G AE												
			Perimeter Attachment	3.2.4													
			Auxiliary Fasteners	2.1.7.2													
			Pre-Manufactured Accessories	2.1.8													
			Cold Weather	1.10	G												
			SD-11 Closeout Submittals														
			Warranty	1.12	G												
			Information Card	2.1.1	G												
			Instructions to Government	3.9	G												
			Personnel														
		07 60 00	SD-02 Shop Drawings														
			Exposed Sheet-Metal	2.2.1	G AE												
			Downspouts	3.1.12	G AE												
			Splash Pans	3.1.16	G AE												
			Flashing for Roof Drains	3.1.13	G AE												
			Base Flashing	3.1.9	G AE												
			Counterflashing	3.1.10	G AE												

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A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G # A R A P H	C L A S I F I C A T I N I O N I	VT OR A/E REVWR	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	A C T I O N C O D E	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a) (	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(0)	(p)	(q)	(r)
		07 60 00	Flashing at Roof Penetrations	3.1.18	G AE	=												
			and Equipment Supports															
			Reglets	2.2.7	G AE	-												
			Copings	3.1.20	G AE	Ξ												
			Conductor Heads	3.1.15	G AE	-												
			Recycled Content	2.1	S													
			Environmental Product	1.5.1	S													
			Declarations															
			Embodied Carbon Optimization	1.5.2	S													
			Report/Action Plan															
			Extended Producer Responsibility	1.5.3.1	S													
			Local/Regional Materials	1.5.5	S													
			Material Ingredient Reporting	1.5.4	S													
			Scuppers	3.1.14	G													
			SD-04 Samples															
			Finish Samples	1.6.2	G AE	=												
			SD-08 Manufacturer's Instructions															
			Instructions for Installation	1.6.3	G													
			Quality Control Plan	3.5	G													
			SD-10 Operation and Maintenance															
			Data															
			Cleaning and Maintenance	1.6.3	G						1							
		07 81 00	SD-03 Product Data															
		-	Fireproofing Material	3.3	G AE													
			Environmental Product	1.5.1	S													
			Declarations															

TITLE	AND	LOCATION			CONTRAC	TOR											
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A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	A C T I O N C O D E	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		07 81 00	Embodied Carbon Optimization	1.5.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.5.3.1	S												
			Recycled Content Materials	1.5.3.2	S												
			Local/Regional Materials	1.5.5	S												
			Material Ingredient Reporting	1.5.4	S												
			Low-Emitting Materials	1.5.6	S												
			SD-04 Samples														
			Spray-Applied Fireproofing	2.1	G AE												
			SD-06 Test Reports														
			Fire Resistance Rating	1.2.2	G AE												
			Field Tests	3.6	G												
			Evaluation Reports	1.2.3	G AE												
			SD-07 Certificates														
			Installer Qualifications	1.6.1	G												
			Surface Preparation Report	3.1	G												
			Manufacturer's Inspection Report	3.5.2	G AE												
		07 84 00	SD-02 Shop Drawings														
			Firestopping System	2.1	G AE												
			SD-03 Product Data														
			Firestopping Materials	2.2	G AE												
			Environmental Product	1.5.1	S												
			Declarations														
			Embodied Carbon Optimization	1.5.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.5.3.1	S												

TITLE	AND	LOCATION			CONTRAC <sup>®</sup>	TOR											
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A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G # A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACT-ON CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		07 84 00	Bio-Based Materials	1.5.3.2	S												
			Recycled Content Materials	1.5.3.3	S												
			Local/Regional Materials	1.5.5	S												
			Material Ingredient Reporting	1.5.4	S												
			Low-Emitting Materials	1.5.6	S												
			SD-06 Test Reports														
			Inspection	3.3	G												
			SD-07 Certificates														
			Inspector Qualifications	1.6.2													
			Firestopping Materials	2.2													
			Installer Qualifications	1.6.1	G												
		07 92 00	SD-03 Product Data														
			Sealants	2.1	G AE												
			Primers	2.2	G AE												
			Bond Breakers	2.3	G AE												
			Backstops	2.4	G AE												
			Environmental Product	1.5.1	S												
			Declarations														
			Embodied Carbon Optimization	1.5.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.5.3.1	S												
			Bio-Based Materials	1.5.3.2	S												
			Recycled Content Materials	1.5.3.3	S												
			Local/Regional Materials	1.5.5	S												
			Material Ingredient Reporting	1.5.4	S												
			Field Adhesion	3.1	G												

TITLE	AND	LOCATION			CONTRAC	TOR											
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A C T V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	A C T I O N C O D E	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		07 92 00	SD-07 Certificates														
			Indoor Air Quality For Interior	2.1.1	S												
			Sealants														
			Indoor Air Quality For Interior	2.1.3	S												
			Floor Joint Sealants														
			Indoor Air Quality For Interior	2.1.4	S												
			Acoustical Sealants														
		08 11 13	SD-02 Shop Drawings														
			Doors	2.1	G AE												
			Doors	2.1	G AE												
			Frames	2.4	G AE												
			Frames	2.4	G AE												
			Accessories	2.2													
			SD-03 Product Data														
			Doors	2.1	G AE												
			Recycled Content for Steel Door	2.1	S												
			Product														
			Frames	2.4	G AE												
			Recycled Content for Steel Frame	2.4	S												
			Product														
			Accessories	2.2													
			Environmental Product	1.4.1	S												
			Declarations														
			Embodied Carbon Optimization	1.4.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.4.3.1	S												

TITLE	E AND	LOCATION			CONTRAC	TOR											
Det	roit A	Arsenol MUMT J	V														
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A C T I V I T Y NO	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G # A R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACT-ON CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		08 11 13	Local/Regional Materials	1.4.5	S												
			Material Ingredient Reporting	1.4.4	S												
			Low-Emitting Materials	1.4.6	S												
		08 14 00	SD-02 Shop Drawings														
			Doors	2.1	G AE												
			SD-03 Product Data														
			Doors	2.1	G AE												
			Recycled Content for Door Cores	2.1.1.1	S												
			Accessories	2.2													
			Water-resistant Sealer	2.3.6													
			Warranty	1.7													
			Sound Transmission Class	2.1.2	G AE												
			Rating														
			Fire Resistance Rating	2.1.3	G AE												
			Environmental Product	1.4.1	S												
			Declarations														
			Embodied Carbon Optimization	1.4.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.4.3.1	S												
			Local/Regional Materials	1.4.5	S												
			Material Ingredient Reporting	1.4.4	S												
			SD-04 Samples														
			Door Finish Colors	2.3.5.2	G AE												
			SD-06 Test Reports														
			Cycle-Slam	2.4													
			Hinge Loading Resistance	2.4													

TITLE	AND	LOCATION			CONTRAC	TOR											
Detr	oit A	Arsenol MUMT J	V														
					G	C SC	CONTRACTO	R: TES		NTRACTOR ACTION		APF	ROVING AU	тног	RITY		
A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G # A G R A P H	OVT OR A/E REVWR CLASS-F-CAT-ON	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	A C T I O N C O D E	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(0)	(p)	(q)	(r)
		08 14 00	SD-07 Certificates														
			Certified Sustainably Harvested	2.1.1	S												
			Flush Wood Doors														
			Indoor Air Quality for	2.1.1.1	S												
			Particleboard and Agrifiber Door														
			Cores														
			SD-11 Closeout Submittals														
			Warranty	1.7													
		08 31 00	SD-02 Shop Drawings														
			Access Doors And Panels	1.5	G AE												
			SD-03 Product Data														
			Access Doors And Panels	1.5	G AE												
			Hardware	1.5.2	G AE												
			Accessories	2.2.8	G AE												
			Recycled Content	2.1	S												
			Environmental Product	1.4.1	S												
			Declarations														
			Embodied Carbon Optimization	1.4.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.4.3.1	S												
			Local/Regional Materials	1.4.5	S												
			Material Ingredient Reporting	1.4.4	S												
			SD-04 Samples														
			Finishes	2.5	G AE					1							
		08 33 23	SD-02 Shop Drawings														
			Overhead Coiling Doors	2.2.1	G AE												

TITLE	AND	LOCATION			CONTRAC	TOR											
Det	roit A	rsenol MUMT J	V														
					G	c sc	CONTRACTO	R: TES	CON	NTRACTOR ACTION		APF	ROVING AU	THOF	RITY		
A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACT-ON CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(0)	(p)	(q)	(r)
		08 33 23	Counterbalancing Mechanism	2.2.3	G AE												
			Electric Door Operators	2.2.4	G AE												
			Bottom Bars	2.2.1.4	G AE												
			Guides	2.1.1.1	G AE												
			Mounting Brackets	2.2.3.1	G AE												
			Hood	2.2.2.2	G AE												
			Installation Drawings	2.1.1.1	G AE												
			SD-03 Product Data														
			Overhead Coiling Doors	2.2.1	G AE												
			Hardware	2.2.2	G AE												
			Counterbalancing Mechanism	2.2.3	G AE												
			Electric Door Operators	2.2.4	G AE												
			Recycled content for steel curtain	2.2.1.1	S												
			slats														
			Environmental Product	1.4.1	S												
			Declarations														
			Embodied Carbon Optimization	1.4.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.4.3.1	S												
			Local/Regional Materials	1.4.5	S												
			Material Ingredient Reporting	1.4.4	S												
			SD-05 Design Data														
			Overhead Coiling Doors	2.2.1	G AE												
			Hardware	2.2.2	G AE												
			Counterbalancing Mechanism	2.2.3	G												
			Electric Door Operators	2.2.4	G AE												

TITLE	AND	LOCATION			CONTRAC	TOR											
Det	roit A	Arsenol MUMT J	JV														
					G	C SC	CONTRACTO	R: TES				APF	ROVING AU	THOF	RITY		
A C T I V I T Y N O	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASS-F-CAT-ON	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		08 33 23	SD-10 Operation and Maintenance														
			Data														
			Operation and Maintenance	1.5.2	G AE												
			Manuals														
			SD-11 Closeout Submittals														
			Warranty	1.5.1	G AE												
		08 34 73	SD-02 Shop Drawings														
			Fabrication Drawings	2.1													
			SD-03 Product Data														
			Hollow Metal Sound Retardant	2.1	G												
			Doors														
			Wood Sound Retardant Doors	2.1	G												
			Door Frames	2.1	G												
			Door Hardware	2.1	G												
			Door Frame Sound Infill	2.3.2	G												
			Vision Panels	2.1	G												
			Thresholds	2.1	G												
			Environmental Product	1.4.1	S												
			Declarations														
			Embodied Carbon Optimization	1.4.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.4.3.1	S												
			Bio-Based Materials	1.4.3.2	S												
			Certified Wood	1.4.3.3	S												
			Local/Regional Materials	1.4.5	S												
			Material Ingredient Reporting	1.4.4	S												

TITLE	AND	LOCATION			CONTRAC	TOR											
Det	roit A	rsenol MUMT J	IV														
					G	C SC	CONTRACTO	R: TES		NTRACTOR ACTION		APF	ROVING AU	тног	RITY		
A C T I V I T Y N O	TRANSMITAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G # A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(0)	(p)	(q)	(r)
		08 34 73	Recycled Content For Metal	2.2.1.1	S												
			Sound Retardant Doors														
			SD-06 Test Reports														
			Acoustical Tests	2.4.4	G												
			Positive Pressure Tests	2.4.4	G												
			SD-07 Certificates														
			Hollow Metal Sound Retardant	2.1	G												
			Doors														
			Wood Sound Retardant Doors	2.1	G												
			Door Frames	2.1	G												
			Door Hardware	2.1	G												
			Vision Panels	2.1	G												
			Thresholds	2.1	G												
			Assembly Test Reports	3.3.1													
			Certified Sustainably Harvested	2.2.2	S												
			Wood Sound Retardant Doors														
			Indoor Air Quality For	2.2.2	S												
			Particleboard And Agrifiber Door														
			Cores														
		08 51 13	SD-02 Shop Drawings														
			Windows	2.1	G AE												
			Fabrication Drawings	1.7													
			SD-03 Product Data														
			Windows	2.1	G AE												
			Recycled Content of Aluminum	2.1	S												
			Windows														

TITLE	AND	LOCATION			CONTRAC	TOR											
Det	roit A	Arsenol MUMT J	IV														
					G	c sc	CONTRACTO	R: TES	CON	NTRACTOR ACTION		APF	PROVING AU	THOF	RITY		
A C T I V I T Y N O	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT CLORSA/E FECREVWR	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACT-ON CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		08 51 13	Hardware	2.2.5.1	G AE												
			Fasteners	2.2.2	G AE												
			Window Performance	1.8	G AE												
			Thermal-Barrier Windows	2.3	G AE												
			Mullions	2.4	G												
			Weatherstripping	2.1.3	G AE												
			Accessories	2.2.5	G												
			Adhesives	2.2.3													
			Thermal Performance	1.8.4	G AE												
			SD-04 Samples														
			Finish Sample	1.3.3.1													
			Window Sample	1.3.3.2													
			SD-05 Design Data														
			Structural Calculations for	2.1	G												
			Deflection														
			Design Analysis	1.3.4	G												
			SD-06 Test Reports														
			Minimum Condensation	1.3.5													
			Resistance Factor														
			SD-10 Operation and Maintenance														
			Data														
			Windows	2.1	G												
			Plastic Identification	1.5													
		08 60 45	SD-02 Shop Drawings														
			Shop Drawings	3.2	G AE												
			SD-03 Product Data														

TITLE	AND	LOCATION			CONTRAC	TOR											
Detr	oit A	rsenol MUMT J	V														
					G	C SC	CONTRACTO	R: TES	CON	NTRACTOR ACTION		APF	PROVING AU	THOF	RITY		
A C T V I T Y O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(o)	(p)	(q)	(r)
		08 60 45	Translucent Panels	2.1	G AE												
			Recycled Content for Aluminum	2.2.4	S												
			Framing Materials														
			Environmental Product	1.5.1	S												
			Declarations														
			Embodied Carbon Optimization	1.5.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.5.3.1	S												
			Local/Regional Materials	1.5.5	S												
			Material Ingredient Reporting	1.5.4	S												
			Low-Emitting Materials	1.5.6	S												
			Warranty	1.8													
			SD-06 Test Reports														
			Test Reports	2.1													
			SD-07 Certificates														
			Systems	2.4													
			Qualifications	1.6													
		08 71 00	SD-02 Shop Drawings														
			Manufacturer's Detail Drawings	1.5	G AE												
			Verification of Existing Conditions	1.5	G												
			Hardware Schedule	1.7	G AE												
			Keying System	2.3.9	G AE												
			SD-03 Product Data														
			Hardware Items	2.3	G AE												
			Environmental Product	1.4.1	S												
			Declarations														

Detroit Arsenol MUMT JV         A         C         C         CONTRACTOR ACTION         CONTRACTOR ACTION         CONTRACTOR ACTION         APPROVING AUTHORITY         Malleb A         Malleb CONTRACTOR         APPROVING AUTHORITY         Malleb A         Malleb CONTRACTOR         A         P         Malleb CONTRACTOR         CONTRACTOR ACTION         CONTRACTOR ACTION         CONTRACTOR ACTION         APPROVING AUTHORITY         Malleb A         Malleb CONTRACTOR           A         N         S         P         A         C         S         A         C         S         A         C         S         A         C         T         A         C         S         A         C         T         A         C         S         A         C         T         A         C         S         C         C         T         A         C         S         C         C         T         A         C         S         C         C         T         A         C         C         T         A         C         C         T         A         C         C         T         A         C         C         DATE         DATE         DATE         DATE         DATE         DATE         DATE         DATE	TITLE AND	DLOCATION				CONTRAC	TOR										
T     R     A     N     S     CONTRACTOR: SCHEDULE DATES     CONTRACTOR: ACTION     APPROVING AUTHORITY       A     N     S     A     N     A     A     A     A       Y     N     S     A     N     A     A     A     A       Y     T     C     S     A     A     A     C     T       Y     T     C     G     A     C     T     A       A     C     S     A     A     C     T       Y     L     S     DESCRIPTION     A     C     A       A     C     T     A     C     A     C     T       N     N     C     C     A     R     T     E       A     A     T     E     A     A     C     T       N     C     C     DATE     DATE     DATE FWD     DATE FWD     CONTR/CONTR/AUTHORITY       N     N     C     C     A     R     T     E       N     C     DATE     DATE     DATE FWD     DATE FWD     DATE FWD       N     C     O     W     N     R     SUBMIT     NEEDED     DATE <td>Detroit</td> <td>Arsenol MUMT J</td> <td>V</td> <td></td>	Detroit	Arsenol MUMT J	V														
A     N     N     S     P     I     A     N     A     C     DATE FWD					G	C SC	CONTRACTO	R: TES	CON	NTRACTOR ACTION		APF	ROVING AU	THOF	RITY		
(a)       (b)       (c)       (d)       (e)       (f)       (g)       (h)       (i)       (j)       (k)       (l)       (m)       (n)       (o)       (p)       (q)       (r)         0       08 71 00       Embodied Carbon Optimization       1.4.2       S	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G # G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
08 71 00       Embodied Carbon Optimization       1.4.2       S       Image: Constraint of the second s	(a) (b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(o)	(p)	(q)	(r)
Report/Action Plan       Report/Action Plan <threport action="" plan<="" th=""> <threport acti<="" td=""><td></td><td>08 71 00</td><td>Embodied Carbon Optimization</td><td>1.4.2</td><td>S</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></threport></threport>		08 71 00	Embodied Carbon Optimization	1.4.2	S												
Extended Producer Responsibility       1.4.3.1       S			Report/Action Plan														
Local/Regional Materials     1.4.5     S       Material Ingredient Reporting     1.4.4     S			Extended Producer Responsibility	1.4.3.1	S												
Material Ingredient Reporting     1.4.4     S       SD 08 Manufacturar's Instructions     Image: Constructions			Local/Regional Materials	1.4.5	S												
SD 08 Manufacturar's Instructions			Material Ingredient Reporting	1.4.4	S												
			SD-08 Manufacturer's Instructions														
Installation 3.1			Installation	3.1													
SD-10 Operation and Maintenance			SD-10 Operation and Maintenance														
Data			Data														
Hardware Schedule 1.7 G AE			Hardware Schedule	1.7	G AE												
SD-11 Closeout Submittals			SD-11 Closeout Submittals														
Key Bitting 1.8.1			Key Bitting	1.8.1													
08 81 00 SD-03 Product Data		08 81 00	SD-03 Product Data														
Insulating Glass 2.2			Insulating Glass	2.2													
Glazing Accessories 1.5			Glazing Accessories	1.5													
Sealants 2.4.3.1			Sealants	2.4.3.1													
Joint Backer 2.4.4			Joint Backer	2.4.4													
Environmental Product 1.4.1 S			Environmental Product	1.4.1	S												
Declarations			Declarations														
Embodied Carbon Optimization 1.4.2 S			Embodied Carbon Optimization	1.4.2	s												
Report/Action Plan		1	Report/Action Plan														
Extended Producer Responsibility 1.4.3.1 S			Extended Producer Responsibility	1.4.3.1	s												
Recycled Content Materials 1.4.3.2 S			Recycled Content Materials	1.4.3.2	s												
Local/Regional Materials 1.4.5 S			Local/Regional Materials	1.4.5	s												
Material Ingredient Reporting 1.4.4 S			Material Ingredient Reporting	1.4.4	s												
Low-Emitting Materials 1.4.6 S			Low-Emitting Materials	1.4.6	s	1	1				1			1			

TITLE	AND	LOCATION				CONTRAC	TOR										
Detr	oit A	Arsenol MUMT J	V														
					G	C SC	ONTRACTOR	R: TES		ITRACTOR ACTION		APF	PROVING AU	тног	RITY		
A C T I V I T Y O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASS-F-CAT-ON	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(0)	(p)	(q)	(r)
		08 81 00	SD-04 Samples														
			Insulating Glass	2.2													
			Glazing Compound	2.4.2													
			Таре	2.4.6													
			Sealing Tapes	2.4.6													
			SD-07 Certificates														
			Insulating Glass	2.2													
			SD-08 Manufacturer's Instructions														
			Setting and Sealing Materials	2.4													
			Glass Setting	3.2													
			SD-11 Closeout Submittals														
			Insulated Glass Units	1.9.1													
		08 91 00	SD-02 Shop Drawings														
			Wall Louvers	1.6													
			SD-03 Product Data														
			Metal Wall Louvers	2.2													
			Environmental Product	1.4.1	S												
			Declarations														
			Embodied Carbon Optimization	1.4.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.4.3.1	S												
			Recycled Content Materials	1.4.3.2	S												
			Local/Regional Materials	1.4.5	S												
			Material Ingredient Reporting	1.4.4	S												
			Low-Emitting Materials	1.4.6	S												
			SD-04 Samples														

TITLE	AND	LOCATION				CONTRAC <sup>®</sup>	TOR										
Detr	oit A	rsenol MUMT J	V														
					G	C SC	ONTRACTO	R: TES		NTRACTOR ACTION		APF	ROVING AU	тног	RITY		
A C T I V I T Y O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASS-F-CAT-ON	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(0)	(p)	(q)	(r)
		08 91 00	Wall Louver Samples	1.7	G AE												
		09 22 00	SD-03 Product Data														
			Metal Support Systems	2.1													
			Recycled Content for Metal	2.1	S												
			Support Systems														
			Environmental Product	1.4.1	S												
			Declarations														
			Embodied Carbon Optimization	1.4.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.4.3.1	S												
			Local/Regional Materials	1.4.5	S												
			Material Ingredient Reporting	1.4.4	S												
		09 29 00	SD-03 Product Data														
			Cementitious Backer Units	2.1.3													
			Accessories	2.1.8													
			Gypsum Board	2.1.1													
			Recycled Content for Gypsum	2.1.1	S												
			Board														
			VOC Content of Joint Compound	2.1.4	S												
			Abuse Resistant Gypsum Board	2.1.2													
			Environmental Product	1.4.1	S												
			Declarations														
			Embodied Carbon Optimization	1.4.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.4.3.1	S												
			Bio-Based Materials	1.4.3.2	S												

TITLE	E AND	LOCATION				CONTRAC	TOR										
Det	roit A	rsenol MUMT J	V														
					G	C SC	ONTRACTO	R: TES	CON	NTRACTOR ACTION		APF	PROVING AU	THOF	RITY		
A C T I V I T Y N O	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	VT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(o)	(p)	(q)	(r)
		09 29 00	Local/Regional Materials	1.4.5	S												
			Material Ingredient Reporting	1.4.4	S												
			SD-06 Test Reports														
			ASTM E90 Factory Test Report	3.7	G												
			ASTM E90 Factory Test Report	3.9	G												
			ASTM E336 Field Test Report	3.9	G												
			SD-07 Certificates														
			Asbestos Free Materials	2.1	G AE												
			Indoor Air Quality for Gypsum	2.1.1	S												
			Board														
			Indoor Air Quality for Non-aerosol	2.1.6	S												
			Adhesives														
			Indoor Air Quality for Aerosol	2.1.6	S												
			Adhesives														
			SD-08 Manufacturer's Instructions														
			Safety Data Sheets	2.1													
			SD-10 Operation and Maintenance														
			Data														
			Manufacturer Maintenance	2.1													
			Instructions														
		09 30 10	SD-02 Shop Drawings														
			Detail Drawings	3.2	G												
			SD-03 Product Data														
			Porcelain Tile	2.1.1	G				Ī								
			Recycled Content for Porcelain	2.1.1	S												
			Tile														

TITLE	AND	LOCATION				CONTRAC	TOR										
Det	roit A	rsenol MUMT J	V														
					G	C SC	ONTRACTO	R: TES		ITRACTOR		APF	PROVING AU	THOR	ITY		
A C T I V I T Y NO	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(o)	(p)	(q)	(r)
		09 30 10	Transition Strips	2.6.1	G												
			Metal Strips	2.6.2	G												
			Setting-Bed	2.2	G												
			Mortar, Grout, and Adhesive	2.4	G												
			Reinforcing Wire Fabric	2.2.6													
			Cementitious Backer Units	2.5.1	G												
			Glass-Mat Gypsum	2.5.2	G												
			Water-Resistant Backing Board														
			Waterproof Membrane	2.7	G												
			Crack Isolation Membrane	2.8	G												
			Environmental Product	1.4.1	S												
			Declarations														
			Embodied Carbon Optimization	1.4.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.4.3.1	S												
			Local/Regional Materials	1.4.5	S												
			Material Ingredient Reporting	1.4.4	S												
			SD-04 Samples														
			Tile	2.1	G												
			Accessories	2.1.2	G												
			Transition Strips	2.6.1	G												
			Metal Strips	2.6.2	G												
			Grout	2.4.4	G												
			SD-07 Certificates														
			Indoor Air Quality for Adhesives	2.4	S												
			Indoor Air Quality for Sealants	2.4.5	S												

TITLE	AND	LOCATION				CONTRAC	TOR										
Detr	oit A	Arsenol MUMT J	IV														
					G	C SC	CONTRACTOR	R: TES	CON	NTRACTOR ACTION		APF	PROVING AU	THOF	RITY		
A C T I V I T Y O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASS-F-CAT-ON	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(o)	(p)	(q)	(r)
		09 30 10	Water Absorption Rates	1.5.2													
			SD-08 Manufacturer's Instructions														
			Manufacturer's Approved	3.8													
			Cleaning Instructions														
			SD-10 Operation and Maintenance														
			Data														
			Porcelain Tile	2.1.1	G												
			Transition Strips	2.6.1	G												
			Metal Strips	2.6.2	G												
		09 51 00	SD-02 Shop Drawings														
			Approved Detail Drawings	2.1	G AE												
			SD-03 Product Data														
			Recycled Content for Type IV	2.2.1.1	S												
			Ceiling Tiles														
			Recycled Content for Suspension	2.3	S												
			Systems														
			Environmental Product	1.4.1	S												
			Declarations														
			Embodied Carbon Optimization	1.4.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.4.3.1	S												
			Bio-Based Materials	1.4.3.2	S												
			Local/Regional Materials	1.4.5	S												
			Material Ingredient Reporting	1.4.4	S												
			Acoustical Performance	2.1.1	G AE												
			SD-04 Samples														

TITLE	AND	LOCATION					CONTRAC <sup>®</sup>	TOR										
Detr	oit A	Arsenol MUMT J	V															
						G	C SC	CONTRACTO	R: TES		NTRACTOR ACTION		APF	PROVING AU	THOR	RITY		
A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G # A G R A P H	C L A S S - F - C A T - O N	VT OR A/E REVWR	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(0)	(p)	(q)	(r)
		09 51 00	Acoustical Units	2.2	GΑ	AE												
			SD-07 Certificates															
			Indoor Air Quality for Type IV	2.2.1.1	S													
			Ceiling Tiles															
			Indoor Air Quality for Adhesives	2.6	S													
			Indoor Air Quality for Sealants	2.9	S													
		09 62 38	SD-03 Product Data															
			Static-Control Resilient Flooring	2.1	GΑ	AE												
			Recycled content for	2.1.1.1	S													
			Static-Dissipative Vinyl Tile															
			Accessories	2.3	GΑ	AE												
			Adhesives	2.2	GΑ	AE												
			Warranty	1.11														
			Environmental Product	1.5.1	S													
			Declarations															
			Embodied Carbon Optimization	1.5.2	S													
			Report/Action Plan															
			Extended Producer Responsibility	1.5.3.1	S													
			Bio-Based Materials	1.5.3.2	S													
			Material Ingredient Reporting	1.5.4	S													
			Local/Regional Materials	1.5.5	S													
			SD-04 Samples															
			Static-Control Resilient Flooring	2.1	G /	AE												
			Special Treatment Materials	1.4.1.2	G /	AE												
			Accessories	2.3	G /	AE												
			SD-06 Test Reports															

TITLE F	ND I	LOCATION				CONTRACT	FOR				•						
Detrc	oit A	rsenol MUMT J	V														
					G	C SC	ONTRACTO	R: TES	CON	NTRACTOR ACTION		APF	PROVING AU	THOR	ITY		
A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(0)	(p)	(q)	(r)
		09 62 38	Fire Resistance	2.6													
			Moisture, Alkalinity and Bond	3.2													
			Testing	3.7													
			SD-07 Certificates														
			Indoor Air Quality for	2.1.1.1	S												
			Static-Dissipative Vinyl Tile														
			Indoor Air Quality for Adhesives	2.2	S												
			Qualifications of Applicator	1.8													
			SD-08 Manufacturer's Instructions														
			Static-Control Resilient Flooring	2.1	G AE												
			Accessories	2.3	G AE												
			SD-10 Operation and Maintenance														
			Data														
			Static-Control Resilient Flooring	2.1	G AE												
			Accessories	2.3	G AE												
		09 65 00	SD-02 Shop Drawings														
			Resilient Flooring and	2.8	G												
			Accessories														
			SD-03 Product Data														
			Resilient Flooring and	2.8	G												
			Accessories														
			Adhesives	2.4													
			Luxury Vinyl Tile	2.1													
			Recycled content for Luxury Vinvl	2.1	S												
			Tile														
			Wall Base	2.2													

TITLE	AND	LOCATION				CONTRAC	TOR										
Detr	roit A	rsenol MUMT J	V														
					G	C SC		R: TES	CON	NTRACTOR ACTION		APF	PROVING AU	THOF	RITY		
A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACT-ON CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		09 65 00	Environmental Product	1.4.1	S												
			Declarations														
			Embodied Carbon Optimization	1.4.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.4.3.1	S												
			Bio-Based Materials	1.4.3.2	S												
			Local/Regional Materials	1.4.5	S												
			Material Ingredient Reporting	1.4.4	S												
			SD-04 Samples														
			Resilient Flooring and	2.8	G												
			Accessories														
			SD-06 Test Reports														
			Moisture, Alkalinity and Bond	3.3	G												
			Tests														
			SD-07 Certificates														
			Indoor Air Quality for Luxury Vinyl	2.1	S												
			Tile														
			Indoor Air Quality for Wall Base	2.2	S												
			Indoor Air Quality for Adhesives	2.4	S												
			SD-08 Manufacturer's Instructions														
			Surface Preparation	3.2	G												
			Installation	3.1	G												
			SD-10 Operation and Maintenance														
			Data														
			Resilient Flooring and	2.8	G		1		Ī								
			Accessories			_											

TITLE	AND	LOCATION				CONTRACT	TOR										
Deti	roit A	rsenol MUMT J	V														
					G	C SC	ONTRACTOR	R: TES		ITRACTOR ACTION		APF	PROVING AU	THOR	RITY		
A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(0)	(p)	(q)	(r)
		09 67 23.15	SD-03 Product Data														
			Joint Sealant	2.1	G												
			Thin Film Flooring System	2.2	G												
			White Aluminum Oxide Non-Skid	2.3	G												
			Grit														
			Environmental Product	1.3.1	S												
			Declarations														
			Embodied Carbon Optimization	1.3.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.3.3.1	S												
			Bio-Based Materials	1.3.3.2	S												
			Local/Regional Materials	1.3.5	S												
			Material Ingredient Reporting	1.3.4	S												
			SD-05 Design Data														
			Environmental Control System	1.4.3.1													
			SD-06 Test Reports														
			Joint Sealant Test Report	1.4.4.1	G												
			Primer Coat	2.2.1	G												
			Urethane Topcoat	2.2.2	G												
			White Aluminum Oxide Non-Skid	2.3	G												
			Grit														
			Patch Test Demonstration	1.8	G												
			Daily Inspection Report	1.4.4.2	G												
			Adhesion Testing	3.8.3	G												
			SD-07 Certificates														
			Coating Work Plan	1.4.2	G												

TITLE	E AND	LOCATION				CONTRAC	TOR										
Det	roit A	Arsenol MUMT J	V														
					G	C SC	CONTRACTO	R: TES	CON	NTRACTOR ACTION		APF	PROVING AU	тног	RITY		
A C T I V I T Y N O	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	A C T I O N C O D E	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(0)	(p)	(q)	(r)
		09 67 23.15	Joint Sealant Certificates	1.4.5.5	G												
			Thin Film Flooring System	1.4.5.6	G												
			Certificates														
			Qualifications of Certified	1.4.5.1													
			Industrial Hygienist (CIH)														
			Qualifications of Certified	1.4.1													
			Protective Coatings Specialist														
			(PCS)														
			Qualifications of Coating	1.4.5.2													
			Inspection Company														
			Qualifications of QC Specialist	1.4.5.3													
			Coating Inspector														
			Qualifications of Coating	1.4.5.4	G												
			Contractors														
			Warranty	1.9	G												
			Indoor Air Quality For Thin Film	2.2	S												
			Flooring System														
			SD-08 Manufacturer's Instructions														
			Joint Sealant Manufacturer's	1.4.6.1	G												
			Instructions														
			Thin Film Flooring System	1.4.6.2	G												
			Manufacturer's Instructions														
			Water-Based Alkaline Degreaser	1.4.6.3	G												
			SD-11 Closeout Submittals														
			Inspection Logbook	3.8.2.2	G												
		09 68 00	SD-02 Shop Drawings														

Detoit Arsenol MUMT JV         CONTRACTOR         APPROVING AUTHORITY           I <td< th=""><th>TITLE</th><th>AND</th><th>LOCATION</th><th></th><th></th><th></th><th>CONTRAC</th><th>TOR</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></td<>	TITLE	AND	LOCATION				CONTRAC	TOR										
Image: Contraction         Contraction         APPROVING AUTHORITY           Image: Contraction         Image: Contraction         APPROVING AUTHORITY           Image: Contraction         Image: Contraction         APPROVING AUTHORITY           Image: Contraction         Image: Contraction         Image: Contraction         APPROVING AUTHORITY           Image: Contraction         Image:	Det	oit A	rsenol MUMT J	V														
A T         N         S         Description         A         <						G	C SC	CONTRACTOR	R: TES		NTRACTOR ACTION		APF	ROVING AU	THOF	RITY		
(a)       (b)       (c)       (	A C T - V - T Y NO	TRANSMITAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASS-F-CAT-ON	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
09 68 00         Installation Drawings         3.4         G         Image: Construct Data         Image:	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(o)	(p)	(q)	(r)
SD-03 Product Data         Image: Constraint of the second se			09 68 00	Installation Drawings	3.4	G												
Carpet         2.1         G<				SD-03 Product Data														
Recycled Content for Carpeting         2.1.1         S				Carpet	2.1	G												
Moldings       2.4       G       Image: Construct of the second				Recycled Content for Carpeting	2.1.1	S												
Environmental Product       1.4.1       S       Image: Constraint of the second seco				Moldings	2.4	G												
Declarations </td <td></td> <td></td> <td></td> <td>Environmental Product</td> <td>1.4.1</td> <td>S</td> <td></td>				Environmental Product	1.4.1	S												
Image: Second				Declarations														
Report/Action Plan				Embodied Carbon Optimization	1.4.2	S												
Extended Producer Responsibility       1.4.3.1       S       Image: Constraint of the system of th				Report/Action Plan														
Bio-Based Materials       1.4.3.2       S<				Extended Producer Responsibility	1.4.3.1	S												
Local/Regional Materials1.4.5SImage: Solution of the solution of th				Bio-Based Materials	1.4.3.2	S												
Image: specific specifi				Local/Regional Materials	1.4.5	S												
SD-04 SamplesImage: CarpetSD-04 SamplesImage: CarpetSD-06 CarpetSD-07 Carp				Material Ingredient Reporting	1.4.4	S												
Image: constraint of the second systemCarpet2.1GImage: constraint of the second systemImage: constraint o				SD-04 Samples														
Image: spectral s				Carpet	2.1	G												
SD-06 Test Reports       Image: Construction of the system o				Moldings	2.4	G												
Moisture and Alkalinity Tests       3.2       G       Image: Constraint of the second secon				SD-06 Test Reports														
SD-07 Certificates       Indoor Air Quality for Carpet       2.1.2       S       Indoor Air Quality for Carpet       2.1.2       S       Indoor Air Quality for Carpet       2.3       S       Indoor Air Quality for Aerosol       2.3       S       Indoor Air Quality for Aerosol       Indoor Air Quality for Aerosol       2.3       S       Indoor Air Quality for Aerosol       Indoor Air Quality for Non-Aerosol       2.3       S       Indoor Air Quality for Non-Aerosol       Indoor Air Quality for Non-Aerosol       2.3       S       Indoor Air Quality for Non-Aerosol       Indoor Air Quality for Concrete       Indoor Air				Moisture and Alkalinity Tests	3.2	G												
Indoor Air Quality for Carpet       2.1.2       S       Image: S <td></td> <td></td> <td></td> <td>SD-07 Certificates</td> <td></td>				SD-07 Certificates														
Indoor Air Quality for Aerosol       2.3       S       Image: Solution of the second				Indoor Air Quality for Carpet	2.1.2	S												
Adhesives     Indoor Air Quality for Non-Aerosol 2.3     S       Adhesives     Adhesives     Indoor Air Quality for Concrete     2.3				Indoor Air Quality for Aerosol	2.3	S				Ī								
Indoor Air Quality for Non-Aerosol 2.3     S     Image: Second se				Adhesives						Ī								
Adhesives     Indoor Air Quality for Concrete     2.3     S				Indoor Air Quality for Non-Aerosol	2.3	S				1	1							
Indoor Air Quality for Concrete 2.3 S				Adhesives														
				Indoor Air Quality for Concrete	2.3	S												
Primer Primer				Primer						Ī								

TITLE	AND	LOCATION				CONTRAC	TOR										
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A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	A C T I O N C O D E	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		09 68 00	SD-08 Manufacturer's Instructions														
			Surface Preparation	3.1													
			SD-10 Operation and Maintenance														
			Data														
			Cleaning and Protection	3.5													
			SD-11 Closeout Submittals														
			Warranty	1.8													
		09 84 20	SD-03 Product Data														
			Installation	3.2													
			Acoustical Wall Panels	2.2	G AE												
			Recycled Content For Recycled	2.1.1	S												
			PET Felt														
			Environmental Product	1.4.1	S												
			Declarations														
			Embodied Carbon Optimization	1.4.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.4.3.1	S												
			Bio-Based Materials	1.4.3.2	S												
			Local/Regional Materials	1.4.5	S												
			Material Ingredient Reporting	1.4.4	S												
			SD-04 Samples														
			Acoustical Wall Panels	2.2	G AE												
			SD-07 Certificates														
			Acoustical Wall Panels	2.2													
			Indoor Air Quality For Acoustical	2.2.1	S												
			Wall Panels														

TITLE	AND	LOCATION				CONTRAC	TOR										
Det	roit A	Arsenol MUMT J	V														
					G	C SC	ONTRACTO	R: TES		NTRACTOR ACTION		APF	ROVING AU	THOR	NTY		
A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASS-F-CAT-ON	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(o)	(p)	(q)	(r)
		09 84 20	SD-11 Closeout Submittals														
			Warranty	1.7													
		09 90 00	SD-02 Shop Drawings														
			Piping Identification	3.10													
			SD-03 Product Data														
			Coating	2.1	G AE												
			Product Data Sheets	2.1													
			Environmental Product	1.7.4.1	S												
			Declarations														
			Embodied Carbon Optimization	1.7.4.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.7.4.3.1	S												
			Bio-Based Materials	1.7.4.3.2	S												
			Recycled Content Materials	1.7.4.3.3	S												
			Local/Regional Materials	1.7.4.5	S												
			Material Ingredient Reporting	1.7.4.4	S												
			SD-04 Samples														
			Color	2.2	G AE												
			SD-07 Certificates														
			Qualification Testing	1.7.6.2	G												
			Indoor Air Quality For Primers	3.13.2	S												
			And Paints														
			SD-08 Manufacturer's Instructions														
			Application Instructions	3.2.1													
			Mixing	2.1													

TITLE	AND	LOCATION				CONTRAC	TOR										
Deti	roit A	rsenol MUMT J	V														
					G	C SC	ONTRACTOR	R: TES		ITRACTOR ACTION		APF	PROVING AU	THOR	RITY		
A C T I V I T Y NO	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G # A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(o)	(p)	(q)	(r)
		09 90 00	Manufacturer's Safety Data	1.9.1													
			Sheets														
			SD-10 Operation and Maintenance														
			Data														
			Coatings	2.1	G												
		10 11 00	SD-02 Shop Drawings														
			Placement Schedule	3.1	G AE												
			SD-03 Product Data														
			Visual Display Unit	1.2	G AE												
			Visual Display Unit	2.1	G AE												
			Environmental Product	1.5.1	S												
			Declarations														
			Embodied Carbon Optimization	1.5.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.5.3.1	S												
			Bio-Based Materials	1.5.3.2	S												
			Recycled Content Materials	1.5.3.3	S												
			Local/Regional Materials	1.5.5	S												
			Material Ingredient Reporting	1.5.4	S												
			SD-04 Samples														
			Porcelain Enamel	2.1.1	G												
			Cork	2.1.2	G												
			SD-07 Certificates														
			Indoor air quality for	2.2.1	S												
			markerboards														
			Indoor air quality for tackboards	2.3	S												

TITLE	E AND	LOCATION				CONTRAC	TOR										
Det	roit A	Arsenol MUMT J	IV														
					G	C SC	CONTRACTOR	R: TES	CON	NTRACTOR ACTION		APF	PROVING AU	THOR	RITY		
A C T I V I T Y N O	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASS-F-CAT-ON	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACT-ON CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(o)	(p)	(q)	(r)
		10 11 00	Certificate of Compliance	1.2													
			SD-08 Manufacturer's Instructions														
			Manufacturer's Cleaning	3.3													
			Instructions														
			Manufacturer's Printed	3.2	G												
			Installation Instructions														
		10 14 00.20	SD-02 Shop Drawings														
			Detail Drawings	1.6.2	G												
			SD-03 Product Data														
			Room Identification And	2.1	G												
			Directional Signage System														
			Exit Door Tactile Sign	2.2	G												
			Environmental Product	1.4.1	S												
			Declarations														
			Embodied Carbon Optimization	1.4.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.4.3.1	S												
			Recycled Content Materials	1.4.3.2	S												
			Local/Regional Materials	1.4.5	S												
			Material Ingredient Reporting	1.4.4	S												
			SD-04 Samples														
			Interior Signage	1.6.1	G												
			Software	1.5	G												
			Room Identification And	2.1	G												
			Directional Signage System														
			Exit Door Tactile Sign	2.2	G												

TITLE	AND	LOCATION				CONTRAC	TOR										
Deti	roit A	rsenol MUMT J	V														
					G	C SC	CONTRACTO	R: TES		NTRACTOR ACTION		APF	ROVING AU	THOR	RITY		
A C T I V I T Y NO	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(0)	(p)	(q)	(r)
		10 14 00.20	SD-10 Operation and Maintenance														
			Data														
			Approved Manufacturer's	3.1	G												
			Instructions														
			Protection and Cleaning	3.1.2	G												
		10 21 13	SD-02 Shop Drawings														
			Fabrication Drawings	2.1													
			Installation Drawings	3.3	G												
			SD-03 Product Data														
			Cleaning and Maintenance	2.1													
			Instructions														
			Sound-Deadening Cores	2.2.2													
			Anchoring Devices and Fasteners	2.2.3													
			Hardware and Fittings	2.2.5													
			Brackets	2.2.4													
			Door Hardware	2.2.6													
			Toilet Enclosures	2.3.1													
			Pilaster Shoes	2.5													
			Finishes	2.2.5.2	G AE												
			Recycled content for stainless	2.3	S												
			steel partitions and screens														
			Environmental Product	1.4.1	S												
			Declarations														
			Embodied Carbon Optimization	1.4.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.4.3.1	S												

TITLE	AND	LOCATION				CONTRAC	TOR										
Det	roit A	rsenol MUMT J	V														
					G	C SC		R: TES		NTRACTOR ACTION		APF	PROVING AU	THOF	RITY		
A C T I V I T Y NO	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		10 21 13	Local/Regional Materials	1.4.5	S												
			Material Ingredient Reporting	1.4.4	S												
			SD-04 Samples														
			Hardware and Fittings	2.2.5													
			Anchoring Devices and Fasteners	2.2.3													
			SD-07 Certificates														
			Warranty	1.8													
		10 23 10	SD-02 Shop Drawings														
			Shop Drawings	1.4.3	G												
			SD-03 Product Data														
			Manufacturer's Descriptive	1.4.4	G												
			Literature														
			Environmental Product	1.6.1	S												
			Declarations														
			Embodied Carbon Optimization	1.6.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.6.3.1	S												
			Local/Regional Materials	1.6.5	S												
			Material Ingredient Reporting	1.6.4	S												
			SD-04 Samples														
			Selection Samples	1.4.5	G												
			Verification Samples	1.4.6	G												
			SD-05 Design Data														
			Design Calculations	1.4.7	G												
			SD-07 Certificates														
			Installer Certificate	1.7.2	G												

TITLE	AND	LOCATION				CONTRACT	TOR										
Detr	oit A	rsenol MUMT J	V														
					G	C SCI	ONTRACTOR	R: TES		ITRACTOR ACTION		APF	PROVING AU	THOR	RITY		
A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	A C T I O N C O D E	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		10 23 10	SD-08 Manufacturer's Instructions														
			Manufacturer's Installation	1.4.8	G												
			Instructions														
			SD-10 Operation and Maintenance														
			Data														
			Manufacturer-supplied Operating	3.6	G												
			Hardware														
			SD-11 Closeout Submittals														
			Manufacturer Warranty	1.4.9	G												
			Manufacturer Warranty	1.9	G												
		10 26 00	SD-02 Shop Drawings														
			Corner Guards	2.2	G AE												
			Wall Covering and Panels	2.3	G AE												
			SD-03 Product Data														
			Corner Guards	2.2	G AE												
			Wall Covering and Panels	2.3	G AE												
			Recycled content for aluminum	2.2.1	S												
			component of corner guards														
			Environmental Product	1.4.1	S												
			Declarations														
			Embodied Carbon Optimization	1.4.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.4.3.1	S												
			Recycled Content Materials	1.4.3.2	S												
			Local/Regional Materials	1.4.5	S												
			Material Ingredient Reporting	1.4.4	S												

TITLE	AND	LOCATION				CONTRAC	TOR										
Detr	oit A	rsenol MUMT J	IV														
					G	C SC	CONTRACTO	R: TES	CON	NTRACTOR ACTION		APF	ROVING AU	тног	RITY		
A C T I V I T Y O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	A C T I O N C O D E	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		10 26 00	SD-04 Samples														
			Corner Guards	2.2	G AE												
			Wall Covering and Panels	2.3	G AE												
			SD-06 Test Reports														
			Fire Resistance Rating	2.1.1.2													
			SD-07 Certificates														
			Indoor air quality for wall	2.3	S												
			covering/panels														
			Indoor air quality for adhesives	2.6	S												
			SD-10 Operation and Maintenance														
			Data														
			Corner Guards	2.2	G												
			Wall Covering and Panels	2.3	G												
		10 28 13	SD-02 Shop Drawings														
			Product Schedule	2.1	G AE												
			SD-03 Product Data														
			Recycled content for stainless	2.1	S												
			steel toilet accessories														
			Item AXXXX	2.1.3	G AE												
			Item A5090	2.1.4	G AE												
			Item A5109	2.1.5	G AE												
			Item A5135	2.1.6	G AE												
			Item A5150	2.1.7	G AE												
			Item A5200	2.1.8	G AE												
			SD-10 Operation and Maintenance														
			Data														

Det	roit A	Arsenol MUMT J	V			CONTRAC	IOR										
					G	C SC	ONTRACTO	R: TES	CON	NTRACTOR ACTION		APF	PROVING AL	JTHOF	RITY		
A C F - V - F Y Z O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A F H H	CLASSA/EREVWR	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		10 28 13	Item AXXXX	2.1.3	G				-								
			Item A5090	2.1.4	G												
			Item A5109	2.1.5	G												
			Item A5135	2.1.6	G												
			Item A5150	2.1.7	G				-								
			Item A5200	2.1.8	G				-								
		10 44 16	SD-02 Shop Drawings														
			Fire Extinguishers	2.1.1	G AE												
			Accessories	Part 2	G AE												
			Cabinets	Part 2	G AE												
			Wall Brackets	2.2.2	G AE												
			Schedule	1.5	G												
			SD-03 Product Data														
			Fire Extinguishers	2.1.1	G AE												
			Accessories	Part 2	G AE												
			Cabinets	Part 2	G AE												
			Wall Brackets	2.2.2	G AE												
			Replacement Parts List	3.2.1	G												
			SD-04 Samples														
			Equipment Samples	1.3.1	G												
			SD-07 Certificates														
			Fire Extinguishers Certifications	2.1.1	G												
			Manufacturer's Warranty with	1.4	G AE												
			Inspection Tag														
		10 51 13	SD-02 Shop Drawings														
			Types	2.1	G												

Det	roit A	Arsenol MUMT J	V			CONTRAC	IOR										
					G	c sc	ONTRACTO	R: TES	CON	NTRACTOR ACTION		APF	PROVING AL	JTHOF	RITY		
A C T I V I F Y NO	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	OVTORA/EREVWR	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACT-ON CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(o)	(p)	(q)	(r)
		10 51 13	Location	1.6	G												
			Installation	3.1													
			Numbering system	3.2													
			SD-03 Product Data														
			Material	2.2													
			Locking Devices	2.3.1													
			Handles	2.3.2													
			Finish	2.2.3													
			components	2.3													
			Assembly	3.1													
			Environmental Product	1.4.1	S												
			Declarations														
			Embodied Carbon Optimization	1.4.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.4.3.1	S												
			Recycled Content Materials	1.4.3.2	S												
			Local/Regional Materials	1.4.5	S												
			Material Ingredient Reporting	1.4.4	S												
			SD-04 Samples														
			Color chips	1.7.1	G												
		12 24 13	SD-02 Shop Drawings														
			Detailed Drawings	3.2	G												
			Location Schedule	2.1	G												
			SD-03 Product Data														
			Window Shades	2.1	G												

TITLE	AND	LOCATION				CONTRAC	FOR										
Deti	roit A	rsenol MUMT J	V														
					G	C SC	ONTRACTO	R: TES		NTRACTOR ACTION		APF	PROVING AU	THOF	RITY		
A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	A C T I O N C O D E	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		12 24 13	Recycled Content for various	2.1	S												
			fiber components														
			Environmental Product	1.4.1	S												
			Declarations														
			Embodied Carbon Optimization	1.4.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.4.3.1	S												
			Local/Regional Materials	1.4.5	S												
			Material Ingredient Reporting	1.4.4	S												
			SD-04 Samples														
			Window Shades	2.1	G												
			SD-06 Test Reports														
			Flammability Requirements	1.6.2	G												
			SD-07 Certificates														
			Indoor Air Quality for roller	2.1	S												
			window shades														
			Qualifications	1.6.1.1													
			SD-10 Operation and Maintenance														
			Data														
			Window Shades	2.1	G												
		12 50 00.13 10	SD-01 Preconstruction Submittals														
			Storage Location	1.8.3	G												
			SD-02 Shop Drawings														
			Installation Drawings	3.3.1	G												

Det	iroit A	LOCATION Arsenol MUMT J	V			CONTRAC	TOR										
					G	C SC	ONTRACTO	R: TES	CON	NTRACTOR ACTION		APF	PROVING AL	JTHOF	RITY		
A C T I V I T Y N O	TRANSEITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACT-ON CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		12 50 00.13 10	Grommet, Power and	3.3.1	G												
			Communication Units, and Wire														
			Management Locations														
			SD-03 Product Data		_												
			Product Data	2.2	G												
			Product Style Options	2.2	G												
			Energy Efficient Equipment	1.4.1	S												
			Environmental Product	1.4.2	S												
			Declarations														
			Embodied Carbon Optimization	1.4.3	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.4.4.1	S												
			Bio-Based Materials	1.4.4.2	S												
			Local/Regional Materials	1.4.6	S												
			Material Ingredient Reporting	1.4.5	S												
			Certified Wood	1.4.4.3	S												
			Recycled Content Materials	1.4.4.4	S												
			SD-04 Samples														
			Fabric and Finishes	2.2.5	G												
			SD-07 Certificates														
			Authorized Dealer	1.7	G												
			Certified Furniture Installers	1.7	G												
			Licensed Electrician	1.7	G												
			Certified Telecommunications	1.7	G												
			Installer														
			Manufacturer's Certification	2.2	G												
TITLE	AND	LOCATION			CONTRAC	TOR											
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Detr	oit A	rsenol MUMT J	V														
					G	C SC	ONTRACTOR	R: TES		NTRACTOR ACTION		APF	PROVING AU	тног	RITY		
A C T I V I T Y O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		12 50 00.13 10	Warranty	1.9	G												
			Indoor Air Quality For Furniture	2.2	S												
			SD-10 Operation and Maintenance														
			Data														
			Furniture, Data Package 1	3.5	G												
		12 59 00	SD-02 Shop Drawings														
			Detail Drawings	1.6.4	G												
			SD-03 Product Data														
			Warranty	1.8	G												
			Workstations	2.2.1													
			Power and Communications	2.11													
			Communications	2.11.7													
			Recycled Content for system	2.1	S												
			furniture components														
			Energy Star Label for Task	2.11.6	S												
			Lighting														
			Environmental Product	1.4.1	S												
			Declarations														
			Embodied Carbon Optimization	1.4.2	s												
			Report/Action Plan														
			Extended Producer Responsibility	1.4.3.1	S												
			Local/Regional Materials	1.4.5	S												
			Material Ingredient Reporting	1.4.4	S												
			SD-04 Samples														
			Workstations	2.2.1	G												
			Mock-up	2.2.3	G												

TITLE	AND	LOCATION			CONTRAC	TOR											
Detr	oit A	rsenol MUMT J	IV														
					G	C SC	CONTRACTOR	R: TES	CON	NTRACTOR ACTION		APF	ROVING AU	THOF	RITY		
A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		12 59 00	Samples	2.2.2													
			SD-06 Test Reports														
			Selected Components	2.2.5.1	G												
			Fire Safety	1.6.2	G												
			Electrical System	1.6.3	G												
			SD-07 Certificates														
			Workstations	2.2.1													
			Indoor Air Quality For Office	2.1	S												
			Furniture Systems And Seating														
			SD-10 Operation and Maintenance														
			Data														
			Assembly Manuals	2.3.1	G												
			Maintenance Manuals	3.2	G												
			Cleaning	3.2	G												
			Electrical System	1.6.3	G												
			Maintenance Agreements	1.9													
			Installation	3.1	G												
		21 13 13	SD-01 Preconstruction Submittals														
			Qualified Fire Protection Engineer	1.2.3	G AE												
			(QFPE)														
			Sprinkler System Designer	1.4.2.1	G AE												
			Sprinkler System Installer	1.4.2.2	G AE												
			SD-02 Shop Drawings														
			Shop Drawing	1.2.1.1	G AE												
			SD-03 Product Data														
			Pipe	2.2.1	G AE												

TITLE	AND	LOCATION				CONTRAC	TOR				•							
Det	roit A	rsenol MUMT J	V															
						G	C SC	ONTRACTO	R: TES	CON	NTRACTOR ACTION		APF	PROVING AU	THOF	RITY		
A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	C L A S S I F I C A T I O N	OVT OR A/E REVWR	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACT-ON CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)		(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(o)	(p)	(q)	(r)
		21 13 13	Fittings	2.3.1.2	G .	AE												
			Valves	2.3.7	G ,	AE												
			Relief Valves	2.8.5	G .	AE												
			Sprinklers	2.7	G .	AE												
			Pipe Hangers and Supports	2.3.6	G .	AE												
			Valve Supervisory (Tamper)	2.4.1	G .	AE												
			Switch															
			Fire Department Connection	2.6	G .	AE												
			Backflow Prevention Assembly	2.5	G .	AE												
			Air Vent	2.8.6	G .	AE												
			Hose Valve	2.5.1	G .	AE												
			Nameplates	2.1.2	G .	AE												
			SD-05 Design Data															
			Hydraulic Calculations	1.2.1.2	G .	AE												
			SD-06 Test Reports															
			Test Procedures	3.7.1	G .	AE												
			SD-07 Certificates															
			Verification of Compliant	3.7.2.1	G .	AE												
			Installation															
			Request for Government Final	3.7.2.2	G .	AE												
			Test															
			SD-10 Operation and Maintenance		1													
			Data		1													
			Operating and Maintenance	3.9	G	AE												
			(O&M) Instructions															
			Spare Parts	1.6	G	AE												

TITLE	AND	LOCATION			CONTRAC	TOR											
Det	roit A	Arsenol MUMT J	IV														
					G	C SC	ONTRACTO	R: TES				APF	PROVING AU	THOR	ITY		
A C T I V I T Y N O	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(o)	(p)	(q)	(r)
		21 13 13	SD-11 Closeout Submittals														
			As-built drawings	3.9													
		21 30 00	SD-01 Preconstruction Submittals														
			Fire Pump Installation Related	1.3	G AE												
			Submittals														
			Fire Protection Specialist	1.3	G AE												
			SD-02 Shop Drawings														
			Installation Drawings	3.3.1	G AE												
			As-Built Drawings	3.11.2	G AE												
			Piping Layout	3.3.2	G AE												
			Pump Room	3.3.2	G AE												
			SD-03 Product Data														
			Catalog Data	2.1	G AE												
			Spare Parts	1.6													
			Preliminary Tests	3.8.2													
			Field Tests	3.8	G AE												
			Manufacturer's Representative	1.7.6	G AE												
			Field Training	3.11.1	G AE												
			Army Final Acceptance Test	3.8.3													
			SD-06 Test Reports														
			Preliminary Tests	3.8.2													
			Army Final Acceptance Test	3.8.3													
			SD-07 Certificates														
			Fire Protection Specialist	1.3													
			Qualifications of Welders	1.7.2													
			Qualifications of Installer	1.7.3													

TITLE	AND	LOCATION				CONTRAC	TOR										
Det	roit A	Arsenol MUMT J	IV														
					G	o SC	CONTRACTO	R: TES	CON	NTRACTOR ACTION		APF	PROVING AU	тног	RITY		
A C T I V I F Y NO	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	CLARA/EREVWR	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	A C T I O N C O D E	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(0)	(p)	(q)	(r)
		21 30 00	Preliminary Test Certification	1.7.4													
			Final Test Certification	1.7.5													
			SD-10 Operation and Maintenance														
			Data														
			Operating and Maintenance	3.11.1	G AE												
			Instructions														
			Flow Meter	2.13													
		22 00 00	SD-02 Shop Drawings														
			Plumbing System	3.8.1	G												
			SD-03 Product Data														
			Backflow Prevention Assemblies	3.8.1.1	G AE												
			Fixtures	2.4	G AE												
			Flush Valve Water Closets	2.4.3	G AE												
			WaterSense Label for Flush	2.4.3	S AE												
			Valve Water Closet														
			Flush Valve Urinals	2.4.4	G AE												
			WaterSense Label for Urinal	2.4.4	S AE												
			Wall Hung Lavatories	2.4.5	G AE												
			Countertop Lavatories	2.4.6	G AE												
			WaterSense Label for Lavatory	2.4.1	S AE												
			Faucet														
			Kitchen Sinks	2.4.7	G AE												
			Service Sinks	2.4.8	G AE												
			Drinking-Water Coolers	2.4.9	G AE												
			Water Heaters	2.9	G AE												

TITLE	AND	LOCATION				CONTRAC	TOR				•						
Detr	oit A	Arsenol MUMT J	V														
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A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASS-F-CAT-ON	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	A C T I O N C O D E	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(o)	(p)	(q)	(r)
		22 00 00	Energy Star Label for Gas	2.9.1.1	S AE												
			Storage Water Heater														
			Pumps	2.10	G AE												
			SD-06 Test Reports														
			Tests, Flushing and Disinfection	3.8													
			Test of Backflow Prevention	3.8.1.1	G												
			Assemblies														
			SD-07 Certificates														
			Materials and Equipment	1.4													
			SD-10 Operation and Maintenance														
			Data														
			Plumbing System	3.8.1	G												
		23 05 93.00 06	SD-02 Shop Drawings														
			TAB Schematic Drawings and	3.3	G												
			Report Forms														
			SD-03 Product Data														
			TAB Related HVAC Submittals	3.2													
			Duct Air Leakage Test	3.6.1	G												
			Procedures														
			TAB Procedures	3.4	G												
			Calibrations	3.5	G												
			Duct Air Leakage Tests	3.6													
			Systems Readiness Check	3.7													
			TAB Field Work	3.8.2	G												
			TAB Verification	3.10	G												
			SD-06 Test Reports														

TITLE	AND	LOCATION			CONTRAC	TOR											
Detr	oit A	rsenol MUMT J	V														
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A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	A C T I O N C O D E	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		23 05 93.00 06	Design Review Report	3.1	G												
			Draft Duct Air Leakage Test	3.6.4	G												
			Report														
			Final Duct Air Leakage Test	3.6.6	G AE												
			Report														
			Systems Readiness Check	3.7	G												
			Report														
			Draft TAB Report	3.9.1	G												
			Final TAB Report	3.9.2	G AE												
			SD-07 Certificates														
			TAB Firm	1.5.1	G												
			TAB Specialist	1.5.2	G												
		23 07 00	SD-02 Shop Drawings														
			MICA Plates	3.2.2.4	G												
			Pipe Insulation Systems	2.3													
			Pipe Insulation Systems	3.2													
			Duct Insulation Systems	3.3													
			Recycled content for insulation	2.3.1	S AE												
			materials														
			Environmental Product	1.5.1	S												
			Declarations														
			Embodied Carbon Optimization	1.5.2	S												
			Report/Action Plan														
			Extended Producer Responsibility	1.5.3.1	S												
			Local/Regional Materials	1.5.5	S												
			Material Ingredient Reporting	1.5.4	S												

TITLE	AND	LOCATION			CONTRAC	FOR											
Detr	oit A	rsenol MUMT J	V														
					G	C SC	ONTRACTOR	R: TES		NTRACTOR ACTION		APF	PROVING AU	THOR	RITY		
A C T V T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(o)	(p)	(q)	(r)
		23 07 00	SD-03 Product Data														
			Pipe Insulation Systems	2.3	G												
			Pipe Insulation Systems	3.2	G												
			Duct Insulation Systems	3.3	G												
			SD-07 Certificates														
			Indoor air quality for adhesives	2.2.1	S AE												
			SD-08 Manufacturer's Instructions														
			Pipe Insulation Systems	2.3	G												
			Pipe Insulation Systems	3.2	G												
			Duct Insulation Systems	3.3	G												
		23 08 00.00 20	SD-03 Product Data														
			Test Equipment	2.1	G DO												
			SD-06 Test Reports														
			Pipe Flushing, Testing, And	1.6	G DO												
			Water Treatment Reports														
			Seasonal Test Report	3.7	G DO												
			Full-Load Test Report	3.8	G DO												
		23 09 00	SD-02 Shop Drawings														
			DDC Contractor Design Drawings	3.2	G AE												
			Draft As-Built Drawings	3.2	G												
			Final As-Built Drawings	3.2	G AE												
			SD-03 Product Data														
			Programming Software	1.8.3	G												
			Controller Application Programs	1.8.4	G												
			Configuration Software	1.8.1	G												
			Controller Configuration Settings	1.8.2	G												

TITLE	AND	LOCATION			CONTRAC	TOR											
Deti	roit A	rsenol MUMT J	V														
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A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	A C T I O N C O D E	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(0)	(p)	(q)	(r)
		23 09 00	Manufacturer's Product Data	2.2	G												
			Niagara Framework Supervisory	1.8.5	G												
			Gateway Backups														
			Niagara Framework Engineering	1.8.6	G												
			Tool														
			SD-06 Test Reports														
			Pre-Construction Quality Control	1.9.1	G												
			(QC) Checklist														
			Post-Construction Quality Control	1.9.2	G												
			(QC) Checklist														
			Start-Up Testing Report	3.4.2	G												
			PVT Procedures	3.5.1	G												
			PVT Report	3.5.3	G AE												
			SD-10 Operation and Maintenance														
			Data														
			Operation and Maintenance	3.6	G												
			(O&M) Instructions														
			Training Documentation	3.8.1	G												
			SD-11 Closeout Submittals														
			Enclosure Keys	2.5	G												
			Password Summary Report	3.1.6.1	G												
			Closeout Quality Control (QC)	1.9.3	G												
			Checklist														
		23 11 20	SD-02 Shop Drawings														
			Gas Piping System	1.5.3	G												
			Gas Piping System	2.2	G												

TITLE	AND	LOCATION			CONTRAC <sup>®</sup>	TOR											
Det	roit A	Arsenol MUMT J	IV														
					G	C SC	CONTRACTO	R: TES		NTRACTOR ACTION		APF	PROVING AU	тног	RITY		
A C T I V I T Y NO	TRANSMITAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		23 11 20	Gas Piping System	3.3	G												
			SD-03 Product Data														
			Pipe and Fittings	1.6.1	G												
			Gas Equipment Connectors	1.5.3	G												
			Gas Piping System	1.5.3	G												
			Gas Piping System	2.2	G												
			Gas Piping System	3.3	G												
			Pipe Coating Materials	2.1	G												
			Pressure Regulators	2.6	G												
			Risers	2.4	G												
			Transition Fittings	2.2.10	G												
			Valves	2.3	G												
			Warning and Identification Tape	2.2.6	G												
			SD-06 Test Reports														
			Testing	3.18	G												
			Pressure Tests	3.18.1	G												
			Test with Gas	3.18.2	G												
			SD-07 Certificates														
			Welders Procedures and	1.5.1	G												
			Qualifications														
			Assigned Number, Letter, or	1.5.1	G												
			Symbol														
			SD-08 Manufacturer's Instructions														
			PE Pipe and Fittings	1.5.2	G												
			Pipe Coating Materials	2.1	G												

TITLE	AND	LOCATION			CONTRAC	TOR											
Deti	roit A	rsenol MUMT J	V														
					G	C SC	ONTRACTO	R: TES		NTRACTOR ACTION		APF	ROVING AU	THOR	RITY		
A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		23 11 20	SD-10 Operation and Maintenance														
			Data														
			Gas Facility System and	1.3.1	G												
			Equipment Operation														
			Gas Facility System Maintenance	1.3.2	G												
			Gas Facility Equipment	1.3.3	G												
			Maintenance														
		23 23 00	SD-02 Shop Drawings														
			Refrigerant Piping System	2.3	G												
			SD-03 Product Data														
			Refrigerant Piping System	2.3													
			Spare Parts	1.5.2													
			Qualifications	1.3.1													
			Refrigerant Piping Tests	3.5													
			Verification of Dimensions	3.1													
			SD-06 Test Reports														
			Refrigerant Piping Tests	3.5													
			SD-07 Certificates														
			Service Organization	2.1													
			SD-10 Operation and Maintenance														
			Data														
			Maintenance	1.5	G												
			Operation and Maintenance	3.4	G												
			Manuals														
			Demonstrations	3.4	G												
		23 30 00	SD-02 Shop Drawings														

TITLE	AND	LOCATION			CONTRAC	TOR											
Det	roit A	rsenol MUMT J	IV														
					G	C SC	ONTRACTO	R: TES	CON	NTRACTOR ACTION		APF	PROVING AU	THOR	RITY		
A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	Р А К А В К Я А В А В А Р Н	OVT OR A/E REVWR CLASS-F-CAT-ON	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACT-ON CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(o)	(p)	(q)	(r)
		23 30 00	Detail Drawings	1.4.4	G												
			SD-03 Product Data														
			Insulated Nonmetallic Flexible	2.9.1.1													
			Duct Runouts														
			Duct Connectors	2.9.1.1													
			Duct Access Doors	2.9.2	G												
			Fire Dampers	2.9.3	G AE												
			Manual Balancing Dampers	2.9.4	G												
			Diffusers	2.9.7.1	G AE												
			Registers and Grilles	2.9.7.2	G AE												
			Louvers	2.9.8	G AE												
			Centrifugal Fans	2.10.1.1	G AE												
			Centrifugal Type Power Roof	2.10.1.2													
			Ventilators														
			Air Handling Units	2.11	G												
			Variable Volume, Single Duct	2.12.1.1	G AE												
			Terminal Units														
			Reheat Units	2.12.1.2	G AE												
			Unit Ventilators	2.12.2	G AE												
			Energy Recovery Devices	2.13	G AE												
			Test Procedures	1.4.5													
			Indoor Air Quality for Duct	2.9.1	S AE												
			Sealants														
			SD-06 Test Reports														
			Performance Tests	3.12	G												
			Damper Acceptance Test	3.10	G												

TITLE	AND	LOCATION				CONTRAC	TOR										
Det	roit A	rsenol MUMT J	V														
					G	C SC	ONTRACTOR	R: TES		NTRACTOR ACTION		APF	ROVING AU	THOF	RITY		
A C T I V I T Y N O	TRANSMITAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(0)	(p)	(q)	(r)
		23 30 00	SD-07 Certificates														
			Ozone Depleting Substances	1.4.3													
			Technician Certification														
			SD-08 Manufacturer's Instructions														
			Manufacturer's Installation	3.2													
			Instructions														
			Operation and Maintenance	3.14.2													
			SD-10 Operation and Maintenance														
			Data		_												
			Operation and Maintenance	3.14.1	G												
			Manuals		_												
			Fire Dampers	2.9.3	G												
			Manual Balancing Dampers	2.9.4	G												
			Centrifugal Fans	2.10.1.1	G												
			Air Handling Units	2.11	G												
			Variable Volume, Single Duct	2.12.1.1	G												
			Terminal Units														
			Reheat Units	2.12.1.2	G												
			Unit Ventilators	2.12.2	G												
			Energy Recovery Devices	2.13	G												
			SD-11 Closeout Submittals														
			Indoor Air Quality During	3.13	S AE						ļ						
			Construction														
		23 35 16.17 10	SD-02 Shop Drawings														
			Detail Drawings	1.4.1	G												

TITLE	AND	LOCATION				CONTRAC	TOR										
Det	roit A	rsenol MUMT J	V														
					G	C SC	CONTRACTO	R: TES		NTRACTOR ACTION		APF	ROVING AU	THOF	RITY		
A C T I V I T Y NO	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	VT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(0)	(p)	(q)	(r)
		23 35 16.17 10	Exhaust System Installation	3.4	G												
			SD-03 Product Data														
			Related Submittals	1.4.2													
			Ductwork Components	2.4	G												
			Materials and Equipment	2.1													
			Spare Parts	1.6													
			Field Instructions	3.6													
			Final Acceptance Tests	3.7													
			Onsite Training	3.6	G												
			Exhaust System Specialist	1.4.2	G												
			SD-06 Test Reports														
			Final Acceptance Tests	3.7													
			SD-07 Certificates														
			Inspection	3.3	G												
			SD-10 Operation and Maintenance														
			Data														
			Exhaust System	1.2													
			Operation and Maintenance	3.6													
			Manuals														
		23 81 00	SD-03 Product Data														
			Spare Parts	3.7.1													
			Posted Instructions	3.4													
			System Performance Tests	3.6													
			Training	3.4	G												
			Inventory	1.4													
			Supplied Products	2.1													

TITLE	AND	LOCATION				CONTRAC	TOR										
Detr	oit A	rsenol MUMT	IV														
					G	C SC	CONTRACTO	R: TES		NTRACTOR ACTION		APF	ROVING AU	тног	RITY		
A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASS-F-CAT-ON	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		23 81 00	Manufacturer's Standard Catalog	2.2													
			Data														
			SD-06 Test Reports														
			Refrigerant Tests, Charging, and	3.5	G												
			Start-Up														
			System Performance Tests	3.6	G												
			SD-07 Certificates														
			Service Organizations	3.7.2													
			SD-10 Operation and Maintenance														
			Data														
			Operation and Maintenance	3.4	G												
			Manuals														
			SD-11 Closeout Submittals														
			Ozone Depleting Substances	2.2.2.3	S												
		23 81 23	SD-03 Product Data														
			Computer Room Air Conditioner	2.1	G AE												
			Small Computer Room Air	2.2	G AE												
			Conditioners														
			Space Temperature Control	2.5.2	G												
			System Drawings														
			Filters	2.1.5													
			Refrigerants	1.5	S AE												
			SD-06 Test Reports														
			Manufacturer's Factory Test	2.8.1	G												
			Plans														
			Factory Test Reports	2.8.4	G												

TITLE	E AND	LOCATION				CONTRAC	TOR										
Det	roit A	rsenol MUMT J	V														
					G	C SC	CONTRACTO	R: TES	CON	NTRACTOR ACTION		APF	PROVING AU	THOF	RITY		
A C T I V I T Y N O	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G # A G R A P H	OVT OR A/E REVWR CLASS-F-CAT-ON	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACT-ON CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		23 81 23	Field Test Schedule	3.3.2	G												
			Manufacturer's Field Test Plans	3.3.1	G												
			Field Test Reports	3.3.6	G												
			SD-07 Certificates														
			Credentials of the Manufacturer's	3.3.3	G												
			Field Test Representative														
			Ozone Depleting Substances	1.6.1													
			Technician Certification														
			Certified List Of Qualified	1.7.3													
			Permanent Service Organization	\$													
			SD-08 Manufacturer's Instructions														
			Installation Manual for Each Type	3.1.2													
			of CRAC														
			SD-10 Operation and Maintenance														
			Data														
			Computer Room Air Conditioner	3.1.3	G												
			Operation and Maintenance Data														
			SD-11 Closeout Submittals														
			Indoor Air Quality During	3.2	s												
			Construction		-												
		25 05 11.01	SD-01 Preconstruction Submittals														
			Contractor Computer	1.10.1.6	G												
			Cybersecurity Compliance														
			Statements														
			Cybersecurity Interconnection	1.8.1	G												
			Schedule														

TITLE	AND	LOCATION			CONTRAC	TOR											
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A C T V T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(o)	(p)	(q)	(r)
		25 05 11.01	SD-02 Shop Drawings														
			Network Communication Report	1.8.2	G												
			Cybersecurity Riser Diagram	1.8.4	G												
			SD-03 Product Data														
			Control System Cybersecurity	1.8.5	G												
			Documentation														
			Software Licenses	1.9	G												
			SD-11 Closeout Submittals														
			Confidential Password Report	3.4.5.2	G												
			Enclosure Keys	3.3.3	G												
			Control System Inventory Report	1.8.3	G												
		25 05 11.02	SD-01 Preconstruction Submittals														
			Wireless and Wired Broadcast	3.2.2.3	G												
			Communication Request														
			Device Account Lock Exception	3.3.2	G												
			Request														
			Contractor Computer	1.10.1.6	G												
			Cybersecurity Compliance														
			Statements														
			Cybersecurity Interconnection	1.8.1	G												
			Schedule														
			SD-02 Shop Drawings														
			Network Communication Report	1.8.2	G												
			Cybersecurity Riser Diagram	1.8.4	G												
			SD-03 Product Data														

TITLE	AND	LOCATION			CONTRAC	TOR											
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A C T - V - T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A G R A P H	OVT OR A/E REVWR CLASS-F-CAT-ON	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	A C T I O N C O D E	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		25 05 11.02	Control System Cybersecurity	1.8.5	G												
			Documentation														
			SD-07 Certificates														
			Software Licenses	1.9	G												
			SD-11 Closeout Submittals														
			Confidential Password Report	3.4.4.4	G												
			Enclosure Keys	3.3.7	G												
			System Maintenance Tool	3.9	G												
			Software														
			Control System Inventory Report	1.8.3	G												
			Integrity Verification Software	3.11.1	G												
		25 05 11.03	SD-01 Preconstruction Submittals														
			Device Account Lock Exception	3.3.2	G												
			Request														
			Contractor Computer	1.10.1.6	G												
			Cybersecurity Compliance														
			Statements														
			Cybersecurity Interconnection	1.8.1	G												
			Schedule														
			Network Communication Report	1.8.2	G												
			SD-03 Product Data														
			Control System Cybersecurity	1.8.5	G												
			Documentation														
			Software Licenses	1.9	G												
			SD-11 Closeout Submittals														

TITLE	AND	LOCATION				CONTRAC	TOR										
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A C T I V I T Y N O	FRANSM-FFAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	Р А К 4 К А С К А Р Н	VT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		25 05 11.03	System Maintenance Tool	3.7	G												
			Software														
			Control System Inventory Report	1.8.3	G												
			Cybersecurity Riser Diagram	1.8.4	G												
			Confidential Password Report	3.4.4.3	G												
		25 08 10	SD-06 Test Reports														
			PVT Plan	3.1.1	G												
			PVT Phase I Report	3.1.2.1	G												
			PVT Phase II Report	3.1.2.2	G AE												
			SD-07 Certificates														
			Test Instrumentation Calibration	1.4	G												
			Certificates														
		25 10 10	SD-02 Shop Drawings														
			UMCS Contractor Design	3.3.2	G AE												
			Drawings														
			Draft As-Built Drawings	3.3.3	G												
			Final As-Built Drawings	3.3.3	G												
			SD-03 Product Data														
			Product Data Sheets	2.1.5	G												
			Computer Software	2.3	G												
			Enclosure Keys	2.5.1	G												
			SD-05 Design Data														
			UMCS IP Network Bandwidth	3.3.1	G												
			Usage Estimate														
			SD-06 Test Reports														
			Pre-Construction QC Checklist	1.7	G												

TITLE	AND	LOCATION				CONTRAC	TOR										
Det	roit A	rsenol MUMT J	V														
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A C T I V I T Y NO	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASS-F-CAT-ON	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		25 10 10	Post-Construction QC Checklist	1.7	G												
			Factory Test Procedures	3.1	G												
			Factory Test Report	3.1	G												
			Existing Conditions Report	3.2	G												
			Start-Up and Start-Up Testing	3.7	G												
			Report														
			PVT Phase I Procedures	3.8.1	G												
			PVT Phase I Report	3.8.2	G												
			PVT Phase II Report	3.8.3	G AE												
			SD-10 Operation and Maintenance														
			Data														
			Operation and Maintenance	1.8	G												
			(O&M) Instructions														
			Preventive Maintenance Work	3.9.7.1	G												
			Plan														
			Basic Training Documentation	3.10.1	G												
			Advanced Training	3.10.1	G												
			Documentation														
			Refresher Training	3.10.1	G												
			Documentation														
			SD-11 Closeout Submittals														
			Closeout QC Checklist	1.7	G												
		26 05 73	SD-01 Preconstruction Submittals														
			Field Examination Plan	3.1	G												
			Arc Flash Label Formats	3.2.9	G												
			SD-06 Test Reports														

TITLE	AND	LOCATION				CONTRAC <sup>®</sup>	TOR										
Detr	oit A	Arsenol MUMT J	IV														
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A C T I V I T Y O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASS-F-CAT-ON	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		26 05 73	Field Examination	3.1.1													
			SD-07 Certificates														
			System Analyzer	1.4.1	G												
			SD-11 Closeout Submittals														
			Model Files	3.3	G												
			Load Flow Study	3.2.4	G												
			Fault Current Study	3.2.5	G												
			System Coordination Study	3.2.6	G												
			Arc Flash Hazard Study	3.2.7	G												
		26 08 00	SD-06 Test Reports														
			Acceptance Tests and	3.1	G												
			Inspections														
			SD-07 Certificates														
			Qualifications	1.4.1	G												
			Acceptance Test and Inspections	1.4.3	G												
			Procedure														
		26 11 16	SD-02 Shop Drawings														
			Unit Substation Drawings	1.5.1.1	G												
			Transformer Drawings	1.5.1.2	G												
			SD-03 Product Data														
			Fuse Curves	1.5.1.1	G												
			Secondary Unit Substation	2.2	G												
			Transformer (Liquid-filled)	2.2.2	G												
			Digital Meters - Advanced Smart	2.2.4.2	G												
			Meters														
			SD-06 Test Reports														

TITLE	E AND	LOCATION				CONTRAC	TOR										
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A C T I V I T Y N O	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A G R A P H	OVT OR A/E REVWR CLASS-F-CAT-ON	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		26 11 16	Acceptance Checks and Tests	3.5.1	G												
			SD-07 Certificates														
			Paint Coating System	1.5.2	G												
			Transformer Efficiencies	1.5.3	G												
			SD-09 Manufacturer's Field														
			Reports														
			Load Interrupter Switch	2.6.2	G												
			Production Tests														
			Transformer Design Tests	2.6.3	G												
			(Liquid-filled)														
			Transformer Routine and Other	2.6.4	G												
			Tests (Liquid-filled)														
			SD-10 Operation and Maintenance														
			Data														
			Unit Substations	2.2	G												
			SD-11 Closeout Submittals														
			Assembled Operation and	1.6.1	G												
			Maintenance Manuals														
			Equipment Test Schedule	2.6.1	G												
		26 13 00	SD-02 Shop Drawings														
			Switchgear Drawings	1.5.1	G AE												
			SD-03 Product Data														
			Electronic Overcurrent Control	1.5.3	G												
			Curves														
			SF6/High-Firepoint Fluid	1.6.1	G AE												
			Insulated Pad-mounted Switchge	ar													

TITLE	AND	LOCATION			CONTRACT	ſOR											
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A C T I V I T Y O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		26 13 00	SF6/High-Firepoint Fluid	2.1	G AE												
			Insulated Pad-mounted Switchge	ar													
			Insulated High-Voltage	2.2	G AE												
			Connectors														
			SD-06 Test Reports														
			Acceptance Checks and Tests	3.4.1	G												
			SD-07 Certificates														
			Paint Coating System	1.5.2	G												
			SD-09 Manufacturer's Field														
			Reports														
			Switchgear Design and	2.3.1	G												
			Production Tests														
			SD-10 Operation and Maintenance														
			Data														
			SF6/High-Firepoint Fluid	1.6.1	G												
			Insulated Pad-mounted Switchge	ar													
			SF6/High-Firepoint Fluid	2.1	G												
			Insulated Pad-mounted Switchge	ar													
		26 20 00	SD-02 Shop Drawings														
			Panelboards	2.11	G AE												
			Motor Control Centers	2.17	G AE												
			SD-03 Product Data														
			Receptacles	2.10	G												
			Circuit Breakers	2.11.3	G AE												
			Switches	2.9	G												
			Transformers	2.13	G AE												

TITLE	E AND	LOCATION				CONTRAC	TOR										
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A C T I V I T Y N O	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A G R A P H	OVT OR A/E REVWR CLASS-F-CAT-ON	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		26 20 00	Motor Controllers	2.15	G AE												
			Combination Motor Controllers	2.17.1	G												
			Manual Motor Starters	2.16	G												
			Marking Strips	3.1.9.1	G												
			Metering	2.25	G AE												
			Secondary Bonding Busbar	2.20.3	G												
			Surge Protective Devices	2.26	G AE												
			Cable Trays	2.3	G												
			SD-06 Test Reports														
			600-volt Wiring Test	3.5.2	G												
			Grounding System Test	3.5.5	G												
			Transformer Tests	3.5.3	G												
			Ground-fault Receptacle Test	3.5.4	G												
			SD-09 Manufacturer's Field														
			Reports														
			Transformer Factory Tests	2.28.1													
			SD-10 Operation and Maintenance														
			Data														
			Metering	2.25	G												
		26 24 13	SD-02 Shop Drawings														
			Switchboard Drawings	1.5.2	G AE												
			SD-03 Product Data														
			Switchboard	2.2	G AE												
			SD-06 Test Reports														
			Switchboard Design Tests	2.5.2	G												
			Switchboard Production Tests	2.5.3	G												

TITLE	AND	LOCATION				CONTRAC	TOR										
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A C T I V I T Y O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	Р А К А <sup>#</sup> К А Р Н	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		26 24 13	Acceptance Checks and Tests	3.5.1	G												
			SD-10 Operation and Maintenance														
			Data														
			Switchboard Operation and	1.6.1	G												
			Maintenance														
			SD-11 Closeout Submittals														
			Assembled Operation and	1.6.2	G												
			Maintenance Manuals														
			Equipment Test Schedule	2.5.1	G												
			Required Settings	3.5	G												
			Service Entrance Available Fault	2.8	G												
			Current Label														
		26 29 23	SD-02 Shop Drawings														
			Schematic Diagrams	1.5.1	G												
			Interconnecting Diagrams	1.5.2	G												
			Installation Drawings	1.5.3	G												
			As-Built Drawings	1.5.3	G												
			SD-03 Product Data														
			Adjustable Speed Drives	2.1	G AE												
			Wires and Cables	2.3													
			Equipment Schedule	1.5.4													
			SD-06 Test Reports														
			ASD Test	3.3.1													
			Performance Verification Tests	3.3.2													
			Endurance Test	3.3.3													
			SD-08 Manufacturer's Instructions														

TITLE	AND	LOCATION				CONTRAC	TOR										
Detr	oit A	rsenol MUMT	JV														
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A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P	VT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACT-ON CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(0)	(p)	(q)	(r)
		26 29 23	Installation instructions	1.5.5													
			SD-09 Manufacturer's Field														
			Reports														
			ASD Test Plan	2.5.1	G												
			Standard Products	1.5.6													
			SD-10 Operation and Maintenance														
			Data														
			Adjustable Speed Drives	2.1													
		26 41 00	SD-02 Shop Drawings														
			Overall lightning protection	1.4.1.1	G AE												
			system														
			SD-06 Test Reports														
			Lightning Protection and	1.4.3	G												
			Grounding System Test Plan														
			Lightning Protection and	3.4.1	G												
			Grounding System Test														
			SD-07 Certificates														
			Lightning Protection System	1.2.3	G												
			Installers Documentation														
			Component UL Listed and	1.4.2	G												
			Labeled														
			Lightning protection system	1.4.4	G												
			inspection certificate														
			Roof manufacturer's warranty	3.1.1	G												
		26 51 00	SD-02 Shop Drawings														
			Luminaire Drawings	1.5.1	G AE												

TITLE	AND	LOCATION					CONTRAC	FOR										
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A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G # A G R A P H	C L A S S I F I C A T I O N	VT OR A/E REVWR	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(1	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(0)	(p)	(q)	(r)
		26 51 00	Lighting Control System One-Line	1.7.2	GΑ	٩E												
			Diagram															
			Sequence of Operation for	2.5.1	GΑ	٩E												
			Lighting Control System															
			SD-03 Product Data															
			Luminaires	2.2	G A	٩E												
			Light Sources	2.3	G													
			LED Drivers	2.4	G													
			Luminaire Warranty	1.6.1	G													
			Lighting Controls Warranty	1.6.2	G													
			Lighting Control Panel	2.5.1.2.1	G A	٩E												
			Gateway	2.5.1.2.2	G													
			Switches	2.5.2.1	G													
			Wall Box Dimmers	2.5.2.2	GΑ	٩E												
			Occupancy/Vacancy Sensors	2.5.2.3	GΑ	٩E												
			Photosensors	2.5.2.4	GΑ	٩E												
			Power Packs	2.5.2.3.5	GΑ	٩E												
			Exit Signs	2.6.1	GΑ	٩E												
			Emergency Drivers	2.6.3	GΑ	٩E												
			SD-05 Design Data															
			Luminaire Design Data	1.5.2	G													
			Occupancy/Vacancy Sensor	3.2.1.1	G													
			Verification Test		-													
			SD-10 Operation and Maintenance				1	1										
			Data															
			Lighting System	1.7.1	G													

TITLE	AND	LOCATION				CONTRAC	TOR										
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A C T I V I T Y N O	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACT-ON CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		26 51 00	Lighting Control System	1.7.2	G												
1			Maintenance Staff Training Plan	3.3.1.1	G												
			End-User Training Plan	3.3.1.2	G												
		27 10 00	SD-02 Shop Drawings														
			Telecommunications Drawings	1.6.1.1	G AE												
			Telecommunications Space	1.6.1.2	G AE												
_			Drawings														
			SD-03 Product Data														
			Telecommunications Cabling	2.3	G AE												
			Patch Panels	2.4.5	G AE												
-			Telecommunications	2.5	G AE												
-			Outlet/Connector Assemblies														
-			Equipment Support Frame	2.4.2	G AE												
-			Connector Blocks	2.4.3	G AE												
-			Spare Parts	1.10.3	G AE												
-			SD-06 Test Reports														
			Telecommunications Cabling	3.5.1	G AE												
			Testing														
			SD-07 Certificates														
			Telecommunications Contractor	1.6.2.1	G												
			Key Personnel	1.6.2.2	G				1								
			Manufacturer Qualifications	1.6.2.3	G												
			Test Plan	1.6.3	G AE				1								
			SD-09 Manufacturer's Field						1								
			Reports						1								
			Factory Reel Tests	2.11.1	G AE												

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A C T - V - T Y NO	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	CLASSIFICATEVWR	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		27 10 00	SD-10 Operation and Maintenance														
			Data														
			Telecommunications Cabling and	1.10.1	G AE												
			Pathway System														
			SD-11 Closeout Submittals														
			Record Documentation	1.10.2	G AE												
		28 31 76	SD-01 Preconstruction Submittals														
			Qualified Fire Protection Engineer	1.3.2	G AE												
			(QFPE)														
			Fire alarm system designer	1.8.2.1	G AE												
			Supervisor	1.8.2.2	G AE												
			Technician	1.8.2.3	G AE												
			Installer	1.8.2.4	G AE												
			Test Technician	1.8.2.5	G AE												
			Fire Alarm System Site-Specific	1.7	G AE												
			Software Acknowledgement														
			SD-02 Shop Drawings														
			Nameplates	1.8.1.3	G AE												
			Instructions	2.2.4	G AE												
			Wiring Diagrams	1.8.1.4	G AE												
			System Layout	1.8.1.5	G AE												
			Notification Appliances	1.8.1.6	G AE												
			Initiating devices	1.8.1.7	G AE												
			Amplifiers	1.8.1.8	G AE												
			Battery Power	1.8.1.9	G AE												
			Voltage Drop Calculations	1.8.1.10	G AE												

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A C T I V I F Y NO	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	C L A S S - F - C A T - O N	OVT OR A/E REVWR	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		28 31 76	SD-03 Product Data															
			Fire Alarm and Mass Notification	2.3	GΑ	٩E												
			Control Unit (FMCU)															
			Flame Detectors	2.8	G /	٩E												
			Local Operating Console (LOC)	1.4.4	G /	٩E												
			Amplifiers	1.8.1.8	G /	٩E												
			Tone Generators	2.5	GΑ	٩E												
			Digitalized voice generators	2.5	G /	٩E												
			Manual Stations	2.6	G /	٩E												
			Smoke Detectors	2.7	GΑ	٩E												
			Duct Smoke Detectors	2.7.2	G /	٩E												
			Carbon monoxide detector	2.9	GΑ	٩E												
			Addressable Interface Devices	2.10	GΑ	٩E												
			Addressable Control Modules	2.11	GΑ	٩E												
			Isolation Modules	2.12	G /	٩E												
			Notification Appliances	1.8.1.6	GΑ	٩E												
			Textual Display Sign Control	2.13.3	GΑ	٩E												
			Panel															
			Textual Display Signs	2.13.3	G /	٩E												
			Batteries	2.15.1	G /	٩E												
			Battery Chargers	2.15.2	GΑ	٩E												
			Supplemental Notification	2.15.1.1	G /	٩E												
			Appliance Circuit Panels															
			Auxiliary Power Supply Panels	2.15.1.1	G /	٩E												
			Surge Protective Devices	2.16	G /	٩E												
			Alarm Wiring	2.16	G /	٩E												

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A C T I V I T Y NO	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACT-ON CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		28 31 76	Back Boxes and Conduit	3.3.4	G AE												
			Ceiling Bridges	3.2.9	G AE												
			Terminal Cabinets	3.3.2	G AE												
			Digital Alarm Communicator	2.18.2	G AE												
			Transmitter (DACT)														
			Automatic Fire Alarm	2.18	G AE												
			Transmitters														
			Radio Transmitter and Interface	2.18.1	G AE												
			Panels														
			Electromagnetic Door Holders	2.19.2	G AE												
			Environmental Enclosures or	2.20	G AE												
			Guards														
			Document Storage Cabinet	3.10.3	G AE												
			SD-06 Test Reports														
			Test Procedures	3.6.1	G AE												
			SD-07 Certificates														
			Verification of Compliant	3.6.2.1	G AE												
			Installation														
			Request for Government Final	3.6.2.2	G AE												
			Test														
			SD-10 Operation and Maintenance														
			Data														
			Operation and Maintenance	3.8	G AE												
			(O&M) Instructions														
			Instruction of Government	3.9	G AE												
			Employees														

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A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	A C T I O N C O D E	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		28 31 76	SD-11 Closeout Submittals														
			As-Built Drawings	1.8.1.13													
			Spare Parts	1.10.1													
		31 00 00.00 06	SD-01 Preconstruction Submittals														
			Dewatering Work Plan	3.2.4	G AE												
			SD-03 Product Data														
			Utilization of Excavated Materials	3.8	G AE												
			Shoulder Construction	3.14													
			SD-07 Certificates														
			Testing	3.17													
			Geotechnical Engineer	3.5													
		32 01 19.61	SD-03 Product Data														
			Sealants	2.1													
			Manufacturer's	3.4.2													
			Recommendations														
			SD-04 Samples														
			Blocking Media/Backup Materials	2.3.1													
			Backer Rod	3.2.2.1													
			SD-06 Test Reports														
			Sealants	2.1													
			SD-08 Manufacturer's Instructions														
			Sealants	2.1													
		32 05 33	SD-07 Certificates														
			Maintenance Inspection Report	3.4.1													
		32 11 20	SD-03 Product Data														
			Plant, Equipment, and Tools	1.4	G												

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A C T I V I T Y NO	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R G # R A P H	CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACT-ON CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		32 11 20	SD-06 Test Reports														
			Initial Tests	2.2.1	G AE												
			In-Place Tests	3.11.1	G AE												
		32 12 13	SD-03 Product Data														
			Local/Regional Materials	2.2.4													
			SD-06 Test Reports														
			Sampling and Testing	3.7													
		32 12 16.16	SD-02 Shop Drawings														
			Placement Plan	2.1	G												
			SD-03 Product Data														
			Diamond Grinding Plan	2.1.5	G												
			Mix Design	2.4	G AE												
			Contractor Quality Control	3.1	G												
			SD-04 Samples														
			Aggregates	2.2													
			Asphalt Cement Binder	2.3													
			Warm-mix Additive	2.4.1													
			SD-06 Test Reports														
			Aggregates	2.2	G AE												
			QC Monitoring	3.1.3.9													
			SD-07 Certificates														
			Asphalt Cement Binder	2.3	G AE												
			Laboratory Accreditation and	1.5.11													
			Validation														
			Warm-mix Additive	2.4.1													
		32 13 13.06 06	SD-03 Product Data														

TITLE	AND	LOCATION				CONTRAC	TOR										
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		32 13 13.06 06	Curing Materials	2.1.6	G												
			Admixtures	2.1.4	G												
			Dowel	2.1.5.1	G												
			Reinforcement	2.1.5.4	G												
			Cementitious Materials	2.1.1	G												
			Aggregate	2.1.3	G												
			SD-04 Samples														
			Field-Constructed Mockup	1.6.5													
			SD-05 Design Data														
			Mix Design	2.3	G												
			SD-06 Test Reports														
			Aggregate	2.1.3	G												
			Concrete Slump Tests	3.7.2	G												
			Air Content Tests	3.7.4	G												
			Flexural Strength Tests	3.7.3	G												
			Cementitious Materials	2.1.1	G												
			SD-07 Certificates														
			Ready-mixed Concrete Plant	1.6.1	G												
			Batch Tickets	1.6.4	G												
			Cementitious Materials	2.1.1	G												
		32 16 19	SD-03 Product Data														
			Concrete	2.1													
			Biodegradable Form Release	2.6.5													
			Agent														
			Biodegradable Form Release	3.2													
			Agent														

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A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASS-F-CAT-ON	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		32 16 19	Albedo	2.1.1	S												
			SD-06 Test Reports														
			Field Quality Control	3.8													
		32 17 23	SD-03 Product Data														
			Surface Preparation Equipment	2.1.1.1	G												
			List														
			Application Equipment List	2.1.2	G												
			Exterior Surface Preparation	3.2													
			Safety Data Sheets	1.3.1	G												
			Reflective media for roads	2.2.2.1	G AE												
			Waterborne Paint	2.2.1	G AE												
			SD-06 Test Reports														
			Reflective Media for Roads	2.2.2.1	G AE												
			Waterborne Paint	2.2.1	G AE												
			SD-07 Certificates														
			Reflective Media for Roads	2.2.2.1													
			Waterborne Paint	2.2.1													
			Volatile Organic Compound	1.3.1	G AE												
			SD-08 Manufacturer's Instructions														
			Waterborne Paint	2.2.1	G												
		32 92 19	SD-03 Product Data														
			Wood Cellulose Fiber Mulch	2.4.3													
			Fertilizer	2.3					1								
-+			SD-06 Test Reports	-					1								
			Topsoil Composition Tests	2.2.3													
			SD-07 Certificates	-													

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A C T I V I T Y O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		32 92 19	Seed	2.1													
			SD-08 Manufacturer's Instructions														
			Erosion Control Materials	2.6													
		32 93 00	SD-01 Preconstruction Submittals														
			Time Restrictions and Planting	1.5													
			Conditions														
			SD-03 Product Data														
			Ground Stakes	2.2.1.2													
			Staking Material	2.2.1													
			SD-07 Certificates														
			Nursery Certifications	2.1.1													
			SD-10 Operation and Maintenance														
			Data														
			Plastic Identification	1.7													
		33 05 07.13	SD-01 Preconstruction Submittals														
			Qualifications	1.3.1	G												
			Horizontal Directional Drilling	1.3.3	G												
			Plan														
			SD-03 Product Data														
			Pipe	2.2.1	G												
			Drilling Fluids	2.2.2	G												
			Additives	2.2.3	G												
			Tracer Wire	2.2.4	G												
			SD-06 Test Reports														
			Soil Test Data	3.1													
			SD-07 Certificates														
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Det	roit A	Arsenol MUMT J	IV														
					G	C SC	ONTRACTO	R: TES		NTRACTOR ACTION		APF	PROVING AU	THOR	ITY		
A C T I V I T Y NO	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G # A R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(o)	(p)	(q)	(r)
		33 05 07.13	Drill Rod	2.1.1													
			SD-11 Closeout Submittals														
			Record Drawings	3.4													
			Complete Work Logs of Guided	3.4													
			Directional Drill Operations														
		33 05 23	SD-01 Preconstruction Submittals														
			Boring and Jacking Plan	1.4	G												
			Statement of Contractor	1.4	G												
			Qualifications														
			SD-03 Product Data														
			Pipe casing	2.3.1	G												
			Lubricating Fluid	2.3.2	G												
			SD-05 Design Data														
			Design calculations for pipe	2.1.1.2	G												
			casing														
			Access Shaft Construction Plan	1.4	G												
			Access Shaft Construction Plan	3.1.1	G												
			SD-06 Test Reports														
			Monitoring Survey	3.5.1.1	G												
			SD-08 Manufacturer's Instructions														
			Installation	3.3	G												
			Safety Data Sheets	1.8.1.2	G												
			SD-11 Closeout Submittals														
			Record Drawings	3.6.3	G												
			Daily Work Logs of installation	3.6.3	G												
			operations														

TITLE	AND	LOCATION				(	CONTRAC	TOR										
Det	roit A	rsenol MUMT J	V															
						G	C SC	ONTRACTOR	R: TES		ATRACTOR		APF	PROVING AU	THOR	ITY		
A C T I V I T Y N O	TRANSELTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	C L A S S I F I C A T I O N	OVT OR A/E REVWR	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	A C T I O N C O D E	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OR CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(o)	(p)	(q)	(r)
		33 11 00	SD-03 Product Data															
			Pipe, Fittings, Joints and	2.1.1	G A	=												
			Couplings															
			Valves	2.1.2	G A	=												
			Valve Boxes	2.1.2.4	G A	=												
			Fire Hydrants	2.1.4.1	G A	=												
			Pipe Restraint	2.2.1	G A	=												
			Corporation Stops	2.2.7.1	G A	=												
			Backflow Preventer	1.4.2.1.1	G Al	Ξ												
			Disinfection Procedures	3.2.4	G													
			SD-06 Test Reports															
			Backflow Preventer Tests	3.3.1.5	G													
			Hydrostatic Sewer Test	3.2.1.1.6														
			Leakage Test	3.3.1.3														
			Bacteriological Samples	3.3.1.4														
			Hydrostatic Test	3.3.1.1														
			SD-07 Certificates															
			Pipe, Fittings, Joints and	2.1.1														
			Couplings															
			Valves	2.1.2														
			Fire Hydrants	2.1.4.1														
			Backflow Prevention Training	1.4.2.1.1	1													
			Certificate															
			Fusion Technician Qualifications	1.4.2.2	G													
			Turbine Type Meters	2.1.5.1														
			SD-08 Manufacturer's Instructions															

TITLE	E AND	LOCATION				CONTRAC	FOR										
Det	roit A	rsenol MUMT J	IV														
					G	C SC	ONTRACTOR	R: TES		NTRACTOR ACTION		APF	PROVING AU	THOR	ITY		
A C T I V I T Y NO	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A G R A P H	CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(o)	(p)	(q)	(r)
		33 11 00	PVC Piping	2.1.1.1.1.	1												
			PVCO Piping	2.1.1.1.1.	2												
			PVC Piping For Service Lines	2.1.1.1.2													
		33 30 00	SD-01 Preconstruction Submittals														
			Contractor's License	1.3.1	G												
			SD-02 Shop Drawings														
			Installation Drawings	3.1.1	G AE												
			SD-03 Product Data														
			Precast Concrete Manholes	2.2.5													
			Frames, Covers, and Gratings	2.2.8													
			Gravity Pipe	2.2.1													
			SD-06 Test Reports														
			Hydrostatic Sewer Test	3.3.1.1	G AE												
			Infiltration Tests And Exfiltration	3.3.1.2.1	G AE												
			Tests														
			Low-Pressure Air Tests	3.3.1.2.2	G AE												
			Deflection Testing	3.3.1.3													
			SD-07 Certificates														
			Portland Cement	2.2.3													
			Pre-Installation Inspection	3.3.2.1	G												
			Request														
			Post-Installation Inspection	3.3.2.2	G AE												
		33 40 00	SD-08 Manufacturer's Instructions														
			Placing Pipe	3.3	G												
			SD-11 Closeout Submittals														

TITLE	AND	LOCATION		CONTRAC <sup>®</sup>	TOR												
Detro	oit A	rsenol MUMT J	V														
					G	C SC	ONTRACTO	R: TES		ITRACTOR ACTION		APF	ROVING AU	THOR	RITY		
A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(0)	(p)	(q)	(r)
		33 40 00	Post-Installation Inspection	3.8.3.3	G AE												
			Report														
			LID Verification Report	3.8.2.1	G AE												
		33 46 16	SD-04 Samples														
			Geotextile	2.2													
			Pipe and Pipe Fittings	2.1													
			SD-07 Certificates														
			Geotextile	2.2													
			Pipe and Pipe Fittings	2.1													
		33 71 02	SD-03 Product Data														
			Medium Voltage Cable	2.5	G AE												
			Medium Voltage Cable	2.6	G AE												
			Terminations														
			Protective Devices and	2.12	G AE												
			Coordination														
			SD-06 Test Reports														
			Medium Voltage Cable	2.13.2	G												
			Qualification and Production Test	s													
			Field Acceptance Checks and	3.14.1	G												
			Tests														
			Arc-Proofing Test	2.13.1	G												
			SD-07 Certificates														
			Cable splicer/terminator	1.5.1	G												
			Cable Installer Qualifications	1.5.2	G												
		33 82 00	SD-02 Shop Drawings														

TITLE	AND	LOCATION				CONTRAC	TOR										
Det	roit A	Arsenol MUMT J	IV														
					G	( SC	CONTRACTO	R: TES	CON	NTRACTOR ACTION		APF	PROVING AU	тног	RITY		
A C T I V I T Y NO	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASS-F-CAT-ON	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACT-ON CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(0)	(p)	(q)	(r)
		33 82 00	Telecommunications Outside	1.6.1.1	G AE												
			Plant														
			Telecommunications Entrance	1.6.1.2	G AE	_											
			Facility Drawings														
			SD-03 Product Data														
			Wire and Cable	2.6	G AE												
			Closures	2.3	G AE												
			Building Protector Assemblies	2.2.1	G AE												
			Protector Modules	2.2.2	G AE												
			Spare Parts	1.8.2	G AE												
			SD-06 Test Reports														
			Pre-installation Tests	3.3.1	G AE												
			Acceptance Tests	3.3.2	G AE												
			Outside Plant Test Plan	1.6.3	G AE												
			SD-07 Certificates														
			Telecommunications Contractor	1.6.2.1	G												
			Key Personnel	1.6.2.2	G												
			Manufacturer's Qualifications	1.6.2.3	G												
			SD-08 Manufacturer's Instructions														
			Building Protector Assembly	2.2.1	G												
			Installation														
			Cable Tensions	3.1.7.1	G												
			Fiber Optic Splices	3.1.8.2	G		1										
			SD-09 Manufacturer's Field				1										
			Reports	1			1										
			Factory Reel Test Data	2.12.1	G AE												

TITLE	AND	LOCATION				CONTRAC	TOR										
Det	roit A	rsenol MUMT	JV														
					G	C SC	CONTRACTO	R: TES	CON	NTRACTOR ACTION		APF	ROVING AU	THOR	RITY		
A C T I V I T Y NO	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACT-ON CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-OZ CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(o)	(p)	(q)	(r)
		33 82 00	SD-10 Operation and Maintenance														
			Data														
			Telecommunications Outside	1.6.1.1	G AE												
			Plant (OSP)						-								
			SD-11 Closeout Submittals						-								
			Record Documentation	1.8.1	G AE												
		41 22 13.14	SD-02 Shop Drawings														
			Overhead Electric Traveling	1.6.4	G AE												
			Crane		_												
			Complete Schematic Wiring	3.3.2	G												
			Diagram														
			SD-03 Product Data														
			Gear Reducers	2.3.7.1	G												
			Hoist Brakes	2.3.10	G												
			Travel Brakes	2.3.9	G												
			Load Blocks and Hooks	2.3.3	G												
			Wheels	2.3.8	G												
			Hoists	2.3.1	G												
			Sheaves	2.3.5	G												
			End Trucks	2.2.4	G												
			Bridge Rails	2.2.3	G												
			End Stops	2.2.6	G		ļ										
			Bumpers	2.2.6	G		ļ			ļ							
			Variable Frequency Drives	2.4.1	G AE					ļ							
			Motors	2.4.1	G				L								
			Runway Conductor System	2.4.8.1	G												

TITLE	AND	LOCATION			CONTRAC <sup>®</sup>	FOR											
Det	roit A	rsenol MUMT J	IV														
					G	C SC	ONTRACTO	R: TES		NTRACTOR ACTION		APF	ROVING AU	THOF	RITY		
A C T I V I F Y NO	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACT-ON CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(0)	(p)	(q)	(r)
		41 22 13.14	Runway Conductor System	2.4.8.1	G												
			Bridge Conductor System	2.4.8.2	G												
			Bridge Conductor System	2.4.8.2	G												
			Limit Switches	2.4.6	G												
			Pendant Pushbutton Station	2.4.7.1	G												
			Controls	2.4.2	G												
			Control Parameter Settings	3.3.2	G												
			Capacity Overload Protective	2.4.9	G												
			Device														
			Painting System	2.5	G												
			SD-05 Design Data														
			Load and Sizing Calculations	1.6.5	G AE												
			SD-06 Test Reports														
			Post-erection Inspection	3.4.1	G												
			Operational Tests	3.4.2	G												
			Hook Tram Measurement	3.4.4	G												
			Load Tests	3.4.5	G												
			SD-07 Certificates														
			Wire Ropes	1.6.3	G												
			Crane Runway System	1.6.3	G												
			Hazardous Material	1.6.3	G												
			Loss of Power Test	1.6.3	G												
			Coupling Alignment Verification	1.6.3	G												
			Record														
			Overload Test	1.6.3	G												
			Brake Adjustment Record	1.6.3	G												

TITLE	AND	LOCATION			CONTRAC	TOR											
Det	roit A	Arsenol MUMT J	V														
					G	C SC	ONTRACTO	R: TES		NTRACTOR ACTION		APF	PROVING AU	THOF	RITY		
A C T I V I T Y N O	TRANSMITTAL NO	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	Р А К А G К А Р Н	OVT OR A/E REVWR CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	A C T I O N C O D E	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(o)	(p)	(q)	(r)
		41 22 13.14	Compliance with Listed	1.6.3	G												
			Standards														
			SD-10 Operation and Maintenance														
			Data														
			Operation and Maintenance	3.6	G												
			Manuals														
		41 24 26	SD-02 Shop Drawings														
			Detail Drawings	2.8.3.2	G AE												
			Installation	3.2	G AE												
			SD-03 Product Data														
			Field Instructions	3.3.2	G												
			SD-04 Samples														
			Hydraulic Fluid	2.9													
			SD-06 Test Reports														
			Field Tests and Cleaning of	3.4													
			Hydraulic Lines														
			SD-07 Certificates														
			Welding	1.4.1													
			SD-10 Operation and Maintenance														
			Data														
			Operation and Maintenance	3.4.3	G												
			Manuals														
			Field Tests and Cleaning of	3.4	G												
			Hydraulic Lines														

# Introduction: Construction Project Signer Restriction State Alberta Stat

<u>SIGNAGE FOR</u> <u>BIPARTISAN</u> <u>INFRASTRUCTURE</u> <u>LAW (BIL) HAS</u> <u>BEEN INCLUDED IN</u> <u>THIS REVISION</u> <u>DATED 20</u> JANUARY 2023

See Attachment C

The use of signs to identify Corps managed or supervised design, construction, and rehabilitation projects - both for military and civil works - is an important part of efforts to keep the public informed of Corps work. For this purpose, a construction project sign package has been adopted. This package consists of two signs: one for project identification and the other to show on-the-job safety performance of the contractor.

These two signs are to be displayed side by side and mounted for reading by passing viewers. Exact placement location will be designated by the contracting officer's representative.

The panel sizes and graphic formats have been standardized for visual consistency throughout all Corps operations.

Panels are fabricated using HDO plywood or aluminum with dimensional lumber uprights and bracing. The sign faces are nonreflective vinyl.

All legends are to be die-cut or computercut in the sizes and typefaces specified and applied to the white panel background following the graphic formats shown on pages 16-2 thru 16-4. The Communication Red panel on the left side of the construction project sign with Corps Signature (reverse version) is screen-printed onto the white background.

Displays of the signs are shown on the following pages. Mounting and fabrication details are provided on page 16-5.

Special applications or situations not covered in these guidelines should be referred to the district Sign Program Manager.

### EP 310-1-6a VOL 1 01 Jun 06 AR 601-208 16 JULY 2013

Following are two samples of the Construction Project Identification sign showing how this panel is adaptable for use to identify either Civil or Military works projects. The graphic format for this 4'x 6' sign panel follows the legend guidelines and layout as specified below. The large 4'x 4' section of the panel on the right is to be white with black legend. The 2'x 4' section of the sign on the left with the full Corps Signature (reverse version) is to be screen-printed Communication Red on the white background The designation of a sponsor in the area indicated is optional with Military or Civil Works construction signs. Signs may list one sponsoring entity. If agreement on a sponsor designation cannot be achieved, the area should be left blank. This sign is to be placed with the Safety Performance sign shown on the following page. Mounting and fabrication details are provided on page 16-4.

Special applications or situations not covered in these guidelines should be referred to the district Sign Program Manager.

## ATTACHMENT A: Example Graphic of Signage with Dimensions for MILCON project



## ATTACHMENT B: Example Graphic of Signage with Dimensions for Civil Works Project



ATTACHMENT C: Example Graphic of Signage with Dimensions for BIL/IIJA Projects



Resident Engineers shall ensure the construction sign with the "Building a Better America" emblem remains visible to the public if in a location accessible to the public and in good and professional condition. Detailed information for the color of the emblem is located at: https:// www.whitehouse.gov/wp-content/uploads/2022/08/Building-A-Better-America-Brand-Guide.pdf

#### EP 310-1-6a VOL 1 01 Jun 06 W912QR25R0052 Specs Vol1-0000 AR 601-208 16 July 2013

Each contractor's safety record is to be posted on Corps managed or supervised construction projects and mounted with the Construction Project Identification sign specified on page 16-2.

The graphic format, color, size and typefaces used on the sign are to be reproduced exactly as specified below. The

Legend Group 1: Standard two-line title "Safety is a Job Requirement" with 8" (outside diameter) Safety Green first aid logo. Color: To match Pantone system 347 Typeface: 3" Helvetica Bold Color: Black

Legend Group 2: One- to two-line project title legend describes the work being done under this contract and name of host project. Color: Black Typeface: 1.5" Helvetica Regular Maximum line length: 42"

Legend Group 3: One- to two-line identification: name of prime contractor and city, state address. Color: Black Typeface: 1.5" Helvetica Regular Maximum line length: 42"

Legend Group 4: Standard safety record captions as shown. Color: Black Typeface: 1.25" Helvetica Regular

Replaceable numbers are to be mounted on white .060 aluminum plates and screwmounted to background. Color: Black Typeface: 3" Helvetica Regular Plate size: 2.5" x 4.5"

All typography is flush left and rag right, upper and lower case with initial capitals only as shown. Letter- and word-spacing to follow Corps standards as specified in Appendix D. title with First Aid logo in the top section of the sign, and the performance record captions are standard for all signs of this type. Legend groups 2 and 3 below identify the project and the contractor and are to be placed on the sign as shown.

Safety record numbers are mounted on individual metal plates and are screw-

mounted to the background to allow for daily revisions to posted safety performance record.

Special applications or situations not covered in these guidelines should be referred to the district Sign Program Manager.



Sign	Legend	Panel	Post	Specification	Mounting	Color
Type	Size (A)	Size	Size	Code	Height	Bkg/Lgd
CID-02	various	4'x4'	4"x4"	HDO-3	48"	WH/BK-SG



#### EP 310-1-6a VOL1 01 Jun 06 AR 601-208 16 July 2013

All Construction Project Identification signs and Safety Performance signs are to be fabricated and installed as described below. The signs are to be erected at a location designated by the contracting officer representative and shall conform to the size, format, and typographic standards shown on pages16-2 thru 16-4. Detailed specifica-

The sign panels are to be fabricated from .75" High Density Overlay Plywood. Panel preparation to follow HDO specifications provided in Appendix B.

Sign graphics to be prepared on a white nonreflective vinyl film with positionable adhesive backing.

All graphics except for the Communication Red background with Corps Signature on the project sign are to be die-cut or computer-cut nonreflective vinyl, prespaced legends prepared in the sizes and typefaces specified and applied to the background panel following the graphic formats shown on pages 16-2 and 16-3.

The 2'x 4' Communication Red panel (to match Pantone system 032) with full Corps Signature (reverse version) is to be screen-printed on the white background. Identification of the district or division may be applied under the signature with white cut vinyl letters prepared to Corps standards.

Drill and insert six (6) .375" T-nuts from the front face of the HDO sign panel. Position holes as shown. Flange of T-nut to be flush with sign face.

Apply graphic panel to prepared HDO plywood panel following manufacturers' instructions.

Sign uprights to be structural grade 4" x 4" treated Douglas Fir or Southern Yellow Pine, No.1 or better. Post to be 12' long. Drill six (6) .375" mounting holes in uprights to align with T-nuts in sign panel. Countersink (.5") back of hole to accept socket head cap screw (4" x .375").

Assemble sign panel and uprights. Imbed assembled sign panel and uprights in 4' hole. Local soil conditions and/or wind loading may require bolting additional 2" x 4" struts on inside face of uprights to reinforce installation as shown.

tions for HDO plywood panel preparation are provided in Appendix B.

Shown below the mounting diagram is a panel layout grid with spaces provided for project information. Photocopy this page and use as a worksheet when preparing sign legend orders.

For additional information on the proper method to prepare sign panel graphics, contact the district Sign Program Manager.



#### Construction Project Identification Sign Legend Group 1: Corps Relationship

- 2. \_\_\_\_\_

#### Legend Group 2: Division/District Name

#### Legend Group 2a: Military/Civil Works Sponsor

- Legend Group 3: Project Title

#### Legend Group 4: Facility Name

- 1. \_\_\_\_\_\_

#### Legend Group 5: Contractor/A&E

- 1. \_\_\_\_\_ 1. \_\_\_\_\_ 1. \_\_\_\_\_ 1. \_\_\_\_ 1. \_\_\_\_ 1. \_\_\_\_
- 2. [\_\_\_\_\_\_

- 5. \_\_\_\_\_ 5. \_\_\_\_\_ 5. \_\_\_\_\_ 5. \_\_\_\_ 5. \_\_\_\_ 5. \_\_\_\_ 5. \_\_\_\_ 5. \_\_\_\_\_ 5. \_\_\_\_\_ 5. \_\_\_\_ 5. \_\_\_\_\_ 5. \_\_\_\_\_ 5. \_\_\_\_\_ 5. \_\_\_\_\_ 5. \_\_\_\_ 5. \_\_\_\_ 5. \_\_\_\_ 5. \_\_\_\_ 5. \_\_\_\_ 5. \_\_\_\_ 5. \_\_\_\_\_ 5. \_\_\_ 5. \_\_\_ 5. \_\_\_ 5. \_\_\_\_ 5. \_\_\_\_ 5. \_\_\_\_ 5. \_\_\_ 5. \_\_\_ 5. \_\_\_ 5. \_\_\_ 5. \_\_\_\_ 5. \_\_\_ 5.

## Safety Performance Sign

### Legend Group 2: Project Title

### Legend Group 3: Contractor/A&E

16-6

Legend Group 5b: Contractor/A&E



## **INFORMATION NEEDED TO FOR BASE ACCESS**

Visitor requests must be received within 5 business days prior to the scheduled visit. For large group visits (11-19 individuals) there is a 8 business day lead time; and for groups larger than 20 the lead time is 15 business days notification prior to visit.

In accordance with STA FORM 17, Feb 2018

First Date Onsite:

Last Date Onsite:

Company:

Project:

Manned/Unmanned Tactical Vehicle Lab (MUMT)

	U.S.	DOD Employee?	CAC/Mil ID?				Expiration
NAME (Last, First, MI)	CITIZEN	Y/N	Y/N	DATE OF BIRTH	Driver's License Number	State of Issue	Date

SECTION 01 11 00

# SUMMARY OF WORK 08/15, CHG 2: 08/21

#### PART 1 GENERAL

#### 1.1 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Utility Outage Requests

Utility Connection Requests

#### 1.2 WORK COVERED BY CONTRACT DOCUMENTS

1.2.1 Project Description

The work includes construction of a new, non-standard building, which includes high-bay testing facilities to provide research and development laboratory space to support the advanced tactical and combat system mission functions. The building will include partial height, precast concrete exterior walls; reinforced concrete foundations; roofing; lightning protection system; electrical and mechanical work; site improvements and utilities; fire detection/protection; and associated controls for a complete and usable facility.

In addition to the high-bay testing functions, the new facility shall contain spaces for all necessary supporting functions, including mechanical, electrical, fire protection, and communications rooms, restrooms, locker/ shower areas, break area, offices area, and conference room.

#### 1.2.2 Location

The work is located at Detroit Arsenal, Michigan, as indicated on the Drawings.

- 1.3 NOT USED
- 1.4 NOT USED
- 1.5 NOT USED
- 1.6 NOT USED
- 1.7 ON-SITE PERMITS
- 1.7.1 Utility Outage Requests and Utility Connection Requests

Schedule work to minimize outages. For utility outages and connections required during the execution of work that affect existing systems, schedule outside the regular working hours or on weekends, as approved by the Contracting Officer. Schedule utility outages and connections to minimize disruptions to the Government. No additional payment will be provided for utility outages and connections required to be performed outside the regular work hours.

Submit requests for utility outages and connections in writing to the Contracting Officer for approval at least 21 calendar days in advance of the time required. In each request, state the system involved, area involved, approximate duration of outage, and the nature of work involved.

1.7.2 Borrow, Excavation, Welding, and Burning Permits

Coordinate the following activities with Garrison Department of Public Works and Envioronmental.

ACTIVITIES	SUBMISSION DATE	SUBMISSION FORM
Construction Impact Notification	21 calendar days prior to work	Form CIN
Digging/Excavation Permits	21 calendar days prior to work	Form PWF-103
Stormwater/Soil Erosion Sediment Control (SESC)	30 calendar days prior to work	
National Pollutant Discharge Elimination System (NPDES)	30 calendar days prior to work	
Sewer	N/A	N/A
Water	N/A	N/A
Electrical	N/A	N/A
Hot Work (Open Flame) Permit	21 calendar days prior to work	N/A

ACTIVITIES	SUBMISSION DATE	SUBMISSION FORM
Airspace/Crane Operations	21 calendar days prior to work	N/A

Post permits at a conspicuous location in the construction area.

Burning of trash or rubbish is not permitted at on project site.

#### 1.8 LOCATION OF UNDERGROUND UTILITIES

Obtain digging permits prior to start of excavation, and comply with Installation requirements for locating and marking underground utilities. Verify existing utility locations indicated on contract drawings, within area of work.

Identify and mark all other utilities not managed and located by the local utility companies. Scan the construction site with Ground Penetrating Radar (GPR), electromagnetic, or sonic equipment, and mark the surface of the ground or paved surface where existing underground utilities are discovered. Verify the elevations of existing piping, utilities, and any type of underground obstruction not indicated, or specified to be removed, that is indicated or discovered during scanning, in locations to be traversed by piping, ducts, and other work to be conducted or installed. Verify elevations before installing new work closer than nearest manhole or other structure at which an adjustment in grade can be made.

1.8.1 Notification Prior to Excavation

Notify the Contracting Officer at least 21 days prior to starting excavation work.

- 1.9 NOT USED
- 1.10 NOT USED
- 1.11 NOT USED
- 1.12 NOT USED
- PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

#### SECTION 01 32 01.00 06

#### PROJECT SCHEDULE 07/18

#### PART 1 GENERAL

#### 1.1 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.

U.S. ARMY CORPS OF ENGINEERS (USACE)

ER 1-1-11

(1995) Administration -- Progress, Schedules, and Network Analysis Systems

#### 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with LRL Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Preliminary Project Schedule; G

Project Schedule; G

Two copies of the schedules showing codes, dates, durations, categories, etc., as required.

Periodic Schedule Updates; G

Narrative Report; G

Schedule Reports; G

#### 1.3 QUALITY ASSURANCE

Designate an authorized representative to be responsible for the preparation of the schedule and all required updating (activity status) and preparation of reports. The authorized representative shall have previously developed, created, and maintained at least 2 electronic schedules for projects similar in nature and complexity to this project and shall be experienced in the use of the scheduling software that meets the requirements of this specification.

PART 2 PRODUCTS (Not Applicable)

#### PART 3 EXECUTION

#### 3.1 GENERAL REQUIREMENTS

Prepare for approval a Project Schedule, as specified herein, pursuant to the FAR 52.236-15 - Schedules for Construction Contracts. Show in the schedule the sequence in which the Contractor proposes to perform the work and dates on which the Contractor contemplates starting and completing all schedule activities. The scheduling of the entire project, construction sequences, is required. The scheduling of construction is the responsibility of the Contractor. Contractor management personnel shall actively participate in its development. Subcontractors and suppliers working on the project shall also contribute in developing and maintaining an accurate Project Schedule. Provide a schedule that is a forward planning as well as a project monitoring tool.

#### 3.1.1 Approved Project Schedule

Use the approved Project Schedule to measure the progress of the work and to aid in evaluating time extensions. Make the schedule cost loaded and activity coded. The schedule will provide the basis for all progress payments. If the Contractor fails to submit any schedule within the time prescribed, the Contracting Officer may withhold approval of progress payments until the Contractor submits the required schedule.

#### 3.1.2 Schedule Status Reports

Status the schedule and provide a Schedule Status Report on at least a monthly basis. If, in the opinion of the Contracting Officer, the Contractor falls behind the approved schedule, the Contractor shall take steps necessary to improve its progress including those that may be required by the Contracting Officer, without additional cost to the Government. In this circumstance, the Contracting Officer may require the Contractor to increase the number of shifts, overtime operations, days of work, and/or the amount of construction plant, and to submit for approval any supplementary schedule or schedules as the Contracting Officer deems necessary to demonstrate how the approved rate of progress will be regained.

#### 3.1.3 Default Terms

Failure of the Contractor to comply with the requirements of the Contracting Officer shall be grounds for a determination, by the Contracting Officer, that the Contractor is not prosecuting the work with sufficient diligence to ensure completion within the time specified in the contract. Upon making this determination, the Contracting Officer may terminate the Contractor's right to proceed with the work, or any separable part of it, in accordance with the default terms of the contract.

#### 3.2 BASIS FOR PAYMENT AND COST LOADING

The schedule shall be the basis for determining contract earnings during each update period and therefore the amount of each progress payment. Lack of an approved schedule update, or qualified scheduling personnel, will result in the inability of the Contracting Officer to evaluate contract earned value for the purposes of payment. Failure of the Contractor to provide all required information will result in the

disapproval of the entire project schedule submission and the inability of the Contracting Officer to evaluate Contractor progress for payment purposes. In the absence of an approved schedule, the Contracting Officer may withhold approval of requests for progress payments. In the case where project schedule revisions are directed by the Contracting Officer and those revisions have not been included in subsequent revisions or updates, the Contracting Officer may hold retainage up to the maximum allowed by contract, each payment period, until such revisions to the Project Schedule have been made. Activity cost loading shall be reasonable, as determined by the Contracting Officer. The aggregate value of all activities coded to a contract CLIN shall equal the value of the CLIN on the Schedule.

#### 3.3 PROJECT SCHEDULE DETAILED REQUIREMENTS

The computer software system utilized by the Contractor to produce and update the Project Schedule shall be capable of meeting all requirements of this specification. Failure of the Contractor to meet the requirements of this specification will result in the disapproval of the schedule. Scheduling software that meets the activity coding structure defined in the Standard Data Exchange Format (SDEF) in ER 1-1-11 are Primavera Enterprise products P6 release 7.0 (and subsequent versions). Files shall be saved in an .XER file format, compatible with the Government's version of the scheduling program. Conversion of data from a non-Primavera software into an .XER format will be cause for rejection of the submitted schedules. Other project software of manual methods used to produce any required information shall require approval by the Contracting Officer.

Holidays for Federal Employees: -New Year's Day (January 1) -Birthday of Martin Luther King, Jr. (Third Monday in January). -Wahington's Birthday (Third Monday in February). -Memorial Day (Last Monday in May). -Juneteenth National Independence Day (June 19). -Independence Day (July 4). -Labor Day (First Monday in September). -Columbus Day (Second Monday in October). -Veterans Day (November 11). -Thanksgiving Day (Fourth Thursday in November). -Christmas Day (December 25).

#### 3.3.1 Critical Path Method

The Critical Path Method (CPM) of network calculation shall be used to generate the Project Schedule. Prepare the Project Schedule using the Precedence Diagram Method (PDM).

#### 3.3.2 Level of Detail Required

Develop the Project Schedule to an appropriate level of detail. Failure to develop the Project Schedule to an appropriate level of detail, as determined by the Contracting Officer, will result in its disapproval. The Contracting Officer will consider, but is not limited to, the following characteristics and requirements to determine appropriate level of detail:

#### 3.3.2.1 Activity Durations

Contractor submissions shall follow the direction of the Contracting

Officer regarding reasonable activity durations. Reasonable activity durations are those that allow the progress of ongoing activities to be accurately determined between update periods. Less than 2 percent of all non-procurement activities shall have Original Durations (OD) greater than 20 work days or 30 calendar days. Procurement activities are defined herein.

#### 3.3.2.2 NOT USED

#### 3.3.2.3 Procurement Activities

The schedule must include separate activities associated with the submittal, approval, procurement, fabrication and delivery of long lead materials, equipment, fabricated assemblies and supplies. Long lead procurement activities are those with an anticipated procurement sequence of over 90 calendar days. A typical procurement sequence includes, but is not limited to, the string of activities: submit, approve, procure, fabricate, and deliver.

#### 3.3.2.4 Mandatory Tasks/Milestones

The following tasks must be included and listed as separate line activities. Each shall have a separate milestone for submit and a separate milestone for approval/acceptance. Furthermore, the preparation of submittals are to be separate activities from the review/approval/acceptance activities, with the government review/approval/acceptance having appropriate durations as specified in submittal procedures and properly scheduled:

	DESCRIPTION	Spec Section paragraph	# days to/from relationship
1.	Preliminary Schedule	01 32 01.00 06 -3.4.1	15d from NTP
2.	Initial Schedule (baseline)	01 32 01.00 06 -3.4.2	42d from NTP
3.	Required Permits	52.236-7 / 01 57 19.00 06 -4.2.21	TBD by KTR
	Identify each permit separately	7	
4.	Foundation / Substructure		Relationships/Duration TBD by KTR
	Identify multiple buildings sep	parately	
5.	Building dry-in		
	Identify multiple buildings sep	parately	
6.	Permanent Power		

	DESCRIPTION	Spec Section paragraph	# days to/from relationship
7.	Accident Prevention Plan	01 35 26.00 06 -1.7.b	TBD by KTR
8.	Quality Control Plan	01 45 04.10 06 -3.3	30d from NTP
9.	Design Quality Control Plan		
	Reference spec/paragraph if pro	ject is D/B	
10	Air Barrier Work Plan	07 05 23 -1.4	TBD by KTR
11	Design Review Report (Cx Agent	01 46 00.00 06	
12	Sustainability Action Plan		
13	Commissioning Plan	01 46 00.00 06	
	Develop the schedule logic asso mechanical systems to a level o	ciated with testing and c	ommissioning of ECB 2005-10
14	Commissioning Agent	01 46 00.00 06	
15	Commissioning	01 46 00.00 06	Relationships/Duration TBD by KTR
	Identify start and finish of se	parate systems	
16	Redzone Meeting	00 80 00.00 06 -1.3.5	TBD by KTR
17	Fire Protection (Sprinkler System) Final Acceptance Test	21 13 13 -3.7.2.2	TBD by KTR
18	Fire Detection Fire Alarm System) Final Acceptance Test	28 31 76 -3.6.2.2	TBD by KTR
19	Building Furniture Ready	00 80 00.00 06 -1.3.1.b	TBD by KTR
20	Prefinal Inspection	01 45 04.10 06 -3.9.2	TBD by KTR
21	Final Acceptance Inspection	01 45 04.10 06 -3.9.3	TBD by KTR

	DESCRIPTION	Spec Section paragraph	# days to/from relationship
22	Closeout Documents		
	Separate milestone for Warranty installed equipment lists, etc.	r, training, O&M manuals, )	as-builts, 1354,

#### 3.3.2.5 Government Activities

Show Government and other agency activities that could impact progress. These activities include, but are not limited to: approvals/acceptance, inspections, utility tie-in, Government Furnished Equipment (GFE) and Notice to Proceed (NTP) for phasing requirements. Refer to specificationsection 01 11 00 SUMMARY OF WORK for permitting requirements.

#### 3.3.2.6 Activity Responsibility Coding (RESP)

All activities shall be identified in the project schedule by the party responsible to perform the work. Responsibility includes, but is not limited to, the subcontracting firm, contractor, or government agency performing a given task. Activities coded with a Government Responsibility code include, but are not limited to: Government approvals, Government design reviews, environmental permit approvals by State regulators, Government Furnished Equipment (GFE) and Notice to Proceed (NTP) for phasing requirements. Code all activities not coded with a Government Responsibility Code to the Prime Contractor or Subcontractor responsible to perform the work. Activities shall not have more than one Responsibility Code. Examples of acceptable activity code values are: DOR (for the designer of record); ELEC (for the electrical subcontractor); MECH (for the mechanical subcontractor); and GOVT (for USACE). Unacceptable code values are abbreviations of the names of subcontractors.

#### 3.3.2.7 Activity Work Area Coding (AREA)

Assign Work Area code to activities based upon the work area in which the activity occurs. Define work areas based on resource constraints or space constraints that would preclude a resource, such as a particular trade or craft work crew, from working in more than one work area at a time due to restraints on resources or space. Examples of Work Area Coding include different areas within a floor of a building, different floors within a building, and different buildings within a complex of buildings. Activities shall not have more than one Work Area Code. Not all activities are required to be Work Area coded. A lack of Work Area coding will indicate the activity is not resource or space constrained.

3.3.2.8 Contract Changes/Requests for Equitable Adjustment (REA) Coding (MODF)

Assign an Activity code to any activity or sequence of activities added to the schedule as a result of a Contract Modification, when approved by the Contracting Officer, with a Contract Changes/REA Code. Key all Code values to the Government's modification numbering system. Any activity or sequence of activities added to the schedule as a result of alleged constructive changes made by the Government may be added to a copy of the current schedule, subject to the approval of the Contracting Officer. Assign Activity codes for these activities with a Contract Changes/REA Code. Key the code values to the Contractor's numbering system. Approval to add these activities does not necessarily mean the Government accepts responsibility and, therefore, liability for such activities and any associated impacts to the schedule, but rather the Government recognizes such activities are appropriately added to the schedule for the purposes of maintaining a realistic and meaningful schedule. Such activities shall not be Responsibility Coded to the Government unless approved. An activity shall not have more than one Contract Changes/REA Code.

3.3.2.9 Contract Line Item (CLIN) Coding (BIDI)

Code all activities to the CLIN on the Contract Line Item Schedule to which the activity belongs. An activity shall not contain more than one CLIN Item Code. CLIN Item code all activities, even when an activity is not cost loaded.

3.3.2.10 Phase of Work Coding (PHAS)

Assign Phase of Work Code to all activities based upon the phase of work in which the activity occurs. Code fast track phases proposed by the Contractor to allow filtering and organizing the schedule by fast track construction packages. If the contract specifies construction phasing with separately defined performance periods, identify a Construction Phase Code to allow filtering and organizing the schedule accordingly. Each activity shall be identified with a single project phase and have only one Phase of Work code.

3.3.2.11 Category of Work Coding (CATW)

Assign Category of Work Code to all activities according to the category of work to which best describes the activity. Category of Work Code shall include, but is not limited to: permits, construction submittals, construction submittal approvals, acceptance, procurement, fabrication, delivery, weather sensitive installation, non-weather sensitive installation, start-up, test and turnover. Assign a Category of Work Code to each activity. Each activity shall have only one Category of Work Code.

3.3.2.12 Definable Features of Work Coding (FOW1, FOW2, FOW3)

Assign a Definable Feature of Work Code to appropriate activities based on the definable feature of work to which the activity belongs. Definable Feature of Work is defined in LRL Section 01 45 04.10 06 CONTRACTOR QUALITY CONTROL. An activity shall not have more than one Definable Feature of Work Code. Not all activities are required to be Definable Feature of Work Coded.

#### 3.3.3 Scheduled Project Completion and Activity Calendars

The schedule interval shall extend from NTP date to the required contract completion date. The contract completion activity (End Project) shall finish based on the required contract duration in the accepted contract proposal, as adjusted for any approved contract time extensions. The first scheduled work period shall be the day after NTP is acknowledged by the Contractor. Schedule activities on a calendar to which the activity logically belongs. Activities may be assigned to a 7 day calendar when the contract assigns calendar day durations for the activity such as a Government Acceptance activity. If the Contractor intends to perform physical work less than seven days per week, schedule the associated activities on a calendar with non-work periods identified including weekends and holidays. Assign the Category of Work Code - Weather Sensitive Installation to those activities that are weather sensitive. Original durations must account for anticipated normal adverse weather. The Government will interpret all work periods not identified as non-work periods on each calendar as meaning the Contractor intends to perform work during those periods.

#### 3.3.3.1 Project Start Date

The schedule shall start no earlier than the date on which the NTP was acknowledged. Include as the first activity in the project schedule an activity called "Start Project" or NTP. The "Start Project" activity shall have an "ES" constraint date equal to the date that the NTP was acknowledged, and a zero day duration.

#### 3.3.3.2 Schedule Constraints and Open Ended Logic

Completion of the last activity in the schedule shall be constrained by the contract completion date. Schedule calculations shall result in a negative float when the calculated early finish date of the last activity is later than the contract completion date. The Contractor shall include as the last activity in the project schedule an activity called "End Project". The "End Project" activity shall have an "LF" constraint date equal to the contract completion date for the project, and with a zero day duration or by using the "project must finish by" date in the scheduling software. The schedule shall have no constrained dates other than those specified in the contract. The use of artificial float constraints such as "zero free float" or "zero total float" are typically prohibited. There shall only be 2 open ended activities: Start Project (or NTP) with no predecessor logic and End Project with no successor logic.

#### 3.3.3.3 Early Project Completion

The last activity shall have a late finish constraint equal to the contract required completion date so that the schedule calculation will result in positive float if the project schedule projects a completion date prior to the contract required completion date. In the event the project schedule calculates an early completion date of the last activity prior to the contract have been accelerated and/or those activities that are scheduled in parallel to support the Contractor's "early" completion. The Contractor shall specifically address each of those activities in the narrative report and at every project schedule update period to assist the Contracting Officer in evaluating the Contractor's ability to actually complete prior to the contract period. The Government will not approve an early completion schedule with zero float on the longest path. The Government is under no obligation to accelerate activities for which it is

responsible to support a proposed early contract completion.

#### 3.3.4 Interim Completion Dates

Contractually specified interim completion dates shall be constrained to show negative float if the calculated early finish date of the last activity in that phase is later than the specified interim completion date.

#### 3.3.4.1 Start Phase

The Contractor shall include as the first activity for a project phase an activity called "Start Phase X" where "X" refers to the phase of work and the activity will have a zero day duration.

#### 3.3.4.2 End Phase

The Contractor shall include as the last activity for a project phase an activity called "End Phase X" where "X" refers to the phase of work and the activity will have a zero day duration.

#### 3.3.4.3 Phase "X" Hammock

The Contractor shall include a hammock type activity for each project phase called "Phase X" where "X" refers to the phase of work. The "Phase X" hammock activity shall be logically tied to the earliest and latest activities in the phase.

#### 3.3.5 Default Progress Data Disallowed

Actual Start and Finish dates shall not be automatically updated by default mechanisms that may be included in the scheduling software. Activity Actual Start (AS) and Actual Finish (AF) dates assigned during the updating process shall match those dates provided from Contractor Quality Control Reports. Failure of the Contractor to document the AS and AF dates on the Daily Quality Control report for every in-progress or completed activity, and failure to ensure that the data contained on the Daily Quality Control reports shall result in the disapproval of the Contractor's updated schedule and the inability of the Contracting Officer to evaluate Contractor progress for payment purposes. Updating of the percent complete and the remaining duration of any activity shall be independent functions. Disable program features which calculate one of these parameters from the other.

#### 3.3.6 Out-of-Sequence Progress

Activities that have progressed before all preceding logic has been satisfied (Out-of-Sequence Progress) will be allowed only on a case-by-case basis subject to approval by the Contracting Officer. Propose logic corrections to eliminate all out of sequence progress or justify not changing the sequencing for approval prior to submitting an updated project schedule. Correct out of sequence progress that continues for more than two update cycles by logic revision, as approved by the Contracting Officer.

#### 3.3.7 Negative Lags and Start to Finish Relationships

Lag durations contained in the project schedule shall not have a negative value. Do not use Start to Finish (SF) relationships.

#### 3.3.8 Calculation Mode

Schedule calculations shall retain the logic between predecessors and successors even when the successor activity starts and the predecessor activity has not finished. Software features that in effect sever the tie between predecessor and successor activities when the successor has started and the predecessor logic is not satisfied ("progress override") will not be allowed.

#### 3.3.9 Milestones

The schedule must include milestone activities for each significant project event including but not limited to: see list of items in paragraph 3.3.2.4 above.

Activity ID	Description	BL Start	Previous Start	Current Start	Actual Start
		BL Finish	Previous Finish	Current Finish	Actual Finish
(TBD by KTR) Preliminar					
	Schedule				
(TBD by KTR)	Preliminary Schedule				
(TBD by KTR)	Initial				
	Schedule				
(TBD by KTR)					

#### 3.4 PROJECT SCHEDULE SUBMISSIONS

The Contractor shall provide the submissions as described below. The data CD, reports, and network diagrams required for each submission are contained in paragraph SUBMISSION REQUIREMENTS. When design/build requirements are not within the project scope of work, all design submittals are not applicable

#### 3.4.1 Preliminary Project Schedule Submission

Submit the Preliminary Project Schedule, defining the Contractor's planned operations for the first 90 calendar days for approval within 15 calendar days after the NTP is acknowledged. The approved Preliminary Project Schedule will be used for payment purposes not to exceed 90 calendar days after NTP. Completely cost load the Preliminary Project Schedule to balance the contract award CLINS shown on the Price Schedule. Detail it for the first 90 calendar days. It may be summary in nature for the remaining performance period. It must be early start and late finish constrained and logically tied as previously specified. The Preliminary Project Schedule forms the basis for the Initial Project Schedule specified herein and must include all of the required Plan and Program preparations, submissions and approvals identified in the contract (for

example, Quality Control Plan, Safety Plan, and Environmental Protection Plan) as well as design activities, the planned submissions of all early design packages, permitting activities, design review conference activities and other non-construction activities intended to occur within the first 90 calendar days. Schedule any construction activities planned for the first 90 calendar days after NTP. Constrain planned construction activities by Government acceptance of the associated design package(s) and all other specified Program and Plan approvals. Activity code any activities that are summary in nature after the first 90 calendar days with Responsibility Code (RESP) and Feature of Work code (FOW1, FOW2, FOW3).

#### 3.4.2 Initial Project Schedule Submission

Submit the Initial Project Schedule for approval within 42 calendar days after NTP. The schedule shall demonstrate a reasonable and realistic sequence of activities which represent all work through the entire contract performance period. The Initial Schedule shall be at a reasonable level of detail as determined by the Contracting Officer. The Contractor shall participate in a review and evaluation of the proposed schedule and analysis by the Contracting Officer.

3.4.3 NOT USED

#### 3.4.4 Periodic Schedule Updates

Based on the result of the meeting, specified in PERIODIC SCHEDULE UPDATE MEETINGS, submit periodic schedule updates. These submissions will enable the Contracting Officer to assess Contractor's progress. If the Contractor fails or refuses to furnish the information and project schedule data, which in the judgment of the Contracting Officer or authorized representative is necessary for verifying the Contractor's progress, the Contractor shall be deemed not to have provided an estimate upon which progress payment may be made. Update the schedule to include detailed, lower WBS level construction activities as the design progresses, but not later than the submission of the final, un-reviewed design submission for each separate design package. The Contracting Officer may require submission of detailed schedule activities for any distinct construction that is started prior to submission of a final design submission, if such activity is authorized.

#### 3.4.5 Standard Activity Coding Dictionary

Use the activity coding structure defined in the Standard Data Exchange Format (SDEF) in ER 1-1-11, Appendix A. This exact structure is mandatory, even if some fields are not used. A template SDEF compatible schedule backup file (sdef.prx) is available on the QCS website: www.rmssupport.com. The SDEF format is as follows:

#### Field Activity Code Le

Length Description

1	WRKP	3	Workers per Day
2	RESP	4	Responsible Party (e.g. GC, subcontractor, USACE)
3	AREA	4	Area of Work
4	MODF	6	Modification or REA number
5	BIDI	6	Bid Item (CLIN)
б	PHAS	2	Phase of Work
7	CATW	1	Category of Work

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Field	Activity										
	Code	Length	Desci	ript	tion						
8	FOW1	10	Feature	of	Work	(up	to	10	characters	in	length)
9	FOW2	10	Feature	of	Work	(up	to	20	characters	in	length)
10	FOW3	10	Feature	of	Work	(up	to	30	characters	in	length)

#### 3.5 SUBMISSION REQUIREMENTS

Submit the following items for the Preliminary Schedule, Initial Schedule, and every Periodic Schedule Update throughout the life of the project in addition to the requirements for submission of schedules and reports in paragraphs 1.2 "SUBMITTALS":

#### 3.5.1 Data CD's

Provide two sets of data CD's containing the project schedule in the backup format. Each CD shall also contain all previous update backup files. File medium shall be CD. Label each CD indicating the type of schedule (Preliminary, Initial, Update), full contract number, Data Date and file name. Each schedule file submitted shall have a unique file name as determined by the Contractor and acceptable to the Government.

#### 3.5.2 Narrative Report

A Narrative Report shall be provided with the Preliminary, Initial, and each Periodic Update of the project schedule, as the basis of the progress payment request. The Narrative Report shall include: a description of activities along the 2 most critical paths where the total float is less than or equal to 20 work days, a description of current and anticipated problem areas or delaying factors and their impact, and an explanation of corrective actions taken or required to be taken. The narrative report is expected to communicate to the Government, the Contractor's thorough analysis of the schedule output and its plans to compensate for any problems, either current or potential, which are revealed through that analysis. Identify and explain why any activities that, based their calculated late dates, should have either started or finished during the update period but did not.

#### 3.5.3 Approved Changes Verification

Only those project schedule changes that have been previously approved by the Contracting Officer shall be included in the schedule submission. The Narrative Report shall specifically reference, on an activity by activity basis, all changes made since the previous period and relate each change to documented, approved schedule changes.

#### 3.5.4 Schedule Reports

The format, filtering, organizing and sorting for each schedule report shall be as directed by the Contracting Officer. Typically reports shall contain: Activity Numbers, Activity Description, Original Duration, Actual Duration, Remaining Duration, Early Start Date, Early Finish Date, Late Start Date, Late Finish Date, Total Float, Actual Start Date, Actual Finish Date, and Percent Complete. The following lists typical reports that will be requested. One or all of these reports may be requested for each schedule submission.

3.5.4.1 Activity Report

A list of all activities sorted according to activity number.

#### 3.5.4.2 Logic Report

A list of detailed predecessor and successor activities for every activity in ascending order by activity number.

### 3.5.4.3 Total Float Report

A list of all incomplete activities sorted in ascending order of total float. Activities which have the same amount of total float shall be listed in ascending order of Early Start Dates. Completed activities shall not be shown on this report.

3.5.4.4 Earnings Report by CLIN

A compilation of the Contractor's Total Earnings on the project from the NTP to the data date. This report shall reflect the earnings of specific activities based on the agreements made in the schedule update meeting defined herein. Provided that the Contractor has furnished a complete schedule update, this report shall serve as the basis of determining progress payments. Group activities by CLIN item number and sort by activity number. This report shall: sum all activities coded to a particular CLIN and provide a CLIN item percent earned value; and complete and sum CLIN items to provide a total project percent complete. The printed report shall contain, for each activity: the Activity Number, Activity Description, Original Budgeted Amount, Total Quantity, Quantity to Date, Percent Complete (based on cost), and Earnings to Date.

#### 3.5.4.5 Milestone Report

A matrix with column headings: Activity ID; Description; Baseline Start/Finish; Previous Month Start/Finish; Current Month Start/Finish; Actual Start/Finish. At a minimum, each row in the matrix shall include milestones listed in paragraph 3.3.2.4.

Activity ID	Description	BL Start	Previous Start	Current Start	Actual Start
		BL Finish	Previous Finish	Current Finish	Actual Finish
TBD by KTR	Preliminary Schedule				
TBD by KTR	Initial Schedule				
TBD by KTR	Permit				
	Foundation/ Substructure				

Activity ID	Description	BL Start	Previous Start	Current Start	Actual Start
		BL Finish	Previous Finish	Current Finish	Actual Finish
	Building Dry-in				
	Permanent Power				
	Accident				
	Prevention Plan				
	Quality				
	Control Plan				
	Design Quality Control Plan				
	Air Barrier Work Plan				
	Design Review Report (Cx				
	Agene /				

#### 3.5.5 Network Diagram

The network diagram is required for the Preliminary, Initial and Periodic Updates. The network diagram shall depict and display the order and interdependence of activities and the sequence in which the work is to be

accomplished. The Contracting Officer will use, but is not limited to, the following conditions to review compliance with this paragraph:

#### 3.5.5.1 Continuous Flow

Diagrams shall show a continuous flow from left to right with no arrows from right to left. The activity number, description, duration, and estimated earned value shall be shown on the diagram.

#### 3.5.5.2 Project Milestone Dates

Dates shall be shown on the diagram for start of project, any contract required interim completion dates, and contract completion dates.

#### 3.5.5.3 Critical Path

The critical path shall be clearly shown.

#### 3.5.5.4 Banding

Organize activities as directed to assist in the understanding of the activity sequence. Typically, this flow will group activities by category of work, work area and/or responsibility.

#### 3.5.5.5 S-Curves

Earnings curves showing projected early and late earnings and earnings to date.

#### 3.6 PERIODIC SCHEDULE UPDATE MEETINGS

Conduct periodic schedule update meetings for the purposes of reviewing the Contractor's proposed out of sequence corrections, determining causes for delay, correcting logic, maintaining schedule accuracy and determining earned value. Meetings shall occur at least monthly within five days of the proposed schedule data date and after the Contractor has updated the schedule with Government concurrence respecting actual start dates, actual finish dates, remaining durations and percent complete for each activity it intend to status. Provide a computer with the scheduling software loaded and a projector during the meeting which allows all meeting participants to view the proposed schedule update during the meeting. The meeting and resultant approvable schedule update shall be a condition precedent to a formal submission of the update as described in SUBMISSION REQUIREMENTS and to the submission of an invoice for payment. The meeting will be a working interactive exchange which will allow the Government and the Contractor the opportunity to review the updated schedule on a real time and interactive basis. The Contractor's authorized scheduling representative will organize, sort, filter and schedule the update as requested by the Government. The meeting will last no longer than 8 hours. A rough draft of the proposed activity logic corrections and narrative report shall be provided to the Government 48 hours in advance of the meeting. The Contractor's Project Manager and Authorized Scheduler shall attend the meeting with the Authorized Representative of the Contracting Officer.

#### 3.6.1 Update Submission Following Progress Meeting

Submit a complete update of the project schedule containing all approved progress, revisions, and adjustments, pursuant to paragraph SUBMISSION

REQUIREMENTS not later than 4 working days after the periodic schedule update meeting, reflecting only those changes made during the previous update meeting.

#### 3.6.2 Status of Activities

Update information, including Actual Start Dates (AS), Actual Finish Dates (AF), Remaining Durations (RD), and Percent Complete shall be subject to the approval of the Government prior to the meeting. As a minimum, address the following items on an activity by activity basis during each progress meeting.

#### 3.6.2.1 Start and Finish Dates

Accurately show the status of the AS and/or AF dates for each activity currently in-progress or completed since the last update. The Government may allow an AF date to be assigned with the percent complete less than 100% to account for the value of work remaining but not restraining successor activities. Only assign AS dates when actual progress occurs on an activity.

#### 3.6.2.2 Remaining Duration

Update the estimated RD for all incomplete activities independent of Percent Complete. Remaining Durations may exceed the activity OD or may exceed the activity's prior update RD if the Government considers the current OD or RD to be understated based on current progress, insufficient work crews actually manning the job, unrealistic OD or deficiencies that must be corrected that restrain successor activities.

#### 3.6.2.3 Percent Complete

Update the percent complete for each activity started, based on the realistic assessment of earned value. Activities which are complete but for remaining minor punch list work and which do not restrain the initiation of successor activities may be declared 100 percent complete. To allow for proper schedule management, cost load the correction of punch list from Government pre-final inspection activity(ies) not less than 1 percent of the total contract value, which activity(ies) may be declared 100 percent complete upon completion and correction of all punch list work identified during Government pre-final inspection(s).

#### 3.6.2.4 Logic Changes

Specifically identify and discuss all logic changes pertaining to NTP on change orders, change orders to be incorporated into the schedule, Contractor proposed changes in work sequence, corrections to schedule logic for out-of-sequence progress, and other changes that have been made pursuant to contract provisions. The Government will only approve logic revisions for the purpose of keeping the schedule valid in terms of its usefulness in calculating a realistic completion date, correcting erroneous logic ties, and accurately sequencing the work.

#### 3.6.2.5 Other Changes

Other changes required due to delays in completion of any activity or group of activities include: 1) delays beyond the Contractor's control, such as strikes and unusual weather. 2) delays encountered due to submittals, Government Activities, deliveries or work stoppages which make

re-planning the work necessary. 3) Changes required to correct a schedule that does not represent the actual or planned prosecution and progress of the work.

#### 3.7 REQUESTS FOR TIME EXTENSIONS

In the event the Contractor believes it is entitled to an extension of the contract performance period, completion date, or any interim milestone date, furnish the following for a determination by the Contracting Officer: justification, project schedule data, and supporting evidence as the Contracting Officer may deem necessary. Submission of proof of excusable delay, based on revised activity logic, duration, and costs (updated to the specific date that the delay occurred) is a condition precedent to any approvals by the Government. In response to each Request For Proposal issued by the Government, the Contractor shall submit a schedule impact analysis demonstrating whether or not the change contemplated by the Government impacts the critical path.

#### 3.7.1 Justification of Delay

The project schedule shall clearly display that the Contractor has used, in full, all the float time available for the work involved with this request. The Contracting Officer's determination as to the number of allowable days of contract extension shall be based upon the project schedule updates in effect for the time period in question, and other factual information. Actual delays that are found to be caused by the Contractor's own actions, which result in a calculated schedule delay, will not be a cause for an extension to the performance period, completion date, or any interim milestone date.

#### 3.7.2 Submission Requirements

Submit a justification for each request for a change in the contract completion date of less than 2 weeks based upon the most recent schedule update at the time of the NTP or constructive direction issued for the change. Such a request shall be in accordance with the requirements of other appropriate Contract Clauses and shall include, as a minimum:

a. A list of affected activities, with their associated project schedule activity number.

- b. A brief explanation of the causes of the change.
- c. An analysis of the overall impact of the changes proposed.
- d. A sub-network of the affected area.

Identify activities impacted in each justification for change by a unique activity code contained in the required data file.

#### 3.7.3 Additional Submission Requirements

The Contracting Officer may request an interim update with revised activities for any requested time extension of over 2 weeks. Provide this disk within 4 days of the Contracting Officer's request.

#### 3.8 DIRECTED CHANGES

If the NTP is issued for changes prior to settlement of price and/or time,
submit proposed schedule revisions to the Contracting Officer within 2 weeks of the NTP being issued. The Contracting Officer will approve proposed revisions to the schedule prior to inclusion of those changes within the project schedule. If the Contractor fails to submit the proposed revisions, the Contracting Officer may furnish the Contractor with suggested revisions to the project schedule. The Contractor shall include these revisions in the project schedule until revisions are submitted, and final changes and impacts have been negotiated. If the Contractor has any objections to the revisions furnished by the Contracting Officer, advise the Contracting Officer within 2 weeks of receipt of the revisions. Regardless of the objections, the Contractor shall continue to update the schedule with the Contracting Officer's revisions until a mutual agreement in the revisions is reached. If the Contractor fails to submit alternative revisions within 2 weeks of receipt of the Contracting Officer's proposed revisions, the Contractor will be deemed to have concurred with the Contracting Officer's proposed revisions. The proposed revisions will then be the basis for an equitable adjustment for performance of the work.

## 3.9 WEEKLY PROGRESS MEETINGS

a. The Government and the Contractor shall meet weekly (or as otherwise mutually agreed to) between the meetings described in paragraph PERIODIC SCHEDULE UPDATE MEETINGS for the purpose of jointly reviewing the actual progress of the project as compared to the as planned progress and to review planned activities for the upcoming three weeks. The then current and approved schedule update shall be used for the purposes of this meeting and for the production and review of reports. The Contractor's Project Manager and the Authorized Representative of the Contracting Officer shall attend. The Contractor shall provide the planned activities for the next three weeks based on a Primavera filter of the current approved schedule. Any activity that has not started or finished as planned shall be listed as a QC deficiency in RMS. The Contractor's Project Manager and the Authorized Representative of the Contracting Officer shall attend. The weekly progress meeting will address the status of RFI's, RFP's and Submittals. At the weekly progress meeting, address the status of approved schedule progress, RFIs, RFPs and Submittals. Prior to beginning work on specific work elements of a Project, the Contractor shall confer with the COR and agree on a sequence of procedures and means of access to premises and buildings; space for storage of materials and equipment; delivery of materials; and use of approaches, use of corridors, stairways, and similar means of passage. Contractor shall provide minutes for the Weekly Progress Meeting, minutes to be attached with the QC Daily Report.

b. Provide a bar chart produced by the scheduling software, organized by Total Float and Sorted by Early Start Date, and a three week "look-ahead" schedule by filtering all schedule activities to show only current ongoing activities and activities scheduled to start during the upcoming two weeks, organized by Work Area Code (AREA) and sorted by Early Start Date.

c. The Government and the Contractor shall jointly review the reports. If it appears that activities on the longest path(s) which are currently driving the calculated completion date (driving activities), are not progressing satisfactorily and therefore could jeopardize timely project completion, corrective action must be taken immediately. Corrective action includes but is not limited to:

> increasing the number of work crews; increasing the number of work shifts; increasing the number of hours worked per shift; and determining if Government responsibility coded activities require Government corrective action.

## 3.10 OWNERSHIP OF FLOAT

Float available in the schedule, at any time, shall not be considered for the exclusive use of either the Government or the Contractor.

# 3.11 TRANSFER OF SCHEDULE DATA INTO RMS/QCS

The Contractor shall download and upload the schedule data into the Resident Management System (RMS) prior to RMS databases being transferred to the Government and is considered to be additional supporting data in a form and detail required by the Contracting Officer pursuant to FAR 52.232-5 - Payments under Fixed-Price Construction Contracts. The receipt of a proper payment request pursuant to FAR 52.232-27 - Prompt Payment for Construction Contracts is contingent upon the Government receiving both acceptable and approvable hard copies and electronic export from QCS of the application for progress payment.

-- End of Section --

SECTION 01 33 00

SUBMITTAL PROCEDURES 08/18, CHG 4: 02/21

#### PART 1 GENERAL

#### 1.1 SUMMARY

1.1.1 Submittal Information

The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections. Each submittal is to be complete and in sufficient detail to allow ready determination of compliance with contract requirements.

Units of weights and measures used on all submittals are to be the same as those used in the contract drawings.

#### 1.1.2 Project Type

The Contractor's Quality Control (CQC) System Manager are to check and approve all items before submittal and stamp, sign, and date indicating action taken. Proposed deviations from the contract requirements are to be clearly identified. Include within submittals items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals.

### 1.1.3 Submission of Submittals

Schedule and provide submittals requiring Government approval before acquiring the material or equipment covered thereby. Pick up and dispose of samples not incorporated into the work in accordance with manufacturer's Safety Data Sheets (SDS) and in compliance with existing laws and regulations.

- 1.2 DEFINITIONS
- 1.2.1 Submittal Descriptions (SD)

Submittal requirements are specified in the technical sections. Examples and descriptions of submittals identified by the Submittal Description (SD) numbers and titles follow:

SD-01 Preconstruction Submittals

Submittals that are required prior to or commencing with the start of work on site. Submittals that are required prior to or at the start of construction (work) or the next major phase of the construction on a multiphase contract.

For Government approved division 01 preconstruction submittals that are required prior to or commencing with the start of work shall be submitted within 30 calendar days of contract award unless specified elsewhere in

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the specifications. For contractor approved division 01 submittals that are required prior to or commencing with the start of work shall be submitted within 45 calendar days of contract award unless specified elsewhere in the specifications.

Preconstruction Submittals include schedules and a tabular list of locations, features, and other pertinent information regarding products, materials, equipment, or components to be used in the work.

Certificates Of Insurance

Surety Bonds

List Of Proposed Subcontractors

List Of Proposed Products

Baseline Network Analysis Schedule (NAS)

Submittal Register

Schedule Of Prices Or Earned Value Report

Accident Prevention Plan Health And Safety Plan

Spill Prevention Plan

Waste Management Plan

SWPP

Fueling Plan

Work Plan

Quality Control (QC) plan

Environmental Protection Plan

SD-02 Shop Drawings

Drawings, diagrams and schedules specifically prepared to illustrate some portion of the work.

Diagrams and instructions from a manufacturer or fabricator for use in producing the product and as aids to the Contractor for integrating the product or system into the project.

Drawings prepared by or for the Contractor to show how multiple systems and interdisciplinary work will be coordinated.

SD-03 Product Data

Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures illustrating size, physical appearance and other characteristics of materials, systems or equipment for some portion of the work.

Samples of warranty language when the contract requires extended

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product warranties.

SD-04 Samples

Fabricated or unfabricated physical examples of materials, equipment or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged.

Color samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the project.

Field samples and mock-ups constructed on the project site establish standards ensuring work can be judged. Includes assemblies or portions of assemblies that are to be incorporated into the project and those that will be removed at conclusion of the work.

#### SD-05 Design Data

Design calculations, mix designs, analyses or other data pertaining to a part of work.

#### SD-06 Test Reports

Report signed by authorized official of testing laboratory that a material, product or system identical to the material, product or system to be provided has been tested in accord with specified requirements. Unless specified in another section, testing must have been within three years of date of contract award for the project.

Report that includes findings of a test required to be performed on an actual portion of the work or prototype prepared for the project before shipment to job site.

Report that includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.

Investigation reports

Daily logs and checklists

Final acceptance test and operational test procedure

#### SD-07 Certificates

Statements printed on the manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that the product, system, or material meets specification requirements. Must be dated after award of project contract and clearly name the project.

Document required of Contractor, or of a manufacturer, supplier, installer or Subcontractor through Contractor. The document purpose is to further promote the orderly progression of a portion of the work by documenting procedures, acceptability of methods, or personnel qualifications.

Confined space entry permits

Text of posted operating instructions

SD-08 Manufacturer's Instructions

Preprinted material describing installation of a product, system or material, including special notices and (SDS)concerning impedances, hazards and safety precautions.

SD-09 Manufacturer's Field Reports

Documentation of the testing and verification actions taken by manufacturer's representative at the job site, in the vicinity of the job site, or on a sample taken from the job site, on a portion of the work, during or after installation, to confirm compliance with manufacturer's standards or instructions. The documentation must be signed by an authorized official of a testing laboratory or agency and state the test results; and indicate whether the material, product, or system has passed or failed the test.

Factory test reports.

SD-10 Operation and Maintenance Data

Data provided by the manufacturer, or the system provider, including manufacturer's help and product line documentation, necessary to maintain and install equipment, for operating and maintenance use by facility personnel.

Data required by operating and maintenance personnel for the safe and efficient operation, maintenance and repair of the item.

Data incorporated in an operations and maintenance manual or control system.

SD-11 Closeout Submittals

Documentation to record compliance with technical or administrative requirements or to establish an administrative mechanism.

Submittals required for Guiding Principle Validation (GPV) or Third Party Certification (TPC).

Special requirements necessary to properly close out a construction contract. For example, Record Drawings and as-built drawings. Also, submittal requirements necessary to properly close out a major phase of construction on a multi-phase contract.

## 1.2.2 Approving Authority

Office or designated person authorized to approve the submittal.

1.2.3 Work

As used in this section, on-site and off-site construction required by contract documents, including labor necessary to produce submittals, construction, materials, products, equipment, and systems incorporated or to be incorporated in such construction. In exception, excludes work to

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produce SD-01 submittals.

#### 1.3 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Submittal Register; G

### 1.4 SUBMITTAL CLASSIFICATION

1.4.1 Government Approved (G)

Government approval is required for extensions of design, critical materials, variations, equipment whose compatibility with the entire system must be checked, and other items as designated by the Government.

Government approval is required for any variations from the Solicitation or the Accepted Proposal and for other items as designated by the Government.

Within the terms of the Contract Clause SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION, submittals are considered to be "shop drawings."

## 1.4.2 NOT USED

1.4.3 For Information Only

Submittals not requiring Government approval will be for information only. Within the terms of the Contract Clause SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION, they are not considered to be "shop drawings."

1.4.4 Sustainability Reporting Submittals (S)

Submittals for Guiding Principle Validation (GPV) or Third Party Certification (TPC) are indicated with an "S" designation. These submittals are for information only and for use as specified in Section 01 33 29.00 06 SUSTAINABILITY REPORTING.

Schedule submittals for these items throughout the course of construction as provided; do not wait until closeout.

- 1.5 NOT USED
- 1.6 PREPARATION
- 1.6.1 Transmittal Form

Transmit each submittal, except sample installations and sample panels to the office of the approving authority using the transmittal form prescribed by the Contracting Officer. Include all information prescribed by the transmittal form and required in paragraph IDENTIFYING SUBMITTALS. Use the submittal transmittal forms to record actions regarding samples.

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Use the ENG Form 4025-R transmittal form for submitting both Government-approved and information-only submittals. Submit in accordance with the instructions on the reverse side of the form. These forms are included in the RMS CM software that the Contractor is required to use for this contract. Properly complete this form by filling out all the heading blank spaces and identifying each item submitted. Exercise special care to ensure proper listing of the specification paragraph and sheet number of the contract drawings pertinent to the data submitted for each item.

#### 1.6.2 Identifying Submittals

The Contractor's Quality Control Manager must prepare, review and stamp submittals, including those provided by a subcontractor, before submittal to the Government.

Identify submittals, except sample installations and sample panels, with the following information permanently adhered to or noted on each separate component of each submittal and noted on transmittal form. Mark each copy of each submittal identically, with the following:

- a. Project title and location
- b. Construction contract number
- c. Dates of the drawings and revisions
- d. Name, address, and telephone number of Subcontractor, supplier, manufacturer, and any other Subcontractor associated with the submittal.
- e. Section number of the specification by which submittal is required
- f. Submittal description (SD) number of each component of submittal
- g. For a resubmission, add alphabetic suffix on submittal description, for example, submittal 18 would become 18A, to indicate resubmission
- h. Product identification and location in project.
- 1.6.3 Submittal Format
- 1.6.3.1 Format of SD-01 Preconstruction Submittals

When the submittal includes a document that is to be used in the project, or is to become part of the project record, other than as a submittal, do not apply the Contractor's approval stamp to the document itself, but to a separate sheet accompanying the document.

Provide data in the unit of measure used in the contract documents.

1.6.3.2 Format for SD-02 Shop Drawings

Provide shop drawings not less than 8 1/2 by 11 inches nor more than 30 by 42 inches, except for full-size patterns or templates. Prepare drawings to accurate size, with scale indicated, unless another form is required. Ensure drawings are suitable for reproduction and of a quality to produce clear, distinct lines and letters, with dark lines on a white background.

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- a. Include the nameplate data, size, and capacity on drawings. Also include applicable federal, military, industry, and technical society publication references.
- b. Dimension drawings, except diagrams and schematic drawings. Prepare drawings demonstrating interface with other trades to scale. Use the same unit of measure for shop drawings as indicated on the contract drawings. Identify materials and products for work shown.

Present shop drawings sized 8 1/2 by 11 inches as part of the bound volume for submittals. Present larger drawings in sets. Submit an electronic copy of drawings in PDF format.

#### 1.6.3.2.1 Drawing Identification

Include on each drawing the drawing title, number, date, and revision numbers and dates, in addition to information required in paragraph IDENTIFYING SUBMITTALS.

Number drawings in a logical sequence. Each drawing is to bear the number of the submittal in a uniform location next to the title block. Place the Government contract number in the margin, immediately below the title block, for each drawing.

Reserve a blank space, no smaller than 2 by 3 inches on the right-hand side of each sheet for the Government disposition stamp.

1.6.3.3 Format of SD-03 Product Data

Present product data submittals for each section as a complete, bound volume. Include a table of contents, listing the page and catalog item numbers for product data.

Indicate, by prominent notation, each product that is being submitted; indicate the specification section number and paragraph number to which it pertains.

# 1.6.3.3.1 Product Information

Supplement product data with material prepared for the project to satisfy the submittal requirements where product data does not exist. Identify this material as developed specifically for the project, with information and format as required for submission of SD-07 Certificates.

Provide product data in units used in the Contract documents. Where product data are included in preprinted catalogs with another unit, submit the dimensions in contract document units, on a separate sheet.

# 1.6.3.3.2 Standards

Where equipment or materials are specified to conform to industry or technical-society reference standards of such organizations as the American National Standards Institute (ANSI), ASTM International (ASTM), National Electrical Manufacturer's Association (NEMA), Underwriters Laboratories (UL), or Association of Edison Illuminating Companies (AEIC), submit proof of such compliance. The label or listing by the specified organization will be acceptable evidence of compliance. In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing, and approved by the

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Contracting Officer. State on the certificate that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.

# 1.6.3.3.3 Data Submission

Collect required data submittals for each specific material, product, unit of work, or system into a single submittal that is marked for choices, options, and portions applicable to the submittal. Mark each copy of the product data identically. Partial submittals will not be accepted for expedition of the construction effort.

Submit the manufacturer's instructions before installation.

#### 1.6.3.4 Format of SD-04 Samples

1.6.3.4.1 Sample Characteristics

Furnish samples in the following sizes, unless otherwise specified or unless the manufacturer has prepackaged samples of approximately the same size as specified:

- a. Sample of Equipment or Device: Full size.
- b. Sample of Materials Less Than 2 by 3 inches: Built up to 8 1/2 by 11 inches.
- c. Sample of Materials Exceeding 8 1/2 by 11 inches: Cut down to 8 1/2 by 11 inches and adequate to indicate color, texture, and material variations.
- d. Sample of Linear Devices or Materials: 10 inch length or length to be supplied, if less than 10 inches. Examples of linear devices or materials are conduit and handrails.
- e. Sample Volume of Nonsolid Materials: Pint. Examples of nonsolid materials are sand and paint.
- f. Color Selection Samples: 2 by 4 inches. Where samples are specified for selection of color, finish, pattern, or texture, submit the full set of available choices for the material or product specified. Sizes and quantities of samples are to represent their respective standard unit.
- g. Sample Panel: 4 by 4 feet.
- h. Sample Installation: 100 square feet.

## 1.6.3.4.2 Sample Incorporation

Reusable Samples: Incorporate returned samples into work only if so specified or indicated. Incorporated samples are to be in undamaged condition at the time of use.

Recording of Sample Installation: Note and preserve the notation of any area constituting a sample installation, but remove the notation at the final clean-up of the project.

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1.6.3.4.3 Comparison Sample

Samples Showing Range of Variation: Where variations in color, finish, pattern, or texture are unavoidable due to nature of the materials, submit sets of samples of not less than three units showing extremes and middle of range. Mark each unit to describe its relation to the range of the variation.

1.6.3.5 Format of SD-05 Design Data

Provide design data and certificates on 8 1/2 by 11 inch paper. Provide a bound volume for submittals containing numerous pages.

1.6.3.6 Format of SD-06 Test Reports

Provide reports on 8 1/2 by 11 inch paper in a complete bound volume.

By prominent notation, indicate each report in the submittal. Indicate the specification number and paragraph number to which each report pertains.

1.6.3.7 Format of SD-07 Certificates

Provide design data and certificates on 8 1/2 by 11 inch paper. Provide a bound volume for submittals containing numerous pages.

1.6.3.8 Format of SD-08 Manufacturer's Instructions

Present manufacturer's instructions submittals for each section as a complete, bound volume. Include the manufacturer's name, trade name, place of manufacture, and catalog model or number on product data. Also include applicable federal, military, industry, and technical-society publication references. If supplemental information is needed to clarify the manufacturer's data, submit it as specified for SD-07 Certificates.

Submit the manufacturer's instructions before installation.

## 1.6.3.8.1 Standards

Where equipment or materials are specified to conform to industry or technical-society reference standards of such organizations as the American National Standards Institute (ANSI), ASTM International (ASTM), National Electrical Manufacturer's Association (NEMA), Underwriters Laboratories (UL), or Association of Edison Illuminating Companies (AEIC), submit proof of such compliance. The label or listing by the specified organization will be acceptable evidence of compliance. In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing, and approved by the Contracting Officer. State on the certificate that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.

#### 1.6.3.9 Format of SD-09 Manufacturer's Field Reports

Provide reports on 8 1/2 by 11 inch paper in a complete bound volume.

By prominent notation, indicate each report in the submittal. Indicate the specification number and paragraph number to which each report

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pertains.

1.6.3.10 Format of SD-10 Operation and Maintenance Data (O&M)

Comply with the requirements specified in Section 01 78 23 OPERATION AND MAINTENANCE DATA for O&M Data format.

1.6.3.11 Format of SD-11 Closeout Submittals

When the submittal includes a document that is to be used in the project or is to become part of the project record, other than as a submittal, do not apply the Contractor's approval stamp to the document itself, but to a separate sheet accompanying the document.

Provide data in the unit of measure used in the contract documents.

- 1.6.4 Source Drawings for Shop Drawings
- 1.6.4.1 Source Drawings

The entire set of source drawing files (DWG) will not be provided to the Contractor. Request the specific Drawing Number for the preparation of shop drawings. Only those drawings requested to prepare shop drawings will be provided. These drawings are provided only after award.

# 1.6.4.2 Terms and Conditions

Data contained on these electronic files must not be used for any purpose other than as a convenience in the preparation of construction data for the referenced project. Any other use or reuse is at the sole risk of the Contractor and without liability or legal exposure to the Government. The Contractor must make no claim, and waives to the fullest extent permitted by law any claim or cause of action of any nature against the Government, its agents, or its subconsultants that may arise out of or in connection with the use of these electronic files. The Contractor must, to the fullest extent permitted by law, indemnify and hold the Government harmless against all damages, liabilities, or costs, including reasonable attorney's fees and defense costs, arising out of or resulting from the use of these electronic files.

These electronic source drawing files are not construction documents. Differences may exist between the source drawing files and the corresponding construction documents. The Government makes no representation regarding the accuracy or completeness of the electronic source drawing files, nor does it make representation to the compatibility of these files with the Contractor hardware or software. The Contractor is responsible for determining if any conflict exists. In the event that a conflict arises between the signed and sealed construction documents prepared by the Government and the furnished source drawing files, the signed and sealed construction documents govern. Use of these source drawing files does not relieve the Contractor of the duty to fully comply with the contract documents, including and without limitation the need to check, confirm and coordinate the work of all contractors for the project. If the Contractor uses, duplicates or modifies these electronic source drawing files for use in producing construction data related to this contract, remove all previous indication of ownership (seals, logos, signatures, initials and dates).

# 1.6.5 Electronic File Format

Provide submittals in electronic format, with the exception of material samples required for SD-04 Samples items. In addition to the electronic submittal, provide three hard copies of the submittals. Compile the submittal file as a single, complete document, to include the Transmittal Form described within. Name the electronic submittal file specifically according to its contents, and coordinate the file naming convention with the Contracting Officer. Electronic files must be of sufficient quality that all information is legible. Use PDF as the electronic format, unless otherwise specified or directed by the Contracting Officer. Generate PDF files from original documents with bookmarks so that the text included in the PDF file is searchable and can be copied. If documents are scanned, optical character resolution (OCR) routines are required. Index and bookmark files exceeding 30 pages to allow efficient navigation of the file. When required, the electronic file must include a valid electronic signature or a scan of a signature.

E-mail electronic submittal documents smaller than 10MB to an e-mail address as directed by the Contracting Officer. Provide electronic documents over 10 MB on an optical disc or through an electronic file sharing system such as the AMRDEC SAFE Web Application located at the following website: https://safe.amrdec.army.mil/safe/.

- 1.7 QUANTITY OF SUBMITTALS
- 1.7.1 Number of SD-01 Preconstruction Submittal Copies

Unless otherwise specified, submit three sets of administrative submittals.

1.7.2 Number of SD-02 Shop Drawing Copies

Submit six copies of submittals of shop drawings requiring review and approval by a QC organization. Submit seven copies of shop drawings requiring review and approval by the Contracting Officer.

1.7.3 Number of SD-03 Product Data Copies

Submit in compliance with quantity requirements specified for shop drawings.

1.7.4 Number of SD-04 Samples

- a. Submit two samples, or two sets of samples showing the range of variation, of each required item. One approved sample or set of samples will be retained by the approving authority and one will be returned to the Contractor.
- b. Submit one sample panel or provide one sample installation where directed. Include components listed in the technical section or as directed.
- c. Submit one sample installation, where directed.
- d. Submit one sample of nonsolid materials.
- 1.7.5 Number of SD-05 Design Data Copies

Submit in compliance with quantity requirements specified for shop

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drawings.

1.7.6 Number of SD-06 Test Report Copies

Submit in compliance with quantity and quality requirements specified for shop drawings, other than field test results that will be submitted with QC reports.

1.7.7 Number of SD-07 Certificate Copies

Submit in compliance with quantity requirements specified for shop drawings.

1.7.8 Number of SD-08 Manufacturer's Instructions Copies

Submit in compliance with quantity requirements specified for shop drawings.

1.7.9 Number of SD-09 Manufacturer's Field Report Copies

Submit in compliance with quantity and quality requirements specified for shop drawings other than field test results that will be submitted with QC reports.

1.7.10 Number of SD-10 Operation and Maintenance Data Copies

Submit three copies of O&M data to the Contracting Officer for review and approval.

1.7.11 Number of SD-11 Closeout Submittals Copies

Unless otherwise specified, submit three sets of administrative submittals.

1.8 INFORMATION ONLY SUBMITTALS

Submittals without a "G" designation must be certified by the QC manager and submitted to the Contracting Officer for information-only. Approval of the Contracting Officer is not required on information only submittals. The Contracting Officer will mark "receipt acknowledged" on submittals for information and will return only the transmittal cover sheet to the Contractor. Normally, submittals for information only will not be returned. However, the Government reserves the right to return unsatisfactory submittals and require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe.

#### 1.9 PROJECT SUBMITTAL REGISTER AND DATABASE

A sample Project Submittal Register showing items of equipment and materials for when submittals are required by the specifications is provided as "Appendix A - Submittal Register."

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#### 1.9.1 Submittal Management

Prepare and maintain a submittal register, as the work progresses. Use an electronic submittal register program furnished by the Government. Do not change data that is output in columns (c), (d), (e), and (f) as delivered by Government; retain data that is output in columns (a), (g), (h), and (i) as approved. As an attachment, provide a submittal register showing items of equipment and materials for which submittals are required by the specifications. This list may not be all-inclusive and additional submittals may be required. Maintain a submittal register for the project in accordance with Section 01 45 00.15 10 RESIDENT MANAGEMENT SYSTEM CONTRACTOR MODE(RMS CM). The Government will provide the initial submittal register with the following fields completed, to the extent that will be required by the Government during subsequent usage.

Column (c): Lists specification section in which submittal is required.

Column (d): Lists each submittal description (SD Number. and type, e.g., SD-02 Shop Drawings) required in each specification section.

Column (e): Lists one principal paragraph in each specification section where a material or product is specified. This listing is only to facilitate locating submitted requirements. Do not consider entries in column (e) as limiting the project requirements.

Column (f): Lists the approving authority for each submittal.

Thereafter, the Contractor is to track all submittals by maintaining a complete list, including completion of all data columns and all dates on which submittals are received by and returned by the Government.

## 1.9.2 NOT USED

1.9.3 Preconstruction Use of Submittal Register

Submit the submittal register as an electronic database, using the submittal management program furnished to Contractor. Include the QC plan and the project schedule. Verify that all submittals required for the project are listed and add missing submittals. Coordinate and complete the following fields on the register database submitted with the QC plan and the project schedule:

Column (a) Activity Number: Activity number from the project schedule.

Column (g) Contractor Submit Date: Scheduled date for the approving authority to receive submittals.

Column (h) Contractor Approval Date: Date that Contractor needs approval of submittal.

Column (i) Contractor Material: Date that Contractor needs material delivered to Contractor control.

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#### 1.9.4 Contractor Use of Submittal Register

Update the following fields in the Government-furnished submittal register program or equivalent fields in the program used by the Contractor with each submittal throughout the contract.

Column (b) Transmittal Number: List of consecutive, Contractor-assigned numbers.

Column (j) Action Code (k): Date of action used to record Contractor's review when forwarding submittals to QC.

Column (1) Date submittal transmitted.

Column (q) Date approval was received.

1.9.5 Approving Authority Use of Submittal Register

Update the following fields:

Column (b) Transmittal Number: List of consecutive, Contractor-assigned numbers.

Column (1) Date submittal was received.

Column (m) through (p) Dates of review actions.

Column (q) Date of return to Contractor.

#### 1.9.6 Action Codes

Entries for columns (j) and (o) are to be used as follows (others may be prescribed by the Transmittal Form):

#### 1.9.6.1 Government Review Action Codes

"A" - "Approved as submitted"; "Completed"

"B" - "Approved, except as noted on drawings"; "Completed"

"C" - "Approved, except as noted on drawings; resubmission required"; "Resubmit"

"D" - "Returned by separate correspondence"; "Completed"

"E" - "Disapproved (See attached)"; "Resubmit"

"F" - "Receipt acknowledged"; "Completed"

"G" - "Other (Specify)"; "Resubmit"

"X" - "Receipt acknowledged, does not comply with contract requirements"; "Resubmit"

# 1.9.6.2 Contractor Action Codes

DESIGN BID BUILD SUBMITTALS						
Submittal Classifications shown in UFGS Sections	Submittal Classification	Corresponding SpecsIntact Submittal Register Code which is populated in the SI Submittal Register. Software Limitations: (The software shows one character delineation in the SpecsIntact Submittal Register)	RMS - The following Submittal Classifications are populated in RMS when the SpecsIntact Submittal Data File is pulled into RMS)			
G	Submittal requires Government Approval	G	GA			
BLANK	Submittal is For Information Only (FIO)	BLANK	FIO			
S	Submittal is for documentation of Sustainable requirements	S	S/FIO			

## 1.9.7 NOT USED

### 1.10 VARIATIONS

Variations from contract requirements require Contracting Officer approval pursuant to contract Clause FAR 52.236-21 Specifications and Drawings for Construction, and will be considered where advantageous to the Government.

# 1.10.1 Considering Variations

Discussion of variations with the Contracting Officer before submission will help ensure that functional and quality requirements are met and minimize rejections and resubmittals. For variations that include design changes or some material or product substitutions, the Government may require an evaluation and analysis by a licensed professional engineer hired by the contractor.

Specifically point out variations from contract requirements in a transmittal letter. Failure to point out variations may cause the Government to require rejection and removal of such work at no additional cost to the Government.

## 1.10.2 Proposing Variations

Check the column "variation" of ENG Form 4025 for submittals that include variations proposed by the Contractor. Set forth in writing the reason for any variations and note such variations on the submittal. The

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Government reserves the right to rescind inadvertent approval of submittals containing unnoted variations.

#### 1.10.3 Warranting that Variations are Compatible

When delivering a variation for approval, the Contractor warrants that this contract has been reviewed to establish that the variation, if incorporated, will be compatible with other elements of work.

## 1.10.4 Review Schedule Extension

In addition to the normal submittal review period, a period of 30 calendar days will be allowed for the Government to consider submittals with variations.

## 1.11 SCHEDULING

Schedule and submit concurrently product data and shop drawings covering component items forming a system or items that are interrelated. Submit pertinent certifications at the same time. No delay damages or time extensions will be allowed for time lost in late submittals.

- a. Coordinate scheduling, sequencing, preparing, and processing of submittals with performance of work so that work will not be delayed by submittal processing. The Contractor is responsible for additional time required for Government reviews resulting from required resubmittals. The review period for each resubmittal is the same as for the initial submittal.
- b. Submittals required by the contract documents are listed on the submittal register. If a submittal is listed in the submittal register but does not pertain to the contract work, the Contractor is to include the submittal in the register and annotate it "N/A" with a brief explanation. Approval by the Contracting Officer does not relieve the Contractor of supplying submittals required by the contract documents but that have been omitted from the register or marked "N/A."
- c. Resubmit the submittal register and annotate it monthly with actual submission and approval dates. When all items on the register have been fully approved, no further resubmittal is required.

Contracting Officer review will be completed within 30 calendar days after the date of submission.

- 1.11.1 NOT USED
- 1.11.2 NOT USED
- 1.11.3 NOT USED
- 1.12 GOVERNMENT APPROVING AUTHORITY

When the approving authority is the Contracting Officer, the Government will:

- a. Note the date on which the submittal was received from the QC manager.
- b. Review submittals for approval within the scheduling period specified

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and only for conformance with project design concepts and compliance with contract documents.

c. Identify returned submittals with one of the actions defined in paragraph REVIEW NOTATIONS and with comments and markings appropriate for the action indicated.

Upon completion of review of submittals requiring Government approval, stamp and date submittals. 2 copies of the submittal will be retained by the Contracting Officer and 1 copies of the submittal will be returned to the Contractor.If the Government performs a conformance review of other Designer of Record approved submittals, the submittals will be identified and returned, as described above.

## 1.12.1 Review Notations

Submittals will be returned to the Contractor with the following notations:

- a. Submittals marked "approved" or "accepted" authorize proceeding with the work covered.
- b. Submittals marked "approved as noted" or "approved, except as noted, resubmittal not required," authorize proceeding with the work covered provided that the Contractor takes no exception to the corrections.
- c. Submittals marked "not approved," "disapproved," or "revise and resubmit" indicate incomplete submittal or noncompliance with the contract requirements or design concept. Resubmit with appropriate changes. Do not proceed with work for this item until the resubmittal is approved.
- d. Submittals marked "not reviewed" indicate that the submittal has been previously reviewed and approved, is not required, does not have evidence of being reviewed and approved by Contractor, or is not complete. A submittal marked "not reviewed" will be returned with an explanation of the reason it is not reviewed. Resubmit submittals returned for lack of review by Contractor or for being incomplete, with appropriate action, coordination, or change.
- e. Submittals marked "receipt acknowledged" indicate that submittals have been received by the Government. This applies only to "information-only submittals" as previously defined.

#### 1.13 DISAPPROVED SUBMITTALS

Make corrections required by the Contracting Officer. If the Contractor considers any correction or notation on the returned submittals to constitute a change to the contract drawings or specifications, give notice to the Contracting Officer as required under the FAR clause titled CHANGES. The Contractor is responsible for the dimensions and design of connection details and the construction of work. Failure to point out variations may cause the Government to require rejection and removal of such work at the Contractor's expense.

If changes are necessary to submittals, make such revisions and resubmit in accordance with the procedures above. No item of work requiring a submittal change is to be accomplished until the changed submittals are approved.

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#### 1.14 APPROVED SUBMITTALS

The Contracting Officer's approval of submittals is not to be construed as a complete check, and indicates only that the general method of construction, materials, detailing, and other information are satisfactory.

Approval or acceptance by the Government for a submittal does not relieve the Contractor of the responsibility for meeting the contract requirements or for any error that may exist, because under the Quality Control (QC) requirements of this contract, the Contractor is responsible for ensuring information contained with in each submittal accurately conforms with the requirements of the contract documents.

After submittals have been approved or accepted by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

#### 1.15 APPROVED SAMPLES

Approval of a sample is only for the characteristics or use named in such approval and is not be construed to change or modify any contract requirements. Before submitting samples, provide assurance that the materials or equipment will be available in quantities required in the project. No change or substitution will be permitted after a sample has been approved.

Match the approved samples for materials and equipment incorporated in the work. If requested, approved samples, including those that may be damaged in testing, will be returned to the Contractor, at its expense, upon completion of the contract. Unapproved samples will also be returned to the Contractor at its expense, if so requested.

Failure of any materials to pass the specified tests will be sufficient cause for refusal to consider, under this contract, any further samples of the same brand or make as that material. The Government reserves the right to disapprove any material or equipment that has previously proved unsatisfactory in service.

Samples of various materials or equipment delivered on the site or in place may be taken by the Contracting Officer for testing. Samples failing to meet contract requirements will automatically void previous approvals. Replace such materials or equipment to meet contract requirements.

#### 1.16 WITHHOLDING OF PAYMENT

Payment for materials incorporated in the work will not be made if required approvals have not been obtained.

### 1.17 CERTIFICATION OF SUBMITTAL DATA

Certify the submittal data as follows on Form ENG 4025: "I certify that the above submitted items had been reviewed in detail and are correct and in strict conformance with the contract drawings and specifications except as otherwise stated.

\_\_\_\_NAME OF CONTRACTOR \_\_\_\_\_ SIGNATURE OF CONTRACTOR

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 33 29.00 06

# SUSTAINABILITY REPORTING 11/17

## PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 189.1 (2014; ERTA 1 2017) Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings

SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)

ANSI/SMACNA 008 (2007) IAQ Guidelines for Occupied Buildings Under Construction, 2nd Edition

U.S. DEPARTMENT OF AGRICULTURE (USDA)

FSRIA 9002

Farm Security and Rural Investment Act Section 9002 (USDA Biopreferred Program)

U.S. DEPARTMENT OF ENERGY (DOE)

Energy Star (1992; R 2006) Energy Star Energy Efficiency Labeling System (FEMP)

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

SNAP(2016) EPA's Significant New AlternativesPolicy Program

U.S. GREEN BUILDING COUNCIL (USGBC)

LEED v4 BDC Ref Guide	(2013; R 2020) USGBC LEED Reference Guide
	for Building Design and Construction, v4
LEED v4.1 BDC Ref Guide	(2023) LEED v4.1 Building Design and

Construction Reference Guide

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 247Comprehensive Procurement Guideline for<br/>Products Containing Recovered Materials

## 1.2 SUMMARY

This specification includes general requirements and procedures for this project to be constructed and documented per the federally mandated High Performance and Sustainable Building Guiding Principles (GP), LEED certification requirements, and other requirements identified in this specification.

## 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following that "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with LRL Section 01 33 00 Submittal Procedures:

SD-01 Preconstruction Submittals

Sustainability Action Plan; G, AE

LEED Implementation Plan; G, AE

Indoor Air Quality Plan; G, AE

LEED AP BD+C; G, AE

SD-09 Manufacturer's Field Reports

Sustainability Progress Report; G, AE

SD-11 Closeout Submittals

Final Sustainability eNotebook; G, AE

Amended Final Sustainability eNotebook; G, AE

Final High Performance and Sustainable Building Checklist; G, AE

LEED Plaque and Certificate; G, AE

## 1.4 LEED Accredited Professional (LEED AP BD+C)

A LEED Accredited Professional with specialty in Building Design + Construction (LEED AP BD+C), accredited by the Green Building Certification Institute, on the Contractor's Quality Control Staff must assemble documentation and ensure that Guiding Principles Compliance documentation is prepared in accordance with this specification section and ensure that Third Party Certification requirements are achieved. Identify the LEED AP BD+C on the Contractor's Quality Control Staff in accordance with specification LRL Section 01 45 04.10 06 CONTRACTOR QUALITY CONTROL. Provide a statement of qualifications of the LEED AP BD+C submitted to the Government with the QC Plan. Includes name and date of expiration of the current credential.

The LEED AP BD+C must review all requests for information, Contractor proposals, contract modifications, deviations from the design documents, or any other items that could potentially impact the compliance and Third Party Certification and rating of the project. Bring any actions that

could negatively impact the Third Party Certification rating or ability to comply with Guiding Principles to the attention of the Contracting Officer.

## 1.5 Guiding Principles Compliance

Provide construction related sustainability documentation to verify compliance with Federal High Performance and Sustainable Building requirements. Refer to paragraph Guiding Principle Requirements for requirements and associated documentation to include in the Sustainability eNotebook.

## 1.5.1 Construction Phase

#### 1.5.1.1 Sustainability Action Plan

Provide a Sustainability Action Plan to demonstrate planned methods to comply with the Guiding Principles requirements and comply with Third Party Certification requirements identified herein. Submit the LEED Implementation Plan as a part of the Sustainability Action Plan. Provide 3 copies submitted to the Government on compact disk with the QC Plan . The Government will consider an interim Sustainability Action Plan and LEED Implementation Plan for the first 60 calendar days of the Contractor's operation. Construction will be permitted to begin only after acceptance of the plans or acceptance of an interim plan applicable to the work to be started related to the Guiding Principles requirements identified in the interim plan. Include a detailed description of all activities that relate to accomplishing each project Guiding Principle requirement, including construction practices and procurement practices. Include any plans required by the Guiding Principle Requirements including the Indoor Air Quality Plan and Waste Management Plan. Include a schedule for completion and documentation of each requirement. Include the template to be used for Sustainability Progress Reports, a plan for indoctrinating employees to sustainable goals and responsibilities, a team structure identifying responsibility for documentation, and a process for reviewing sustainability related submittals and documentation.

## 1.5.1.2 Sustainability eNotebook

Provide and maintain a comprehensive Sustainability eNotebook to document compliance with the Guiding Principles requirements identified herein. All materials requirements must be updated each month. The Sustainability eNotebook must contain all required data to support compliance with the Guiding Principles requirements. The Sustainability eNotebook must be in the form of an Adobe PDF file; bookmarked at each requirement, and sub-bookmarked at each document. Include the Final High performance and Sustainable Building Checklist. Include all "S" submittals through the specification sections of this contract.

Provide 3 copies of the Final Sustainability eNotebook and Final High Performance and Sustainable Building Checklist to the Government on DVD 30 calendar days prior to the Contract Required Completion Date.Include a separate section in the Final Sustainability eNotebook with a copy of all Third Party Certification documentation, bookmarked at each separate requirement. Final progress payment retainage may be held by the Contracting Officer until the documentation is complete. Provide an Amended Final Sustainability eNotebook including any updates to documentation based on post-occupancy corrections or based on Third Party Certification requirements.

# 1.5.1.3 High Performance and Sustainable Building Checklist

Complete the Army Energy & Sustainability Record Card shown in Attachment A as required in paragraph Sustainability eNotebook. Obtain the electronic copy of the Army Energy & Sustainability Record Card from the Contracting Officer's Representative. Only the RECYCLED MATERIALS section of the Building Data Worksheet is required. If any deviations from contract result in a change in status to compliance with a listed requirement in the checklist, update the status of that item in the checklist.

## 1.5.1.4 Progress Report

Submit a monthly Sustainability Progress Report, on the same day each month, that identifies the Guiding Principles requirements completed and documented to date. The Sustainability Progress Report must also include the Third Party Certification requirements and documentation completed to date. The Government will compare the Sustainability Progress Report and the available data in the current Sustainability eNotebook and Third Party Certification documentation to the schedule in the Sustainability Action Plan and LEED Implementation Plan. Failure to adhere to the schedule for completion of requirements, including the associated documentation, in the Sustainability Action Plan and LEED Implementation Plan will be cause for withholding the monthly progress payment until the information is updated and in accordance with the Sustainability Action Plan.

# 1.6 Guiding Principles Requirements

Incorporate each of the following Guiding Principles requirements into the project construction, and provide documentation that proves compliance with each listed requirement. For each of the following paragraphs that require the use of products listed on Government-required websites, provide documentation of the process used to select products, or process used to determine why listed products do not meet project performance requirements.

# 1.6.1 Commissioning

Comply with the requirements of LRL section 01 46 00.00 06 TOTAL BUILDING COMMISSIONING.

## 1.6.2 Energy Efficient Products

Provide only energy-using products that are Energy Star rated, or have the Federal Energy Management Program (FEMP) recommended efficiency for products with established Energy Star or FEMP requirements. Provide only energy using products that meet FEMP requirements for low standby power consumption. Energy efficient products can be found at: https://energy.gov/eere/femp/federal-energy-management-program and https://www.energystar.gov/. Provide the following documentation:

Proof that products are labeled energy efficient and comply with the cited requirements.

# 1.6.3 Indoor Water Use

Provide only water-consuming products that are EPA WaterSense labeled, or water fixtures available that meet the requirements of ASHRAE 189.1 Section 6.3.2, whichever is most water-efficient. Provide the following

documentation:

For products available with EPA WaterSense labeling, proof that fixtures are labeled EPA WaterSense or Energy Star; for all other fixtures, proof they comply with the cited efficiency requirements.

1.6.4 Reduce Volatile Organic Compound (VOC) (Low Emitting Materials)

Meet the requirements of Table 3-1 at the end of this specification. Provide the following documentation:

Provide certifications or labels that demonstrate compliance with cited requirements.

## 1.6.5 Indoor Air Quality During Construction

Prior to construction, create indoor air quality plan. Implement IAQ plan during construction and flush building air before occupancy.

For new construction and for renovation of unoccupied existing buildings, indoor air quality plan must meet the requirements of ANSI/SMACNA 008, Chapter 3 and ASHRAE 189.1 Section 10.3.1.4, (Indoor Air Quality (IAQ) Construction Management), with maximum outdoor air consistent with achieving relative humidity no greater than 60 percent.

Provide documentation showing that after construction ends and prior to occupancy, HVAC filters were replaced and building air was flushed out in accordance with the cited standard.

# 1.6.6 Regional Materials

Comply with ASHRAE 189.1 paragraph 9.4.1.2 Regional Materials. Provide documentation demonstrating that 15% of the cost of building materials or products used were extracted, harvested, recovered or manufactured within 500 miles of the project site.

# 1.6.7 Recycled Content

Comply with 40 CFR 247. Refer to

https://www.epa.gov/smm/comprehensive-procurement-guidelines-construction-products for assistance identifying products cited in 40 CFR 247. Selected products must comply with non-proprietary requirements of the Federal Acquisition Regulation, and must meet performance requirements. Provide the following documentation:

- a. Manufacturers' documents stating the recycled content by material, or written justification for claiming one of the exceptions allowed on the cited website.
- b. Substitutions: Submit for Government approval, proposed alternative products or systems that provide equivalent performance and appearance and have greater contribution to project recycled content requirements. For all such proposed substitutions, submit with the Sustainability Action Plan accompanied by product data demonstrating equivalence.

# 1.6.8 Bio-Based Products

Provide products and material composed of the highest percentage of

biobased materials (including rapidly renewable resources and certified sustainably harvested products), consistent with FSRIA 9002 USDA Biopreferred Program, to the maximum extent possible without jeopardizing the intended end use or detracting from the overall quality delivered to the end user. Use only supplies and materials of a type and quality that conform to applicable specifications and standards.

Comply with FSRIA 9002 USDA BioPreferred Program. Refer to https://www.biopreferred.gov/BioPreferred/ for the product categories and BioPreferred Catalog. Selected products must comply with non-proprietary requirements of the Federal Acquisition Regulation, and must meet performance requirements. Provide the following documentation:

USDA Biopreferred label for each product; for bio-based products used on project but not listed with Biopreferred program, provide bio-based content and percentage.

1.6.9 Ozone Depleting Substances

Meet the requirements of ASHRAE 189.1 Section 9.3.3 Refrigerants for no CFC-based refrigerants in heating ventilation, air conditioning and refrigeration systems. Where feasible, use products from U.S. EPA Significant New Alternatives Policy (SNAP) (<u>https://www.epa.gov/snap</u>) or meet the criteria of SNAP. Provide the following documentation:

- a. MSDS sheets for all refrigerants.
- b. Provide label for each product meeting the cited standards.
- 1.6.10 Waste Material Management (Recycling Construction)

A minimum of 75% of nonhazardous construction and demolition waste material generated prior to the issuance of the final certificate of occupancy shall be diverted from disposal in landfills and incinerators by recycling or reuse. Reuse includes donation of materials to charitable organization, salvage of existing materials onsite, and packaging materials returned to the manufacturer, shipper, or other source that will reuse the packaging in future shipments. Excavated soil and land clearing debris shall not be included in the calculation. Calculations are allowed to be done by either weight or volume, but shall be consistent throughout. Specific areas on the construction site shall be designated for collection of recyclable and reusable materials. Off-site storage and sorting of materials shall be allowed. Diversion efforts shall be tracked by the contractor throughout the construction process and documentation provided to the Government prior to contract closeout. Refer to LEED v4 MR Construction and Demolition Waste Management Planning prerequisite and MR Construction and Demolition Waste Management credit for addiitonal requirments.

## 1.7 Third Party Certification

Comply with all requirements and provide all required documentation for the project to achieve certification in the Third Party Certification system identified herein. The Contractor must bear all costs and perform all administrative actions necessary to complete Third Party Certification.

1.7.1 LEED

This project has been designed for a rating of Silver in the Leadership in

Energy and Environmental Design (LEED) version 4 certification system. Certify the project at the designed LEED rating through the Green Building Certification Institute. The project has been registered with the Green Building Certification Institute. The Final Design Review of the Split Design & Construction Review path has been completed. Complete all remaining activities necessary for LEED certification. Some LEED prerequisites and credits are similar to Guiding Principle Requirements. Some LEED credits are are substituted with LEED v4.1 requirements in lieu of LEED v4 requirements. Comply with both the LEED and Guiding Principle Requirements. Refer to LEED v4 BDC Ref Guide and LEED v4.1 BDC Ref Guide for additional information regarding LEED and LEED certification processes.

1.7.2 LEED Documentation

LEED documentation requires the following:

- a. Refer to Attachment B, LEED Checklist at the end of this specification section.
- b. Obtain approval of the LEED Checklist from the Contracting Officer at the Sustainability Implementation Meeting.

No variations or substitutions to the approved LEED Checklist are allowed without written consent from the Contracting Officer. Immediately bring to the attention of the Contracting Officer any project changes that impact meeting the approved LEED Requirements for this project. Demonstrate that change will not: incur additional construction cost; increase the life cycle cost; impact previous LEED Design Review; or impact required LEED certification level.

- c. Complete all work required to incorporate the applicable LEED Requirements.
- d. Maintain the construction related information, and provide replacement pages, in the Sustainability eNotebook pertaining to additions and changes to the approved sustainability requirements. The Sustainability eNotebook is in electronic format and is explained in the paragraph entitled "SUSTAINABILITY eNOTEBOOK". The Sustainability eNotebook contains the following components in addition to the GPV components above:
  - (1) LEED Checklist
  - (2) Completed LEED Online forms for each identified prerequisite and credit
  - (3) Copy of all correspondence with the LEED organization.
  - (4) Documentation illustrating compliance with LEED requirements.
  - (5) LEED Award Certificate and Plaque.
- e. LEED Implementation Plan: Include the following information in the Sustainability Action Plan. Provide this LEED information in addition to the GPV Action Plan items above:
  - (1) Contractor's planned method to achieve each LEED requirement.

- (2) For each required LEED credit that is attempted but not achieved, provide narrative explaining how mission or activity precludes achieving specific sustainability requirement or goal. Provide analysis of particular requirement and level to which project is able to comply.
- (3) Name and contact information for: Contractor's Sustainability POC and other names of sustainability professionals on the Contractor's Staff responsible for ensuring LEED sustainability goals are accomplished and documentation is assembled and who requires access to the LEED online website.
- (4) Provide the plan and schedule for performance testing, data collection, and commissioning to take place during first year of facility usage.
- (5) Prepare and submit detailed work plans directly related to achieving LEED construction phase prerequisites and credits. Note that some of the following plans must be uploaded to LEED Online as supporting documents to specific credits, and others are intended to demonstrate the Contractor's understanding of LEED data collection, early planning and communication with relevant parties. Such planning and execution is required for LEED credit achievement. The list of work plans shall include the following:
- f. Contractor is responsible for all costs associated with constructing and demonstrating that project complies with approved LEED requirements, including but not limited to:
  - (1) Final LEED review, certification and plaque fees
  - (2) Online LEED management and documentation.
  - (3) Obtaining LEED certification based on Government-approved sustainability goals.
  - (4) Construction work required to incorporate LEED prerequisites and credits.
  - (5) Submittals required to demonstrate compliance with Government approved LEED checklists.
- g. Provide all calculations, product data, and certifications required in this specification to demonstrate compliance with the LEED Requirements.
- h. Provide all online LEED management and documentation.
- i. Contractor is responsible for all required responses to USGBC/GBCI.
- j. Provide LEED Plaque and Certificates. Use format below to create the Plaque, Certificate and Letter of Congratulations. Forward to parties designated by Contracting Officer:
  - (1) Plaque:

Name: Final Building Name. If unknown, provide Form DD1391 Project Name.

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(2) Certificate:

Project Title, first line: P-(X); Form DD1391 Project Name).

Project Title, second line: UIC (Installation code)

(3) Letter Congratulations:

Address letter to Facility's Installation commander Name. Address the letter to an individual person.

1.7.3 LEED Documentation Requirements

LEED v4 and v4.1 credits as identified in Attachment B shall be incorporated and documented as required by the Contract documents and in full compliance with the LEED v4 BDC Ref Guide or the LEED v4.1 BDC Ref Guide. LEED v4 and LEED v4.1 credits not identified elsewhere in the Contract documents and those requiring further instruction are specified below. Refer to the LEED v4 BDC Ref Guide and the LEED v4.1 BDC Ref Guide for further definitions and requirements.

1.7.3.1 MR Construction and Demolition Waste Management

Contractor shall employ construction waste management practices as required in the LEED v4 BDC Ref Guide Option 1 - Diversion,Path 2 - Divert 75% and Four Material Streams, and in 01 74 19 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT to achieve the threshold stated therein.

1.7.3.1.1 Calculations for MR Construction Waste Management

Contractor shall track all construction and demolition waste and diverted waste using the LEED Online Construction and Demoltion Waste Calculator.

1.7.3.2 MR Building Product Disclosure and Optimization - Environmental Product Declarations

1.7.3.2.1 Option 1 Environmental Product Declaration

Contractor shall select materials so that the sum of installed products with Environmental Product Declarations (EPD) is at least 20 different products from at least five different manufacturers. EPDs shall comply with the requirements in the LEED v4.1 BDC Ref Guide

1.7.3.2.2 Option 2 Embodied Carbon/LCA Optimization

Contractor shall select at least 5 permanently installed products sourced from at least three different manufacturers that have an embodied carbon optimization report or action plan in compliance with the LEED v4.1 BDC Ref Guide.

1.7.3.3 MR Building Product Disclosure and Optimization - Sourcing of Raw Materials

Contractor shall select materials so that the sum of the following constitutes at least one of the responsible sourcing and extraction criteria for at least 30 percent by cost, of the total value of permanently installed building prodducts in compliance with the LEED v4.1 BDC Ref Guide.

- a. Extended producer responsibility: Products meeting extended producer responsibility criteria are valued at 50 percent of their cost for purposes of credit achievement calculation.
- b. Bio-based materials: Products that meet bio-based product criteria are valued at 50 percnet of the cost multiplied by the biobased content of the product for purposes of credit achievement calculation.
- c. Certified wood products: Products that meet certified wood products criteria are valued at 100 percent of their cost for purposes of the credit achievment calculation.
- d. Materials reuse: Products meeting materials reuse criteria are valued at 200 percent of their cost for the purposes of credit achievement calculation.
- e. Recycled content: Products that meet recycled content criteria are valued at 100 percent of their cost for purposes of credit achievement calculation.
- f. For credit achievement, products meeting any of the above criteria that are sourced (extracted, manufactured and purchased)within 100 miles of the project site are valued at twice their base contributing cost, up to a maximum of 200 percent of cost.

1.7.3.4 MR Building Product Disclosure and Optimization - Material Ingredients

#### 1.7.3.4.1 Option 1 Material Ingredient Reporting

Contractor shall select materials so that the sum of installed products demonstrating a chemical inventory of the product to at least 0.1 percent is at least 20 different products from at least five different manufacturers. Material Ingredient Reporting programs shall comply with the requirements in the LEED v4.1 BDC Ref Guide.

- a. ANSI/BIFMA e3 Furniture Sustainability Standard
- b. Cradle to Cradle
- c. Declare
- d. Facts NSF/ANSI 336
- e. Global Green TAG
- f. Health Product Declaration
- g. Living Product Challenge
- h. Manufacturer Inventory
- i. Product Lens Certification
- j. Any compliant reports above with third-party verification that includes the verification of content inventory are worth 1.5 products for credit achievement calculations.

1.7.3.4.2 Option 2 Material Ingredient Optimization

Contractor shall select products that have a compliant material ingredient optimization report or action plan. Use at least 5 permanently installed products sourced from at least three different manufacturers. Products are valued according to the Option 2 Material Ingredient Optimization table in the LEED v4.1 BDC Ref Guide.

For credit achievement calculation, products sourced (extracted, manufactured, purchased) within 100 miles of the project site are valued at twice their base contributing number of products, up to a maximum of 2 products.

# 1.7.3.5 Low-Emitting Materials

Contractor shall select materials used on the interior of the building that comply with the low-emitting requirements in the LEED v4.1 BDC Ref Guide for the following categories:

- a. Paints and coatings: At least 75 percent of all paints and coatings, by volume or surface area, meet the VOC emissions evaluation and 100 percent meet the VOC content evaluation.
- b. Adhesives and sealants: At least 75 percent of all adhesives and sealants, by volume or surface area, meet the VOC emissions evaluation and 100 percent meet the VOC content evaluation.
- c. Flooring: At least 90 percent of all flooring, by cost or surface area, meets the VOC emissions evaluation or inherently nonemitting sources criteria, or salvaged and reused materials criteria.
- d. Wall panels: At least 75 percent of all wall panels, by cost or surface area, meet the VOC emissions evaluation, or inherently nonemitting sources criteria, OR salvaged and reused materials criteria.
- e. Ceilings: At least 90 percent of all ceilings, by cost or surface area, meet the VOC emissions evaluation, or inherently nonemitting sources criteria, or salvaged and reused materials criteria.
- f. Insulation: At least 75 percent of all insulation, by cost or surface area, meets the VOC emissions evaluation.
- g. Furniture: At least 75 percent of all furniture in the project scope of work, by cost, meets the furniture emissions evaluation, or inherently nonemitting sources criteria, OR salvaged and reused materials criteria.
- h. Composite wood: At least 75 percent of all composite wood, by cost or surface area, meets the Formaldehyde emissions evaluation OR salvaged and reused materials criteria.

## 1.7.3.6 Construction Indoor Air Quality Management Plan

Comply with the requirements of sub-section 1.6.5 Indoor Air Quality During Construction for indoor air quality plan requirements. Additionally, indoor air quality plan shall address the following:

- a. Protect all absorptive materials that are stored onsite and installed from moisture damage.
- b. Install minimum efficiency MERV 8 filters at each return air grille and return or transfer duct inlet opening prior to operating permanently installed air-handling equipment during construction and replace filtration media with specified filtration media prior to occupancy.
- c. Prohibit smoking inside the building and within 50 feet of all building openings during construction.
- d. Conduct building flush-out or baseline air testing per sub-section 1.7.3.7 Indoor Air Quality Assessment.

## 1.7.3.7 Indoor Air Quality Assessment

#### 1.7.3.7.1 Option 2 Air Testing

After substantial completion and prior to occupancy, conduct baseline indoor air quality testing in occupied spaces using protocols consistent with the methods listed in Table 1 of the LEED v4 BDC Ref Guide.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

## 3.1 SUSTAINABILITY IMPLEMENTATION MEETING

The LEED AP BD+C , QC System Manager, and Contracting Officer's Representative must meet within 60 calendar days after notice to proceed to review project sustainability goals with respect to the Sustainability Action Plan and LEED Implementation Plan, identify potential difficulties related to meeting the Guiding Principle Requirements, and discuss mitigation strategies.

# 3.2 Sustainability Pre-Closeout Meeting

The LEED AP BD+C , QC System Manager, and Contracting Officer's Representative must meet 60 calendars days prior to Contract Required Completion Date to review completion status of sustainability requirements including level of completion of Third Party Certification, Guiding Principles Requirements documentation and the High Performance and Sustainable Building Checklist. Discuss any potential difficulties in completing Third Party Certification, outstanding requirements and documentation. Provide a copy of the Sustainability eNotebook with up-to-date documentation.

LEED Plaque and Certificate

Finalize the process requirements and obtain the LEED Plaque and Certificate, and compliance report, indicating completion of the project's sustainability goals. Include LEED compliance report with final LEED scoresheet as applicable.

Provide one original framed copy of the certificate, assessment, or validation, mounted in 1 inch deep metal frames, with double matt, and wire hangers, in location approved by Contracting Officer. Deliver one original certificate and compliance report to Contractor Officer, unless otherwise instructed. Provide and hang Plaque in a prominent interior location approved by the Contracting Officer.

3.3 TABLE 3-1 VOLATILE ORGANIC COMPOUNDS (VOC) (LOW EMITTING MATERIALS) REQUIREMENTS

Refer to following table, based on ASHRAE 189.1 section 8.4.2 (Materials), for compliance criteria.

TABLE 3-1 Volati	le Organic Compounds	(VOC)	(Low Emitting Materia	als) Requirements			
MATERIAL CATEGORY	EMISSIONS REQUIREMENT		MATERIALS WITH ADDED VOC REQUIREMENT	MATERIAL CATEGORY			
Adhesives and Sealants	CDPH/EHLB/Standard method V1.1 (California Section 01350) (Use "office" or "classroom" space limits for all applications)	or	Adhesives (carpet, resilient, wood flooring; panel; primers) Sealants (acoustical; firestop; HVAC Air duct; primers) Caulks	SCAQMD Rule 1168 (Use "other" category for HVAC duct sealant) (for firestop adhesive, UFC 3-600-01 overrides conflicting requirements)			
			Aerosol adhesives	Section 3 of Green Seal Standard GS-36 (except: cleaners, solvent cements, and primers used with plastic piping and conduit in plumbing, fire suppression, and electrical systems; HVAC air duct sealants when the application space air temp is less than 40 F (4.5 C).			
Paints and Coatings	CDPH/EHLB/Standard method V1.1 (California Section 01350) (Use "office" or "classroom" space limits for all applications)	or	Flat and nonflat topcoats, primers, undercoaters, and anti-corrosive coatings	Green Seal Standard GS-11			

TABLE 3-1 Volatile Organic Compounds (VOC) (Low Emitting Materials) Requirements
MATERIAL CATEGORY	EMISSIONS REQUIREMENT		MATERIALS WITH ADDED VOC REQUIREMENT	MATERIAL CATEGORY
Paints and Coatings	CDPH/EHLB/Standard method V1.1 (California Section 01350) (Use "office" or "classroom" space limits for all applications)	or	Basement specialty coatings, high-temperature coatings, low solids coatings, stone consolidants, swimming-pool coatings, tub- and tile-refining coatings, and waterproofing membranes	California Air Resources Board (CARB) Suggested Control Measure for Architectural Coatings
Floor Covering Materials	For carpet, all locations: CDPH/EHLB/Standard Method V1.1 (California Section 01350) or label for Section 9 of CDPH/EHLB/Standard Method V1.1 (California Section 01350)		none	none

TABLE 3-1 Volatile Organic Compounds (VOC) (Low Emitting Materials) Requirements

TABLE 3-1 Volatile Organic Compounds (VOC) (Low Emitting Materials) Requirements									
		T	1						
MATERIAL CATEGORY	EMISSIONS REQUIREMENT		MATERIALS WITH ADDED VOC REQUIREMENT	MATERIAL CATEGORY					
Composite Wood, Wood Structural Panel, and Agrifiber Products particleboard medium density fiberboard (MDF) wheatboard strawboard panel substrates door cores no added urea-formaldehyde resins including laminating adhesives for composite wood and agrifiber	Third-party certification (approved by CARB) of <b>California Air</b> <b>Resource Board's</b> (CARB) regulation, Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products		none	none					
assemblies	CDPH/EHLB/Standard method V1.1 (California Section 01350) (Use "office" or "classroom" space limits for all applications) (except: Structural panel components such as plywood, particle board, and oriented strand board identified as "EXPOSURE 1," "EXTERIOR," or "HUD-APPROVED" are considered acceptable for interior use.)								

TABLE 3-1 Volatile Organic Compounds (VOC) (Low Emitting Materials) Requirements										
MATERIAL CATEGORY	EMISSIONS REQUIREMENT		MATERIALS WITH ADDED VOC REQUIREMENT	MATERIAL CATEGORY						
Office Furniture Systems and Seating installed prior to occupancy	ANSI/BIFMA X7.1 ANSI/BIFMA X7.1: (95 percent of installed office furniture system workstations and seating units) Section 7.6.2 of ANSI/BIFMA e3 (50 percent of office furniture system workstations and seating units)		none	none						
<b>Ceiling and Wall</b> <b>Systems</b> ceiling and wall insulation acoustical ceiling panels tackable wall panels gypsum wall board and panels wall coverings	CDPH/EHLB/Standard method V1.1 (California Section 01350) (Use "office" or "classroom" space limits for all applications)		none	none						

Attachment A HIGH PERFORMANCE AND SUSTAINABLE BUILDING CHECKLIST

Attachment B LEED PROJECT CHECKLIST

-- End of Section --

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## GOVERNMENT SAFETY REQUIREMENTS 04/20

#### PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

ASSP	A10.32		(2013)	Fall Protection
ASSP	A10.34		(2001; or Adja	R 2012) Protection of the Public on acent to Construction Sites
ASSP	Z359.1		(2016)	The Fall Protection Code
	AMERICAN	SOCIETY OF	MECHANICAL	ENGINEERS (ASME)
ASME	B30.22		(2016)	Articulating Boom Cranes
ASME	в30.3		(2016)	Tower Cranes
ASME	B30.5		(2018)	Mobile and Locomotive Cranes

ASME B30.8 (2015) Floating Cranes and Floating Derricks

#### NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA	10	(2018; TIA 18-1) Standard for Portable Fire Extinguishers
NFPA	241	(2019) Standard for Safeguarding Construction, Alteration, and Demolition Operations
NFPA	51B	(2019) Standard for Fire Prevention During Welding, Cutting, and Other Hot Work
NFPA	70	(2017; ERTA 1-2 2017; TIA 17-1; TIA 17-2; TIA 17-3; TIA 17-4; TIA 17-5; TIA 17-6; TIA 17-7; TIA 17-8; TIA 17-9; TIA 17-10; TIA 17-11; TIA 17-12; TIA 17-13; TIA 17-14; TIA 17-15; TIA 17-16; TIA 17-17 ) National Electrical Code
NFPA	70E	(2018; TIA 18-1; TIA 81-2) Standard for Electrical Safety in the Workplace

P2#: 506474 - Manned/Unmanned Tactical Vehicle Lab (MUMT) Detroit Arsenal, MI U.S. ARMY CORPS OF ENGINEERS (USACE) EM 385-1-1 (2014) Safety and Health Requirements Manual U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA) 29 CFR 1910 Occupational Safety and Health Standards 29 CFR 1915 Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment 29 CFR 1926 Safety and Health Regulations for Construction 29 CFR 1926.500 Fall Protection

1.2 SUBMITTALS

Government approval/acceptance is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with LRL Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Accident Prevention Plan (APP) Fatigue Management Plan Bloodborne Pathogen Plan Exposure Control Plan Automatic External Defibrillator (AED) Program Site Layout Plan

Access/Haul Road Plan Hearing Conservation Program Respiratory Protection Plan Health Hazard Control Program Hazard Communication Program

Process Safety Management Plan Lead Compliance Plan & Specifications Asbestos Abatement Plan & Specifications

Heat Stress Monitoring Plan Cold Stress Monitoring Plan Indoor Air Quality Management Plan Mold Remediation Plan Chromium (VI) Exposure Evaluation

Crystalline Silica Assessment Lighting Plan for Night Operations Traffic Control Plan Fire Prevention Plan Wild Land Fire Management Plan

Arc Flash Hazard Analysis

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> Assured Equipment Grounding Control Program (AEGCP) Hazardous Energy Control Plan Standard Pre-Lift Plan (LHE) Critical Lift Plan - LHE

Fall Protection and Prevention Plan Demolition/Renovation Plan (to include engineering survey) Rope Access Work Plan Excavation/Trenching Plan

Fire Prevention & Protection Plan for Underground Construction Compressed Air Plan for Underground Construction Erection and Removal Plan for Formwork and Shoring PreCast Concrete Plan Lift-Slab Plans

Masonry Bracing Plan Steel Erection Plan Tree Felling/Maintenance Program

Site Safety and Health Plan (HTRW) Confined Space Entry Procedures Confined Space Program

Activity Hazard Analysis (AHA); G, RO

Site Safety and Health Officer Qualifications(SSHO); G, RO Certified Safety Professional/Certified Industrial Hygienist Qualifications; G, RO Proof of qualification for Crane Operators; G, RO

Critical Lift Plan; G, RO

SD-06 Test Reports

Reports

Accident Reports

Monthly Exposure Reports

Crane Reports

Regulatory Citations and Violations

SD-07 Certificates

Confined Space Entry Permit

Hot work permit

Crane Certificate of Compliance

Submit one copy of each permit/certificate attached to each daily Quality Control Report.

#### 1.3 DEFINITIONS

a. Site Safety and Health Officer (SSHO). The qualified or competent

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person who is responsible for the on-site safety and health management required for the contract project work.

b. Competent Person, Fall Protection: A person designated in writing by the employer to be responsible for immediate supervising, implementing and monitoring of the fall protection program, who through training, knowledge and experience in fall protection and rescue systems and equipment, is capable of identifying, evaluating and addressing existing and potential fall hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

c. High Visibility Accident. Any mishap which may generate publicity and/or high visibility.

d. Medical Treatment. Treatment administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment even through provided by a physician or registered personnel.

e. Qualified Person, Fall Protection: A person with a recognized degree or professional certificate and with extensive knowledge, training and experience in the fall protection and rescue field who is capable of designing, analyzing, evaluating and specifying fall protection and rescue systems; shall have an advanced understanding of the regulatory requirements, physical sciences and engineering principles that affect equipment and systems for FP and rescue; be able to calculate forces generated by an arrested fall, the total loading and the deflection of the fall arrest anchorage, the impact on the structural members to which the fall arrest system is attached and shall be able to determine safe locations of anchorages; shall supervise the design, selection, installation and inspection of certified anchorages and horizontal lifelines.

f. Recordable Injuries or Illnesses. Any work-related injury or illness that results in:

(1) Death, regardless of the time between the injury and death, or the length of the illness;

(2) Days away from work (any time lost after day of injury/illness onset);

- (3) Fatal injury / illness;
- (4) Permanent totally disabling injury/illness;
- (5) Permanent partial disabling injury/illness;

(6) One(1) or more persons hospitalized as inpatients as a result of a single occurrence;

(7) \$500,000 or greater accidental property damage;

(8) Three(3) or more individuals become ill or have a medical condition which is suspected to be related to a site condition, or a hazardous or toxic agent on the site;

(9) Restricted work;

(10) Transfer to another job;

(11) Medical treatment beyond first aid;

(12) Loss of consciousness; or

(13) A significant injury or illness diagnosed by a physician or other licensed health care professional, even if it did not result in (1) through (13) above.

g. "USACE" property and equipment specified in USACE EM 385-1-1 should be interpreted as Government property and equipment.

h. Weight Handling Equipment (WHE) Accident. A WHE accident occurs when any one or more of the six elements in the operating envelope fails to perform correctly during operation, including operation during maintenance or testing resulting in personnel injury or death; material or equipment damage; dropped load; derailment; two-blocking; overload; and/or collision, including unplanned contact between the load, crane, and/or other objects. A dropped load, derailment, two-blocking, overload and collision are considered accidents even though no material damage or injury occurs. A component failure (e.g., motor burnout, gear tooth failure, bearing failure) is not considered an accident solely due to material or equipment damage unless the component failure results in damage to other components (e.g., dropped boom, dropped load, roll over, etc.).

i. Low-slope roof. A roof having a slope less than or equal to 4 in 12 (vertical to horizontal).

j. Steep roof. A roof having a slope greater than 4 in 12 (vertical to horizontal).

k. Certified Safety Professional/Certified Industrial Hygienist Qualifications

(1) Certified Construction Health & Safety Technician (CHST). An individual who is currently certified by the Board of Certified Safety Professionals.

(2) Certified Industrial Hygienist (CIH). An individual who is currently certified by the American Board of Industrial Hygiene.

(3) Certified Safety Professional (CSP). An individual who is currently certified by the Board of Certified Safety Professionals.

(4) Certified Safety Trained Supervisor (STS). An individual who is currently certified by the Board of Certified Safety Professionals.

(5) Associate Safety Professional (ASP). An individual who is currently certified by the Board of Certified Safety Professionals.

#### 1.4 REGULATORY REQUIREMENTS

In addition to the detailed requirements included in the provisions of this contract, work performed shall comply with USACE EM 385-1-1, federal, state, local, host nation laws, ordinances, criteria, rules and regulations. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting work.

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Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements shall apply.

1.5 SITE QUALIFICATIONS, DUTIES AND MEETINGS

1.5.1 Personnel Qualifications

1.5.1.1 Site Safety and Health Officer Qualifications(SSHO)

a. A Site Safety and Health Officer (SSHO)and alternate(s) shall be provided at the work site at all times and shall be a member of the onsite work organization and be responsible for overall management of the safety and occupational health program. The SSHO shall have the authority to act in all safety matters for the Contractor at all times to perform safety and occupational health management, surveillance, inspections, and safety enforcement for the Contractor. The SSHO and alternate(s) shall be employed by the Prime Contractor and shall report to a corporate safety official or other corporate official not engaged in quality control or supervision.

The SSHO shall be:

assigned no other duties except being the SSHO, shall not be the CQC System Manager or Superintendent.

b. The SSHO and alternate(s)shall have an experience Level as follows and the Contractor must show evidence that the SSHO and alternate(s) have met these requirements. When an alternate is required for the project, the alternate shall have the same experience level and other qualifications as the SSHO. In addition, the SSHO and alternate(s) are also required to have:

(1) Completed, as a minimum, the 30-Hour OSHA Construction Industry safety class with current First Aid and CPR Training / AED.

(2) Either a person with 10 years of demonstratable SSHO experience on similar projects or a College graduate with Five (5) years of Construction Industry safety experience on similar projects in supervising or managing general or industry construction (managing safety programs or processes or conducting hazard analyses and developing controls).

(3) Maintained experience through having taken 24 hours of documented formal or on-line safety and health related coursework in the past three years. The training must be applicable to the work being performed on the contract. Teaching is not considered the equivalent of attending training.

(4) SSHO shall be able to demonstrate training in the following areas: personal protective equipment and clothing to include selection, use and maintenance; hazard communication; excavation; scaffolding; fall protection; ; ; health hazard recognition, evaluation and control of chemical, physical and biological agents.

c. To insure that safety and health conditions are maintained/enforced at all times, and a SSHO is present at all times, the Contractor shall designate one or more alternates to perform the safety and health requirements stated herein to cover any period when the SSHO can not be

present, such as during absences for vacations/extended sickness, or when there are multiple shifts that requires additional coverage. The alternate(s) shall have the same qualifications/training/ education requirements as the SSHO.

d. The Contractor shall identify the SSHO and alternate(s)for this project and shall submit qualifications to the Government in resume form for acceptance. A copy of the letter to the SSHO and alternate(s) signed by an authorized official of the firm describing responsibilities and delegating authority to stop work when safety or occupational health of workers is compromised must be provided to the Government.

e. Acceptance of the Contractor's SSHO and alternate(s) is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during construction. The Government reserves the right to require the Contractor to make changes to operations including removal of personnel, as necessary, to obtain a safe work site. At no time will the job be permitted to operate without a SSHO on duty at the work site.

f. Duties of the SSHO shall include, as a minimum, the following in addition to the duties now listed per other paragraphs of this Section:

(1) Prepare the Contractor's Safety Plan, and Activity Hazard Analysis for each definable feature of work;

(2) Provide safety indoctrination to all construction site visitors;

(3) Ensure the Contractor's accepted Accident Prevention Plan is carried out;

(4) Ensure that all Contractor/subcontractor employees have all HTRW, asbestos, and lead paint training, and their personnel protection equipment meets applicable OSHA/EPA requirements;

(5) Conducts daily walk through of the site ensuring work is being accomplished safely and occupational health is not compromised;

(6) Attend and participate in all preparatory and initial quality control phase meetings;

(7) Conduct weekly safety meetings for all workers;

(8) Conduct monthly supervisory safety meetings;

(9) Provide accident reports;

(10) Produce a Daily Safety Report of activities performed and attach this report to the Contractor's Quality Control Report.

(11) Provide minutes for weekly and monthly safety meetings, minutes to be attached with the Daily Safety Report.

1.5.2 Personnel Duties

1.5.2.1 Site Safety and Health Officer (SSHO)

a. Conduct daily safety and health inspections and maintain a written log which includes area/operation inspected, date of inspection, identified

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hazards, recommended corrective actions, estimated and actual dates of corrections. Safety inspection logs shall be attached to the Contractors' daily quality control report.

b. Conduct mishap investigations and complete required reports. Maintain the OSHA Form 300 for prime contractor.

c. Maintain applicable safety reference material on the job site.

d. Attend the pre-construction conference, pre-work safety conference, pre-work meetings including preparatory inspection meeting, and periodic in-progress meetings.

e. Implement and enforce accepted APPS and AHAs.

f. Maintain a safety and health deficiency tracking system that monitors outstanding deficiencies until resolution. A list of unresolved safety and health deficiencies shall be posted on the safety bulletin board.

g. Ensure sub-contractor compliance with safety and health requirements.

h. Other duties as identified per LRL Section 01 45 04.10 06 Contractor Quality Control. Failure to perform the above duties shall result in dismissal of the SSHO, and/or CQC System Manager, and/or superintendent and a project work stoppage. The project work stoppage will remain in effect pending approval of a suitable replacement.

#### 1.5.3 Meetings

#### 1.5.3.1 Prework Safety Conference

a. Contractor representatives who have a responsibility or significant role in accident prevention on the project shall attend the prework safety conference. The purpose of the prework safety conference is for the Contractor and the Contracting Officer's representatives to become acquainted and explain the functions and operating procedures of their respective organizations and to reach mutual understanding relative to the administration of the overall project's APP before the initiation of work. This includes the project superintendent, Site Safety and Health Officer, Quality Control System Manager, or any other assigned safety and health professionals who participated in the development of the APP (including the Activity Hazard Analyses (AHAs) and special plans, program and procedures associated with it).

b. The Contractor shall discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of anticipated AHAs that will be developed and implemented during the performance of the contract. This list of proposed AHAs will be reviewed at the conference and an agreement will be reached between the Contractor and the Contracting Officer's representative as to which phases will require an analysis. In addition, a schedule for the preparation, submittal, review, and acceptance of AHAs shall be established to preclude project delays.

c. Deficiencies in the submitted APP will be brought to the attention of the Contractor at the prework safety conference, and the Contractor shall revise the plan to correct deficiencies and re-submit it for acceptance. Work shall not begin until there is an accepted APP.

d. The functions of a prework safety conference, may take place at the Post-Award Kickoff meeting for Design Build Contracts.

#### 1.5.3.2 Weekly Safety Meetings

Shall be conducted and documented as required by EM 385-1-1. Minutes showing contract title, signatures of attendees and a list of topics discussed shall be attached to the Contractors' daily quality control report.

#### 1.5.3.3 Work Phase Meetings

The appropriate AHA shall be reviewed and attendance documented by the Contractor at the preparatory, initial, and follow-up control phases of quality control inspection in accordance with LRL Section 01 45 04.10 06 CONTRACTOR QUALITY CONTROL. The analysis should be used during daily inspections to ensure the implementation and effectiveness of safety and health controls; and the results reported on the daily QC Report.

#### 1.6 TRAINING

#### 1.6.1 New Employee Indoctrination

New employees (prime and sub-contractor) will be informed of specific site hazards before they begin work. Documentation of this orientation shall be kept on file at the project site.

#### 1.6.2 Periodic Training

Provide Safety and Health Training in accordance with USACE EM 385-1-1 and the accepted APP. Ensure all required training has been accomplished for all onsite employees.

#### 1.6.3 Training on Activity Hazard Analysis (AHA)

Prior to beginning a new control phase, training will be provided to all affected employees to include a review of the AHA to be implemented.

#### 1.7 ACCIDENT PREVENTION PLAN (APP)

a. The Contractor shall use a qualified person to prepare the written site-specific APP. Prepare the APP in accordance with the format and requirements of USACE EM 385-1-1 and as supplemented herein. Cover all paragraph and subparagraph elements in USACE EM 385-1-1, Appendix A, "Minimum Basic Outline for Accident Prevention Plan". Specific requirements for some of the APP elements are described below. The APP shall be job-specific and shall address any unusual or unique aspects of the project or activity for which it is written. The APP shall interface with the Contractor's overall safety and health program. Any portions of the Contractor's overall safety and health program referenced in the APP shall be included in the applicable APP element and made site-specific. The Government considers the Prime Contractor to be the "controlling authority" for all work site safety and health of the subcontractors. Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out. The APP shall be signed per

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requirements of EM 385-1-1, Appendix A-1, Paragraph 3, Signature Sheet.

Fatigue Management Plan Bloodborne Pathogen Plan Exposure Control Plan Automatic External Defibrillator (AED) Program Site Layout Plan

Access/Haul Road Plan Hearing Conservation Program Respiratory Protection Plan Health Hazard Control Program Hazard Communication Program

Process Safety Management Plan Lead Compliance Plan & Specifications Asbestos Abatement Plan & Specifications

Heat Stress Monitoring Plan Cold Stress Monitoring Plan Indoor Air Quality Management Plan Mold Remediation Plan Chromium (VI) Exposure Evaluation

Crystalline Silica Assessment Lighting Plan for Night Operations Traffic Control Plan Fire Prevention Plan Wild Land Fire Management Plan

Arc Flash Hazard Analysis Assured Equipment Grounding Control Program (AEGCP) Hazardous Energy Control Plan Standard Pre-Lift Plan (LHE) Critical Lift Plan - LHE

Fall Protection and Prevention Plan Demolition/Renovation Plan (to include engineering survey) Rope Access Work Plan Excavation/Trenching Plan

Fire Prevention & Protection Plan for Underground Construction Compressed Air Plan for Underground Construction Erection and Removal Plan for Formwork and Shoring PreCast Concrete Plan Lift-Slab Plans

Masonry Bracing Plan Steel Erection Plan

Tree Felling/Maintenance Program Site Safety and Health Plan (HTRW) Confined Space Entry Procedures Confined Space Program

b. Submit the APP to the Contracting Officer fifteen (15) calendar days prior to the date of the prework safety conference for acceptance. Work cannot proceed without an accepted APP. The Contracting Officer reviews and comments on the Contractor's submitted APP and accepts it when it

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meets the requirements of the contract provisions.

c. Acceptance is conditional and will be predicated on satisfactory performance during the construction. Once accepted by the Contracting Officer, the APP and attachments will be enforced as part of the contract. Disregarding the provisions of this contract or the accepted APP will be cause for stopping of work, at the discretion of the Contracting Officer, until the matter has been rectified. Work cannot proceed without an accepted APP.

d. Once work begins, changes to the accepted APP shall be made with the knowledge and concurrence of the Contracting Officer, project superintendent, SSHO and Construction Quality Control System Manager. Should any hazard become evident, stop work in the area, and secure the area. The project superintendent shall inform/notify the Contracting Officer within 12 hours of discovery, both verbally and in writing, and develop a plan for resolution as soon as possible to eliminate/ remove the hazard. In the interim, all necessary action shall be taken to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public (as defined by ASSP A10.34,) and the environment.

e. Copies of the accepted plan will be maintained at the Resident Engineer's office and at the contractor's job site office.

f. The APP shall be continuously reviewed and amended, as necessary, throughout the life of the contract. Unusual or high-hazard activities not identified in the original APP shall be incorporated in the plan as they are discovered.

#### 1.8 ACTIVITY HAZARD ANALYSIS (AHA)

a. The Activity Hazard Analysis (AHA) format shall be in accordance with USACE EM 385-1-1 as modified by the Louisville District, using CELRL Form 1259, current edition. Submit the AHA for review at least fifteen (15) calendar days prior to the start of each phase. Format subsequent AHAs as amendments to the APP.

b. An AHA will be developed by the Contractor for every operation involving a type of work presenting hazards not experienced in previous project operations or where a new work crew or subcontractor is to perform work. In addition, AHA's are needed using the project schedule as the basis for the activities performed. Any activities listed on the project schedule will require an AHA. The AHA's will either be developed by the contractor, supplier or subcontractor and provided to the prime contractor for submittal to the Contracting Officer. The analysis must identify and evaluate hazards and outline the proposed methods and techniques for the safe completion of each phase of work. At a minimum, define activity being performed, sequence of work, specific safety and health hazards anticipated, control measures (to include personal protective equipment) to eliminate or reduce each hazard to acceptable levels, equipment to be used, inspection requirements, training requirements for all involved, and the competent person in charge of that phase of work. The analysis should be used during daily inspections to ensure the implementation and effectiveness of the activity's safety and health controls. For work with fall hazards, including fall hazards associated with scaffold erection and removal, identify the appropriate fall arrest systems. For work with materials handling equipment, address safeguarding measures related to materials handling equipment. For work requiring excavations, include

requirements for safeguarding excavations.

c. The analysis should be used during daily inspections to ensure the implementation and effectiveness of the activity's safety and health controls.

d. The AHA list will be reviewed periodically (at least monthly) at the Contractor supervisory safety meeting and updated as necessary when procedures, scheduling, or hazards change.

e. Activity hazard analyses shall be updated as necessary to provide an effective response to changing work conditions and activities. The on-site superintendent, site safety and health officer and competent persons used to develop the AHAs, including updates, shall sign and date the AHAs before they are implemented.

f. The activity hazard analyses shall be developed using the project schedule as the basis for the activities performed. Any activities listed on the project schedule will require an AHA. The AHAs will be developed by the contractor, supplier or subcontractor and provided to the prime contractor for submittal to the Contracting Officer.

#### 1.9 DISPLAY OF SAFETY INFORMATION

Within one (1) calendar day after commencement of work, erect a safety bulletin board at the job site. The safety bulletin board shall include information and be maintained as required by EM 385-1-1, Section 01.A.07.

#### 1.10 SITE SAFETY REFERENCE MATERIALS

Maintain safety-related references applicable to the project, including those listed in the article "References." Maintain applicable equipment manufacturer's manuals.

#### 1.11 EMERGENCY MEDICAL TREATMENT

Contractors will arrange for their own emergency medical treatment. Government has no responsibility to provide emergency medical treatment.

#### 1.12 REPORTS

Submit reports as their incidence occurs, in accordance with the requirements of this paragraph entitled, "Reports."

#### 1.12.1 Accident Reports

For recordable injuries and illnesses, and property damage accidents resulting in at least \$5,000 in damages, the Prime Contractor shall conduct an accident investigation to establish the root cause(s) of the accident, complete the USACE Accident Report Form 3394 and provide the report to the Contracting Officer within five (5) calendar day(s) of the accident. The Contracting Officer will provide copies of any required or special forms.

#### 1.12.2 Accident Notification

Notify the Contracting Officer as soon as practical, but not later than four hours, after any accident meeting the definition of Recordable Injuries or Illnesses or High Visibility Accidents, property damage equal

to or greater than \$5,000, or any weight handling equipment accident. Information shall include contractor name; contract title; type of contract; name of activity, installation or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of accident (to include type of construction equipment used, PPE used, etc.). Preserve the conditions and evidence on the accident site until the Government investigation team arrives on-site and Government investigation is conducted.

#### 1.12.3 Monthly Exposure Reports

Monthly exposure reporting to the Contracting Officer is required to be attached to the monthly billing request. This report is a compilation of employee-hours worked each month for all site workers, both prime and subcontractor.

#### 1.12.4 Regulatory Citations and Violations

Contact the Contracting Officer immediately of any OSHA or other regulatory agency inspection or visit, and provide the Contracting Officer with a copy of each citation, report, and contractor response. Correct violations and citations promptly and provide written corrective actions to the Contracting Officer.

#### 1.12.5 Crane Reports

Submit crane inspection reports required in accordance with USACE EM 385-1-1 and as specified herein with Daily Reports of Inspections.

#### 1.12.6 Crane Certificate of Compliance

The Contractor shall provide a Certificate of Compliance for each crane entering an activity under this contract (see Contracting Officer for a blank certificate). Certificate shall state that the crane and rigging gear meet applicable OSHA regulations (with the Contractor citing which OSHA regulations are applicable, e.g., cranes used in construction, demolition, or maintenance shall comply with 29 CFR 1926 and USACE EM 385-1-1 Section 16. Certify on the Certificate of Compliance that the crane operator(s) is qualified and trained in the operation of the crane to be used. The Contractor shall also certify that all of its crane operators working on the DOD activity have been trained in the proper use of all safety devices (e.g., anti-two block devices). These certifications shall be posted on the crane.

#### 1.12.7 Critical Lift Plan

Prior to performing Load Handling Equipment Critical Lifts, as identified in EM 385-1-1, a detailed Critical Lift Plan shall be developed and written by a competent person complying with all USACE requirements in EM 385-1-1. As part of the Critical Lift Plan, Proof of qualification for Crane Operators, lift supervisors and the rigger shall be submitted to the GDA.

#### 1.12.8 Confined Space Entry Permit

In accordance with 29 CFR 1910, 29 CFR 1915 and EM 385-1-1, prior to entering a permit required confined space, a confined space entry permit shall be completed, reviewed, processed, signed and maintained. The entry

supervisor or manager shall be required to sign all permits daily before entry.

#### 1.13 HOT WORK PERMIT

Prior to performing "Hot Work" (welding, cutting, etc.) or operating other flame-producing/spark producing devices, a written Hot Work Permit shall be requested from the area, base, post or local fire district. CONTRACTORS ARE REQUIRED TO MEET ALL CRITERIA BEFORE A PERMIT IS ISSUED. The Contractor will provide at least two (2) twenty (20) pound 4A:20 BC rated extinguishers for normal "Hot Work". All extinguishers shall be current inspection tagged, approved safety pin and tamper resistant seal. It is also mandatory to have a designated FIRE WATCH for any "Hot Work" done at this activity. The Fire Watch shall be trained in accordance with NFPA 51B and remain on-site for a minimum of 60 minutes after completion of the task or as specified on the hot work permit.

When starting work in the facility, Contractors shall require their personnel to familiarize themselves with the location of the nearest fire alarm boxes and place in memory the emergency Fire Division phone number. ANY FIRE, NO MATTER HOW SMALL, SHALL BE REPORTED TO THE RESPONSIBLE FIRE DIVISION IMMEDIATELY.

- PART 2 PRODUCTS NOT USED
- PART 3 EXECUTION
- 3.1 CONSTRUCTION AND/OR OTHER WORK

The Contractor shall comply with USACE EM 385-1-1, NFPA 241, the APP, the AHA, Federal and/or State OSHA regulations, and other related submittals and installation/activity fire and safety regulations. The most stringent standard shall prevail.

3.1.1 Hazardous Material Use

Each hazardous material must receive approval prior to being brought onto the job site or prior to any other use in connection with this contract. Allow a minimum of ten (10) working days for processing of the request for use of a hazardous material.

3.1.2 Hazardous Material Exclusions

Notwithstanding any other hazardous material used in this contract, radioactive materials or instruments capable of producing ionizing/non-ionizing radiation (with the exception of radioactive material and devices used in accordance with USACE EM 385-1-1 such as nuclear density meters for compaction testing and laboratory equipment with radioactive sources) as well as materials which contain asbestos, mercury or polychlorinated biphenyls, di-isocynates, lead-based paint are prohibited. The Contracting Officer, upon written request by the Contractor, may consider exceptions to the use of any of the above excluded materials.

3.1.3 Unforeseen Hazardous Material

The design should have identified materials such as PCB, lead paint, and friable and non-friable asbestos. If additional material, not indicated, that may be hazardous to human health upon disturbance during construction

operations is encountered, stop that portion of work and notify the Contracting Officer immediately. Within fourteen (14) calendar days the Government will determine if the material is hazardous. If material is not hazardous or poses no danger, the Government will direct the Contractor to proceed without change. If material is hazardous and handling of the material is necessary to accomplish the work, the Government will issue a modification pursuant to FAR 52.243-4 - Changes and FAR 52.236-2 - Differing Site Conditions.

#### 3.1.4 Unanticipated Discovery of Ordnance and Explosives

If during the course of construction operations, any unanticipated or unplanned discovery of Munitions and Explosives of Concern (MEC), Explosive Media, Chemical Warfare Media (CWM), or chemical agent contaminated media (CACM) occurs, all work must cease, personnel must withdraw from the affected area and the Contracting Officer's Representative (COR) must be contacted for further information and direction. Refer ER 385-1-95 and EM 385-1-97 for additional requirements.

#### 3.2 PRE-OUTAGE COORDINATION MEETING

Contractors are required to apply for utility outages at least fifteen (15) days in advance. As a minimum, the request should include the location of the outage, utilities being affected, duration of outage and any necessary sketches. Special requirements for electrical outage requests are contained elsewhere in this specification section. Once approved, and prior to beginning work on the utility system requiring shut down, the Contractor shall attend a pre-outage coordination meeting with the Contracting Officer and the Installation representative to review the scope of work and the lock-out/tag-out procedures for worker protection. No work will be performed on energized electrical circuits unless proof is provided that no other means exist.

#### 3.3 FALL HAZARD PROTECTION AND PREVENTION PROGRAM

The Contractor shall establish a fall protection and prevention program, for the protection of all employees exposed to fall hazards. The program shall include company policy, identify responsibilities, education and training requirements, fall hazard identification, prevention and control measures, inspection, storage, care and maintenance of fall protection equipment and rescue and evacuation procedures.

#### 3.3.1 Training

The Contractor shall institute a fall protection training program. As part of the Fall Hazard Protection and Prevention Program, the Contractor shall provide training for each employee who might be exposed to fall hazards. A competent person for fall protection shall provide the training. Training requirements shall be in accordance with USACE EM 385-1-1, Section 21.C.

#### 3.3.2 Fall Protection Equipment and Systems

The Contractor shall enforce use of the fall protection equipment and systems designated for each specific work activity in the Fall Protection and Prevention Plan and/or AHA at all times when an employee is exposed to a fall hazard or on a surface 6 feet or more above lower levels. Fall protection systems such as guardrails/toeboards, personnel fall arrest system, safety nets, etc., are required when working within 6 feet of any

leading edge and employees shall be protected from fall hazards as specified in EM 385-1-1, Section 21. In addition to the required fall protection systems, safety skiff, personal floatation devices, life rings etc., are required when working above or next to water in accordance with USACE EM 385-1-1, Section 21. Personal fall arrest systems are required when working from an articulating or extendible boom, swing stages, or suspended platform. In addition, personal fall arrest systems are required when operating other equipment such as scissor lifts if the work platform is capable of being positioned outside the wheelbase. The need for tying-off in such equipment is to prevent ejection of the employee from the equipment during raising, lowering, or travel. Fall protection must comply with 29 CFR 1926.500, Subpart M, USACE EM 385-1-1 and ASSP A10.32.

#### 3.3.2.1 Personal Fall Arrest Equipment

Personal fall arrest equipment, systems, subsystems, and components shall meet ASSP Z359.1. Only a full-body harness with a shock-absorbing lanyard or self-retracting lanyard is an acceptable personal fall arrest body support device. Body belts may only be used as a positioning device system (for uses such as steel reinforcing assembly and in addition to an approved fall arrest system). Harnesses shall have a fall arrest attachment affixed to the body support (usually a Dorsal D-ring) and specifically designated for attachment to the rest of the system. Only locking snap hooks and carabiners shall be used. Webbing, straps, and ropes shall be made of synthetic fiber. The maximum free fall distance when using fall arrest equipment shall not exceed (6 feet). The total fall distance and any swinging of the worker (pendulum-like motion) that can occur during a fall shall always be taken into consideration when attaching a person to a fall arrest system.

#### 3.3.3 Fall Protection for Roofing Work

Fall protection controls shall be implemented based on the type of roof being constructed and work being performed. The roof area to be accessed shall be evaluated for its structural integrity including weight-bearing capabilities for the projected loading.

a. Low Sloped Roofs:

(1) For work within (6 feet) of an edge, on low-slope roofs, personnel shall be protected from falling by use of personal fall arrest systems, guardrails, or safety nets.

(2) For work greater than (6 feet) from an edge, warning lines shall be erected and installed in accordance with 29 CFR 1926.500 and USACE EM 385-1-1.

b. Steep-Sloped Roofs: Work on steep-sloped roofs requires a personal fall arrest system, guardrails with toe-boards, or safety nets. This requirement also includes residential or housing type construction.

#### 3.3.4 Existing Anchorage

Existing anchorages, to be used for attachment of personal fall arrest equipment, shall be certified (or re-certified) by a qualified person for fall protection in accordance with ASSP Z359.1. Exiting horizontal lifeline anchorages shall be certified (or re-certified) by a registered

professional engineer with experience in designing horizontal lifeline systems.

3.3.5 Horizontal Lifelines

Horizontal lifelines shall be designed, installed, certified and used under the supervision of a qualified person for fall protection as part of a complete fall arrest system which maintains a safety factor of 2 ( 29 CFR 1926.500).

3.3.6 Guardrails and Safety Nets

Guardrails and safety nets shall be designed, installed and used in accordance with EM 385-1-1 and 29 CFR 1926 Subpart M.

#### 3.3.7 Rescue and Evacuation Procedures

When personal fall arrest systems are used, the contractor must ensure that the mishap victim can self-rescue or can be rescued promptly should a fall occur. A Rescue and Evacuation Plan shall be prepared by the contractor and include a detailed discussion of the following: methods of rescue; methods of self-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical facility. The Rescue and Evacuation Plan shall be included in the Activity Hazard Analysis (AHA) for the phase of work, in the Fall Protection and Prevention (FP&P) Plan and the Accident Prevention Plan (APP).

#### 3.4 SCAFFOLDING

Employees shall be provided with a safe means of access to the work area on the scaffold. Climbing of any scaffold braces or supports not specifically designed for access is prohibited. Access to scaffold platforms greater than 6 (six) feet in height shall be accessed by use of a scaffold stair system. Vertical ladders commonly provided by scaffold system/tower manufacturers shall not be used for accessing scaffold platforms greater than 6 (six) feet in height. The use of an adequate gate is required. Contractor shall ensure that employees are qualified to perform scaffold erection and dismantling. Do not use scaffold without the capability of supporting at least four times the maximum intended load or without appropriate fall protection as delineated in the accepted fall protection and prevention plan. Stationary scaffolds must be attached to structural building components to safeguard against tipping forward or backward. Special care shall be given to ensure scaffold systems are not overloaded. Side brackets, used to extend scaffold platforms on self-supported scaffold systems for the storage of material is prohibited. The first tie-in shall be at the height equal to 4 times the width of the smallest dimension of the scaffold base. Work platforms shall be placed on mud sills. Scaffold or work platform erectors shall have fall protection during the erection and dismantling of scaffolding or work platforms that are more than 6 (six) feet. Delineate fall protection requirements when working above 6 (six) feet or above dangerous operations in the Fall Protection and Prevention (FP&P) Plan and Activity Hazard Analysis (AHA) for the phase of work.

#### 3.4.1 Stilts

The use of stilts in conjunction with scaffolds is prohibited. Stilts shall not be used for gaining additional height for construction,

renovation, repair or maintenance work; see EM 385-1-1 for types of scaffolds where this requirement applies.

#### 3.5 EQUIPMENT

3.5.1 Material Handling Equipment

a. Material handling equipment such as forklifts shall not be modified with work platform attachments for supporting employees unless specifically delineated in the manufacturer's printed operating instructions.

b. The use of hooks on equipment for lifting of material must be in accordance with manufacturer's printed instructions.

c. Operators of forklifts or power industrial trucks shall be licensed in accordance with OSHA.

3.6 Weight Handling Equipment

a. Cranes and derricks shall be equipped as specified in EM 385-1-1, Section 16.

b. The Contractor shall notify the Contracting Officer fifteen (15) days in advance of any cranes entering the activity so that necessary quality assurance spot checks can be coordinated. Contractor's operator shall remain with the crane during the spot check.

c. The Contractor shall comply with the crane manufacturer's specifications and limitations for erection and operation of cranes and hoists used in support of the work. Erection shall be performed under the supervision of a designated person (as defined in ASME B30.5). All testing shall be performed in accordance with the manufacturer's recommended procedures.

d. The Contractor shall comply with ASME B30.5 for mobile and locomotive cranes, ASME B30.22 for articulating boom cranes, ASME B30.3 for construction tower cranes, and ASME B30.8 for floating cranes and floating derricks.

e. Under no circumstance shall a Contractor make a lift at or above 85% of the cranes rated capacity in any configuration.

f. When operating in the vicinity of overhead transmission lines, operators and riggers shall be alert to this special hazard and shall follow the requirements of USACE EM 385-1-1 and ASME B30.5 or ASME B30.22 as applicable.

g. Crane suspended personnel work platforms (baskets) shall not be used unless the Contractor proves that using any other access to the work location would provide a greater hazard to the workers or is impossible. Personnel shall not be lifted with a line hoist or friction crane.

h. Portable fire extinguishers shall be inspected, maintained, and recharged as specified in NFPA 10, Standard for Portable Fire Extinguishers.

i. All employees shall be kept clear of loads about to be lifted and of suspended loads.

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j. The Contractor shall use cribbing when performing lifts on outriggers.

k. The crane hook/block must be positioned directly over the load. Side loading of the crane is prohibited.

1. A physical barricade must be positioned to prevent personnel from entering the counterweight swing (tail swing) area of the crane.

m. Certification records which include the date of inspection, signature of the person performing the inspection, and the serial number or other identifier of the crane that was inspected shall always be available for review by Contracting Officer personnel.

n. Written reports listing the load test procedures used along with any repairs or alterations performed on the crane shall be available for review by Contracting Officer personnel.

o. Certify that all crane operators have been trained in proper use of all safety devices (e.g. anti-two block devices).

p. Each load shall be rigged/attached independently to the hook/master-link in such a fashion that the load cannot slide or otherwise become detached. Multiple Lift Rigging (MLR aka "Christmas Tree Rigging") is not allowed unless it is for the purpose of erecting/placing structural steel ONLY.

q. The presence of Government personnel does not relieve the Contractor of an obligation to comply with all applicable safety regulations. The Government will investigate all complaints of unsafe or unhealthful working conditions received in writing from contractor employees, federal civilian employees, or military personnel.

#### 3.7 EXCAVATIONS

The competent person shall perform soil classification in accordance with 29 CFR 1926.

#### 3.7.1 Utility Locations

Prior to digging, the appropriate digging permit must be obtained. All underground utilities in the work area must be positively identified by a private utility locating service in addition to any station locating service and coordinated with the station utility department. Any markings made during the utility investigation must be maintained throughout the contract.

#### 3.7.2 Utility Location Verification

The Contractor must physically verify underground utility locations by hand digging using wood or fiberglass handled tools when any adjacent construction work is expected to come within three feet of the underground system. Digging within 2 feet of a known utility must not be performed by means of mechanical equipment; hand digging shall be used. If construction is parallel to an existing utility the utility shall be exposed by hand digging every 100 feet if parallel within 5 feet of the excavation.

#### 3.7.3 Shoring Systems

Trench and shoring systems must be identified in the accepted safety plan and AHA. Manufacture tabulated data and specifications or registered engineer tabulated data for shoring or benching systems shall be readily available on-site for review. Job-made shoring or shielding shall have the registered professional engineer stamp, specifications, and tabulated data. Extreme care must be used when excavating near direct burial electric underground cables.

#### 3.7.4 Trenching Machinery

Trenching machines with digging chain drives shall be operated only when the spotters/laborers are in plain view of the operator. Operator and spotters/laborers shall be provided training on the hazards of the digging chain drives with emphasis on the distance that needs to be maintained when the digging chain is operating. Documentation of the training shall be kept on file at the project site.

#### 3.8 UTILITIES WITHIN CONCRETE SLABS

Utilities located within concrete slabs or pier structures, bridges, and the like, are extremely difficult to identify due to the reinforcing steel used in the construction of these structures. Whenever contract work involves concrete chipping, saw cutting, or core drilling, the existing utility location must be coordinated with station utility departments in addition to a private locating service. Outages to isolate utility systems shall be used in circumstances where utilities are unable to be positively identified. The use of historical drawings does not alleviate the contractor from meeting this requirement.

#### 3.9 ELECTRICAL

#### 3.9.1 Conduct of Electrical Work

Underground electrical spaces must be certified safe for entry before entering to conduct work. Cables that will be cut must be positively identified and de-energized prior to performing each cut. Positive cable identification must be made prior to submitting any outage request for electrical systems. Arrangements are to be coordinated with the Contracting Officer and Station Utilities for identification. The Contracting Officer will not accept an outage request until the Contractor satisfactorily documents that the circuits have been clearly identified. Perform all high voltage cable cutting remotely using hydraulic cutting tool. When racking in or live switching of circuit breakers, no additional person other than the switch operator will be allowed in the space during the actual operation. Plan so that work near energized parts is minimized to the fullest extent possible. Use of electrical outages clear of any energized electrical sources is the preferred method. When working in energized substations, only qualified electrical workers shall be permitted to enter. When work requires Contractor to work near energized circuits as defined by the NFPA 70, high voltage personnel must use personal protective equipment that includes, as a minimum, electrical hard hat, safety shoes, insulating gloves with leather protective sleeves, fire retarding shirts, coveralls, face shields, and safety glasses. In addition, provide electrical arc flash protection for personnel as required by NFPA 70E. Insulating blankets, hearing protection, and switching suits may also be required, depending on the specific job and as delineated in the Contractor's AHA.

#### 3.9.2 Portable Extension Cords

Portable extension cords shall be sized in accordance with manufacturer ratings for the tool to be powered and protected from damage. All damaged extension cords shall be immediately removed from service. Portable extension cords shall meet the requirements of NFPA 70.

-- End of Section --

# Energy & Sustainability Record Card

PROJECT INFORMATION	57		<b>,</b>		
Project No.:		FY I	MILCON Project No. / Ot	her Customer Refere	nce No.:
Location:					
USACE Project Manager:				Pro	oject Design Level:
Facility Area:	Units (SF/S	SM):	Category Code:		Facility #:
AE Firm Name:					
AE Contract # & T.O.:			AE Sustainability PC	DC:	
Construction Contractor:					Award Date:
Construction Contract & T.O.:					BOD Date:
Contractor Sustainability POC:					
SUSTAINABILITY DATA - GUIDING	PRINCIPLES for SU	STAINABLE DEV	ELOPMENT		
OVERALL COMPLIANCE:	<b>O</b>				
	Complies with	UFC 1-200-0	D2 and Agency S	bustainability i	Policy Building
	does not meet	the criteria	for tracking in U	FC 1-200-02/P	olicy
	An Exemption	has been:	Requested	Granted	N/A
BUILDING IDENTIFICAT	ION:				
1 How many buildings are inc	cluded in this project?				
2 Of those, which building is	this form for?				
3 New building or stand-alone	e addition greater than	or equal to 10,00	0 GSF? Yes N	0	
- If project is for more than o	ne building for which tr	acking is required,	complete a separate form	n for each building.	
- If an element was not achie	ved at project completi	on, mark "Not Atta	ined" and include a justifi	cation in the "Not attai	ned reason" field.
DOCUMENTATION OF COMPI	LIANCE WITH GUII	DING PRINCIPL	ES		
I. Employ Integrated Design Princ	iples				
1 <u>Integrated Design</u> Attained In Cor	mpliance Yes	N/A	Not Attained		
	N/A due to	1	Not Attained		
	Miss	sion preclusion	Building/site i	issue	
	Not	LCCE	Renovation o	only: not part of scope	
	Inst	allation/region issu	le		
Not attained reas	son				
2 Commissioning					
2 <u>Commissioning</u> Attained In Cor	npliance Yes	N/A	Not Attained		
<u>ritaniou</u> in con	N/A due to	14,7 (	Not / ttailloa		
	Miss	sion preclusion	Building/site i	issue	
	Not	LCCE	Renovation o	only: not part of scope	
	Insta	allation/region issu	le		
Not attained reas	son				
(i) Systems (	commissioned				]

II. Optimize Energy Performance					
3. Energy Efficiency					
Attained In Complia	ince	Yes	N/A	Not Attained	
	N/A due	to			
		Mission preclu	usion	Building/site issue	
		NOT LCCE		Renovation only: r	tot part of scope
		Installation/reg	gion issue		
Not attained reason					
(i) Energy Saving	s Below Bas	eline %			
(ii) Energy Standa	ard				
		ASHRAE 90. ASHRAE 90.	1-2013 (06NOV16 1-2016	i+)	IECC OTHER:
C Energy Efficient Produ	ate				
Attained In Complia	ince	Yes	N/A	Not Attained	
	N/A due	e to	10/7	Not Attained	
		Mission preclu	usion	Building/site issue	
		Not LCCE		Renovation only: r	not part of scope
		Installation/re	gion issue		
Not attained reason					
Not attained reason					
4. Renewable Energy					
Attained In Complia	ince	Yes	N/A	Not Attained	
	N/A due	to			
		Mission preclu	usion	Building/site issue	and part of soopa
		Installation/re	gion issue	Renovation only. I	
			-		
Not attained reason					
A. Renewable energy tech	nnology types	5			
		Geothermal			Daylighting (quantified passive)
		Ground Source	ce Heat Pumps		Mechanical (i.e., direct water pumping)
		Solar Photovo	oltaic		Micro-hydro
		Solar Therma	I - domestic hot wa	ater	Concentrating (sterling)
		Solar Therma	I - space condition	ing	wind
(i) Annual % of to	otal load				
(ii) System size (ł	watts)				
B. Solar Hot Water Perce	ntage - 30%	target			
Attained In Complia	ince	Yes	N/A	Not Attained	
	N/A due	e to			
		Mission preclu	usion	Building/site issue	_
		Not LCCE		Renovation only: r	not part of scope
		Installation/re	gion issue		
Not attained reason					
(i) Annual % of to	otal load				
(ii) System size (ł	(BTU/Year)				

5. Meter (B	Energy)					
	Attained	In Compliance	Yes	N/A	Not Attained	
		N/A	due to			
			Mission p	reclusion	Building/site issue	
			Not LCCE	: 	Renovation only: not part of scope	
			Installatio	n/region issue		
	Not attai	ined reason				
6. Energy	Use Intensi (i) T	ity kBTU/Sq Ft/Year otal Design Energy U	se Intensity (El	UI): kBTU/Sq Ft∕\	/ear	
Protoct and	Consorval	Wator				
7. Indoor \	Vater Use	Valei				
A.	Water-Effi	cient Products				
	Attained	In Compliance	Yes	N/A	Not Attained	
		N/A	due to			
			Mission p	reclusion	Building/site issue	
			Not LCCE	E	Renovation only: not part of scope	
			Installatio	n/region issue		
	Not attai	ined reason				
	(i) T	otal Design Indoor W	ater Use Intens	sity (WUI) <sup>,</sup> Gallons	/Sg Et/Year	
_						
В.	Indoor Wa	ater Meter	Maa	N1/A		
	Attained	In Compliance	Yes	N/A	Not Attained	
		IN/A	Mission n	reclusion	Building/site issue	
			Not LCCE		Building/site issue	
			Installatio	- n/region issue	Renovation only. Not part of scope	
	Not attai	ined reason				
8. Outdoor	r Water Use	e				
A.	Outdoor V	Vater Meter (for 25,00	0 SF of irrigation	on)		
	(i) Is	there a permanent ir	rigation system	n serving more that	n 25,000 SF of landscaping?	
				Ye	es No	
	,	, , <b>, ,</b> ,				
	(ii) V	Vater Meter	Ma	N1/A		
	Attained	In Compliance	Yes	N/A	Not Attained	
		N/A	aue to	realization		
				eciusion	Duilding/site issue	
			Installatio	: n/region issue	Renovation only. Not part of scope	
	Not attai	ined reason				
			L			
В.	Water-effi	cient landscape	N/	N1/6		
	Attained	In Compliance	Yes	N/A	Not Attained	
		N/A	due to			
			Mission p	reclusion	Building/site issue	
			Not LCCE		Renovation only: not part of scope	
			Installatio	n/region issue		
	NI-4 - 44	and root				
	inot attai	ineu reason				

9. Alterr	native Water L	Jse					
	<u>Attained</u>	In Compliance		Yes	N/A	Not Att	ained
			N/A due	e to Mission pro	aluaian	Duildin	
				Not LCCE	CIUSION	Renov	g/site issue
				Installation/	region issue	T(CHOV	ation only. Not part of scope
				motanation			
	Not attai	ned reason					
	Methods	Used:		Air Handler	Condensate C	apture	Reclaimed Water
				Grey Water			Treated Wastewater
				Harvested F	Rainwater		OTHER:
10 Ctore	autor Monor	amant undatat					
10. Storn	nwater Manag	ement - update t	ne LID L	Jata tad			
/. Enhance I	ndoor Enviro	onmental Quality	,				
11. Ventil	lation and The	ermal Comfort					
	A. Ventilation						
	Attained	In Compliance	N/A due	Yes	N/A	Not At	ained
			N/A due	Mission pro	clusion	Buildin	a/site issue
				Not LCCE	Clusion	Renov	ation only: not part of scope
				Installation/	region issue	i tonov	
					-9		
	Not attai	ned reason					
	B. Thermal C	omfort					
	Attained	In Compliance		Yes	N/A	Not Att	ained
			N/A due	e to			
				Mission pre	clusion	Buildin	g/site issue
				Not LCCE		Renov	ation only: not part of scope
				Installation/	region issue		
	Not attai	ned reason					
12. Daylig	ghting and Lig	hting Controls					
	A. Daylight						
	<u>Attained</u>	In Compliance		Yes	N/A	Not At	ained
			N/A due	e to			
				Mission pre	clusion	Buildin	g/site issue
				NOT LCCE	rogion issue	Renov	ation only: not part of scope
				mstallation	legion issue		
	Not attai	ned reason					
1	B. Automatic	dimming controls					
	Attained	In Compliance		Yes	N/A	Not Atta	ained
		1	N/A due	to			
				Mission pred	clusion	Building	g/site issue
				Not LCCE		Renova	ation only: not part of scope
				Installation/r	egion issue		
	Not attain	and reason					
	NOT ATTAIN	ieu reason					

13. Indoor A	ir Quality						
Α.	Moisture C	ontrol					
	<u>Attained</u>	In Compliance		Yes	N/A	Not Attained	
			N/A due	to			
				Not LCCE	eclusion	Building/site issue	
				Installation/	region issue	Renovation only. Not part of scope	
				motaliation	region issue		
	Not attair	ned reason					
_							
В.	Low-Emitti	ng Materials		Vaa	N1/A		
	Allained	in Compliance	N/A due	to	IN/A	Not Attained	
			N/A due	Mission pre	eclusion	Building/site issue	
				Not LCCE		Renovation only: not part of scope	
				Installation/	/region issue		
					0		
	Not attair	ned reason					
C	Indoor Air	Quality during Co	onstructio	on			
0.	Attained	In Compliance		Yes	N/A	Not Attained	
			N/A due	to			
				Mission pre	eclusion	Building/site issue	
				Not LCCE		Renovation only: not part of scope	
				Installation/	/region issue		
	Not attair	ned reason					
14. Occupa	nt Health ar	nd Wellness					
	Attained	In Compliance		Yes	N/A	Not Attained	
		·	N/A due	to			
				Mission pre	eclusion	Building/site issue	
				Not LCCE		Renovation only: not part of scope	
				Installation/	/region issue		
	Not attair	ned reason					
	not attai						
V. Reduce the E	nvironmer	ntal Impact of M	aterials				
15. Material	Content an	d Performance					
A.	Resource	Conservation an	d Recove	ery Act (RCF	RA) Section 6002	(recycled content)	
	<u>Attained</u>	In Compliance		Yes	N/A	Not Attained	
				Mission pro		Puilding/cite iceus	
				Not I CCE	CIUSION	Benovation only: not part of scope	
				Installation/	region issue	Renovation only. Not part of scope	
				motaliation	Togion locuo		
	Not attair	ned reason					
-	<b>Farm 0</b>			+ A -+ (EOD)	N		
В.	Farm Secu	Inty and Rural In	vestmen	t ACt (FSRIA	A) Section 9002 (E	Not Attained	
	<u>, maineu</u>		N/A due	to		NUL ALLAILEU	
			,,	Mission pre	eclusion	Building/site issue	
				Not LCCE		Renovation only: not part of scope	
				Installation/	/region issue		
	Not attair	ned reason					

16. Waste Managem	ent					
Attained	In Compliance	Yes	S	N/A	Not Attained	
		N/A due to				
		Mis	ssion preclus	sion	Building/site issue	
		Not	t LCCE		Renovation only:	not part of scope
		Ins	tallation/reg	on issue		
Not att	ained reason					
17. Waste Diversion	- 60% target					
Attained	In Compliance	Yes	S	N/A	Not Attained	
		N/A due to				
		Mis	sion preclus	sion	Building/site issue	
		Not	t LCCE		Renovation only:	not part of scope
		Ins	tallation/reg	on issue		
Not att	ained reason					
(i)	Percent diverted					
/ Annon and Consider	Climata Channa	Diaka				
/I. Assess and Consider		RISKS				
18. Address Climate		Ve	_	N1/A		
Allained	in Compliance	Yes	5	N/A	Not Attained	
		N/A due to	nion produ	vion	Building/site issue	
		Not		SOT	Bonovation only:	, and part of scope
		Ins	tallation/reg	on issue	Renovation only.	lot part of scope
Not att	ained reason					
THIRD PARTY CERTI	FICATION INFOR	RMATION				
s this building pursuing T	hird Party Certificat	ion?		Yes	No	
Reason not included						
Sustainability T	hird Party Certifica	ation Rating	3			
- Third Pa	rty Certification Rat	ing System	and Level			
		USGBC LEI	ED Certified			GBI Green Globes 1 Globe
		USGBC LEI	ED Silver			GBI Green Globes 2 Globes
		USGBC LEI	ED Gold			GBI Green Globes 3 Globes
		USGBC LEI	ED Platinum			GBI Green Globes 4 Globes
		USGBC "Gu	uiding Princi	ples Assessment'		GBI "Guiding Principles Compliance
		OTHER:	0			<b>0 1 1 1 1 1</b>



### LEED v4 for BD+C: New Construction and Major Renovation



Project Checklist

		Proje Date	ct Nan	ne: Detroit Arsenal MUMT August 1, 2024		JOINT VENTURE TEAM
Y	?	N	D/C			Notes
1		Credit	D	Integrative Process (LEED v4.1)	1	
4	0	12 Loca	tion an	d Transportation	16	
		na Credit		LEED for Neighborhood Development Location	16	Project not I,ocated in LEED for ND location
1		Credit	D	Sensitive Land Protection	1	Option 1 - Site is previously developed
		2 Credit	D	High Priority Site	2	Site is not a high priority site.
2		3 Credit	D	Surrounding Density and Diverse Uses (LEED v4.1)	5	Option 2- qualifies for Diverse Uses as 8 or more diverse uses are within 1/2 mile walking distance of bldg entrance
		5 Credit	D	Access to Quality Transit	5	Site does not meet criteria for access to quality transit
		1 Credit	D	Bicycle Facilities	1	Site is not located near a qualifying bike network
1		Credit	D	Reduced Parking Footprint (LEED v4.1)	1	Option 1 - No new parking is provided
		1 Credit	D	Green Vehicles (LEED v4.1)	1	Would require installation of charging stations or infrastructure - not in scope.

4	0	6	Susta	inable	Sites	10	
Y			Prereq	С	Construction Activity Pollution Prevention	Required	Contractor responsibility - Design Team to provide SWPPP
1			Credit	D	Site Assessment	1	Site inventory and assessment
		2	Credit	D	Site Development - Protect or Restore Habitat	2	Onsite restoration not feasible or LCCE
		1	Credit	D	Open Space	1	Site design does not meet Open Space requirements
		3	Credit	D	Rainwater Management (LEED v4.1)	3	Clay soils do not allow infiltration per LEED requirements
2			Credit	D	Heat Island Reduction	2	Building roof and site meet credit requirements
1			Credit	D	Light Pollution Reduction	1	Design meets both Uplight and Light Trespass requirements

9	0	2 W	ater	Effici	ency	11	
Y		Prei	eq	D	Outdoor Water Use Reduction	Required	Option 1 - No irrigation required
Y		Prei	eq	D	Indoor Water Use Reduction	Required	Project meets prerequisite requirements
Y		Prei	eq	D	Building-Level Water Metering	Required	Permanent bldg meters to be provided
2		Cre	dit	D	Outdoor Water Use Reduction	2	Option 1 - No irrigation required
6		Cre	dit	D	Indoor Water Use Reduction	6	50+% water use reduction
		2 Cre	dit	D	Cooling Tower Water Use	2	No cooling towers or evaporative condensers
1		Cre	dit	D	Water Metering	1	Sub-metering two or more subsystems - domestic hot water and indoor plumbing fixtures

14	0	19	Energ	y and	Atmosphere	33	
Y			Prereq	С	Fundamental Commissioning and Verification	Required	Contractor scope
Y			Prereq	D	Minimum Energy Performance	Required	Whole building energy modeling
Y			Prereq	D	Building-Level Energy Metering	Required	Permanent bldg meters to be provided
Y			Prereq	D	Fundamental Refrigerant Management	Required	No CFC refrigerants will be used
6			Credit	С	Enhanced Commissioning	6	Envelope Cx and Monitoring-Based Cx be pursued in addition to Enhanced Cx
6		12	Credit	D	Optimize Energy Performance	18	
1			Credit	D	Advanced Energy Metering	1	Advanced metering to include metering any individual use that represents 10% or more of total energy consumption
		2	Credit	D	Demand Response	2	Due to project type, not feasible or recommended
		3	Credit	D	Renewable Energy Production	3	PV is not LCCE
1			Credit	D	Enhanced Refrigerant Management	1	Calculations need to confirm compliance
		2	Credit	D	Green Power and Carbon Offsets	2	Govt does not pursue Green Power or Carbon Offsets

9	0	4	Mater	rials an	d Resources	13	
Y			Prereq	D	Storage and Collection of Recyclables	Required	Recycling area provided, including storage for batteries and electronics
Y	1		Prereq	С	Construction and Demolition Waste Management Planning	Required	Contractor credit to develop Construction Waste management Plan
1		4	Credit	D	Building Life-Cycle Impact Reduction (LEED v4.1)	5	Requires a whole building life cycle assessment (not LCCA). One point will be met for performing the LCA. LCA in process.
2			Credit	С	Building Product Disclosure and Optimization - Environmental Product Declarations (LEED v4.1)	2	Contractor credit - Option 1: Environmental Product Declaration is feasible, Option 2: Embodied Carbon/LCA Optimization difficult.
2			Credit	С	Building Product Disclosure and Optimization - Sourcing of Raw Materials (LEED v4.1)	2	Responsible sourcing of raw materials (extended producer responsibility, bio-based materials, certified wood, material reuse, recycled content) - 15% for one point, 30% for two points. Contractor is responsible for procurement and determining percentage threshold.
2			Credit	С	Building Product Disclosure and Optimization - Material Ingredients (LEED v4.1)	2	Contractor credit - Option 1 is feasible, Option 2 difficult.
2			Credit	С	Construction and Demolition Waste Management	2	Project is to meet at least 60% waste diversion to comply with UFC 1-200-02. LEED v4 requires 3 materials streams and 50% for one point, and 4 material streams and 75% for two points. Request for available waste diversion facilities has been submitted. LEED v4.1 eliminates the material streams and 75% option, but adds in waste prevention option. Project team to determine best option for this credit.

10	0	6	Indoo	r Envii	ronmental Quality	16	
Y			Prereq	D	Minimum Indoor Air Quality Performance	Required	Project to comply with Option 1 - ASHRAE 62.1-2010 ands also meet monitoring requirements for mechanically ventilated spaces
Y			Prereq	D	Environmental Tobacco Smoke Control	Required	UFC 1-200-02 requires no smoking within 50' of entrances, air intakes, operable windows and louver. Signage is required at building entrances
2			Credit	D	Enhanced Indoor Air Quality Strategies	2	Option 1 requires 10' walk-off mats at all regularly used entrances, interior cross-contamination prevention and MERV 13 filtration, Option 2 either CO2 monitoring or exterior contamination prevention
3			Credit	С	Low-Emitting Materials (LEED v4.1)	3	Contractor credit - to meet low-emitting criteria for at least 4 categories - adhesive/sealants, flooring, wall panels, ceilings, insulation, furniture, composite wood - exemplary performance for fifth category

1		Credit	С	Construction Indoor Air Quality Management Plan	1	Contractor credit - Construction Indoor Air Quality Management Plan to be defined in specs, written and implemented by Contractor
2		Credit	С	Indoor Air Quality Assessment	2	Contractor Credit - Option 2: Air Quality Testing. (Option 1 Bldg Flushout is only wortth 1 pt)
		1 Credit	D	Thermal Comfort	1	Thermal Comfort Design - ASHRAE 55 is a challenge in high bay areas unless fans are used. Thermal Comfort Controls may require wall-mounted fans in open office to meet 50% thermal comfort controls for 50% of indivdual occupants
2		Credit	D	Interior Lighting	2	Option 1 - Lighting Controls: Project will be designed to meet controls for 90% of occupant spaces with at least 3 levels, and 100% for multi-occupant spaces; Option 2 - Lighting Quality: Project to meet four of the eight quality categories
		3 Credit	D	Daylight (LEED v4.1)	3	occupied area meeting illuminance level requirements - 55% - 1 pt, 75% - 2 pts, 90% - 3 pts. Simulation in process.
		1 Credit	D	Quality Views	1	Project will not meet criteria for quality views
		1 Credit	D	Acoustic Performance	1	Project will not meet requirements for acoustic performance
3	3	0 Innov	vation		6	
<b>3</b> 2	<b>3</b>	0 Innov	vation D/C	Innovation:	<b>6</b> 5	Innovation Options: Thermal Comfort Survey, Low emitting exemplary performance
<b>3</b> 2 1	<b>3</b>	0 Innov Credit Credit	vation D/C C	Innovation: LEED Accredited Professional	<b>6</b> 5 1	Innovation Options: Thermal Comfort Survey, Low emitting exemplary performance Contractor to provide LEED AP BD+C
<b>3</b> 2 1	<b>3</b>	0 Innov Credit Credit	vation D/C C	Innovation: LEED Accredited Professional	<b>6</b> 5 1	Innovation Options: Thermal Comfort Survey, Low emitting exemplary performance Contractor to provide LEED AP BD+C
3 2 1	3 3 0	0 Innov Credit Credit 2 Regio	vation D/C C onal Pr	Innovation: LEED Accredited Professional	<b>6</b> 5 1 <b>4</b>	Innovation Options: Thermal Comfort Survey, Low emitting exemplary performance Contractor to provide LEED AP BD+C
3 2 1 2 1	3 3 0	0 Innov Credit Credit 2 Regio	vation D/C C onal Pr D	Innovation: LEED Accredited Professional <b>'iority</b> Regional Priority: Enhanced Indoor Air Quality Strategies (1pt)	<b>6</b> 5 1 <b>4</b> 1	Innovation Options: Thermal Comfort Survey, Low emitting exemplary performance Contractor to provide LEED AP BD+C
3 2 1 2 1 1	3 3 0	0 Innov Credit Credit 2 Regit Credit	vation D/C C onal Pr D D	Innovation: LEED Accredited Professional <b>Tiority</b> Regional Priority: Enhanced Indoor Air Quality Strategies (1pt) Regional Priority: Surrounding Density and Diverse Uses (threshold - 2 pts)	6 5 1 4 1 1	Innovation Options: Thermal Comfort Survey, Low emitting exemplary performance Contractor to provide LEED AP BD+C
3 2 1 2 1 1	3 3 0 0	0 Innov Credit Credit 2 Regio Credit Credit 1 Credit	vation D/C C onal Pr D D D	Innovation: LEED Accredited Professional <b>Tiority</b> Regional Priority: Enhanced Indoor Air Quality Strategies (1pt) Regional Priority: Surrounding Density and Diverse Uses (threshold - 2 pts) Regional Priority: Renewable Energy Production (threshold - 1 pt)	6 5 1 4 1 1 1	Innovation Options: Thermal Comfort Survey, Low emitting exemplary performance Contractor to provide LEED AP BD+C
3 2 1 2 1	3 3 0	0 Innov Credit Credit 2 Regit Credit Credit 1 Credit 1 Credit	vation D/C C D D D D D D D D	Innovation: LEED Accredited Professional <b>iority</b> Regional Priority: Enhanced Indoor Air Quality Strategies (1pt) Regional Priority: Surrounding Density and Diverse Uses (threshold - 2 pts) Regional Priority: Renewable Energy Production (threshold - 1 pt) Regional Priority: Rainwater Management (threshold - 2 pts)	6 5 1 4 1 1 1 1 1	Innovation Options: Thermal Comfort Survey, Low emitting exemplary performance Contractor to provide LEED AP BD+C
3 2 1 2 1	3 3 0	<ul> <li>Innov</li> <li>Credit</li> <li>Credit</li> <li>Credit</li> <li>Credit</li> <li>Credit</li> <li>Credit</li> <li>Credit</li> <li>Credit</li> <li>Credit</li> </ul>	vation D/C C onal Pr D D D D D	Innovation: LEED Accredited Professional <b>Fiority</b> Regional Priority: Enhanced Indoor Air Quality Strategies (1pt) Regional Priority: Surrounding Density and Diverse Uses (threshold - 2 pts) Regional Priority: Renewable Energy Production (threshold - 1 pt) Regional Priority: Rainwater Management (threshold - 2 pts) Other RPs - Bldg Life-cycle impact reduction (3 pts), High Priority Site (2 pts)	6 5 1 4 1 1 1 1 1	Innovation Options: Thermal Comfort Survey, Low emitting exemplary performance Contractor to provide LEED AP BD+C

Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80 to 110
## SECTION 01 42 00

# SOURCES FOR REFERENCE PUBLICATIONS 02/19

## PART 1 GENERAL

#### 1.1 REFERENCES

Various publications are referenced in other sections of the specifications to establish requirements for the work. These references are identified in each section by document number, date and title. The document number used in the citation is the number assigned by the standards producing organization (e.g., ASTM B564 Standard Specification for Nickel Alloy Forgings). However, when the standards producing organization has not assigned a number to a document, an identifying number has been assigned for reference purposes.

## 1.2 ORDERING INFORMATION

The addresses of the standards publishing organizations whose documents are referenced in other sections of these specifications are listed below, and if the source of the publications is different from the address of the sponsoring organization, that information is also provided.

> ACOUSTICAL SOCIETY OF AMERICA (ASA) 1305 Walt Whitman Road, Suite 300 Melville, NY 11747-4300 Ph: 516-576-2360 Fax: 631-923-2875 E-mail: asa@acousticalsociety.org Internet: <u>https://acousticalsociety.org/</u>

AIR BARRIER ASSOCIATION OF AMERICA (ABAA) 1600 Boston-Providence Hwy Walpole, MA 02081 Ph: 1-866-956-5888 Fax: 1-866-956-5819 Internet: https://www.airbarrier.org/

AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL, INC. (AMCA) 30 West University Drive Arlington Heights, IL 60004-1893 Ph: 847-394-0150 Fax: 847-253-0088 E-mail: communications@amca.org Internet: http://www.amca.org

AIR-CONDITIONING, HEATING AND REFRIGERATION INSTITUTE (AHRI) 2111 Wilson Blvd, Suite 400 Arlington, VA 22201 Ph: 703-524-8800 Internet: <u>http://www.ahrinet.org</u>

ALUMINUM ASSOCIATION (AA) 1400 Crystal Drive Suite 430

> Arlington, VA 22202 Ph: 703-358-2960 E-Mail: info@aluminum.org Internet: <u>https://www.aluminum.org/</u>

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA) 1900 E Golf Rd, Suite 1250 Schaumburg, IL 60173 Ph: 847-303-5664 E-mail: customerservice@aamanet.org Internet: https://aamanet.org/

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO) 444 North Capital Street, NW, Suite 249 Washington, DC 20001 Ph: 202-624-5800 Fax: 202-624-5806 E-Mail: info@aashto.org Internet: https://www.transportation.org/

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS (AATCC) 1 Davis Drive P.O. Box 12215 Research Triangle Park, NC 27709-2215 Ph: 919-549-8141 Fax: 919-549-8933 Internet: https://www.aatcc.org/

AMERICAN BEARING MANUFACTURERS ASSOCIATION (ABMA) 330 N. Wabash Ave., Suite 2000 Chicago, IL 60611 Ph: 202-367-1155 E-mail: info@americanbearings.org Internet: https://www.americanbearings.org/

AMERICAN CONCRETE INSTITUTE (ACI) 38800 Country Club Drive Farmington Hills, MI 48331-3439 Ph: 248-848-3700 Fax: 248-848-3701 Internet: https://www.concrete.org/

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH) 1330 Kemper Meadow Drive Cincinnati, OH 45240 Ph: 513-742-2020 Fax: 513-742-3355 Internet: <u>https://www.acgih.org/</u>

AMERICAN GAS ASSOCIATION (AGA) 400 North Capitol Street, NW Suite 450 Washington, D.C. 20001 Ph: 202-824-7000 Internet: https://www.aga.org/

AMERICAN GEAR MANUFACTURERS ASSOCIATION (AGMA) 1001 N. Fairfax Street, Suite 500

SECTION 01 42 00 Page 2 Certified Final Submittal

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P2#: 506474 - Manned/Unmanned Tactical Vehicle Lab (MUMT)
Detroit Arsenal, MI
Alexandria, VA 22314-1587
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Ph: 703-684-0211 Fax: 703-684-0242 E-mail: tech@agma.org Internet: https://www.agma.org/

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PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

-- End of Section --

### SECTION 01 45 00.15 10

## RESIDENT MANAGEMENT SYSTEM CONTRACTOR MODE (RMS CM) 11/16, CHG 2: 08/19

#### PART 1 GENERAL

#### 1.1 REFERENCES

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

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1

(2014) Safety -- Safety and Health Requirements Manual

#### 1.2 MEASUREMENT AND PAYMENT

The work of this section is not measured for payment. The Contractor is responsible for the work of this section, without any direct compensation other than the payment received for contract items.

#### 1.3 CONTRACT ADMINISTRATION

The Government will use the Resident Management System (RMS) to assist in its monitoring and administration of this contract. The Government accesses the system using the Government Mode of RMS (RMS GM) and the Contractor accesses the system using the Contractor Mode (RMS CM). The term RMS will be used in the remainder of this section for both RMS GM and RMS CM. The joint Government-Contractor use of RMS facilitates electronic exchange of information and overall management of the contract. The Contractor accesses RMS to record, maintain, input, track, and electronically share information with the Government throughout the contract period in the following areas:

Administration Finances Quality Control Submittal Monitoring Scheduling Closeout Import/Export of Data

#### 1.3.1 Correspondence and Electronic Communications

For ease and speed of communications, exchange correspondence and other documents in electronic format to the maximum extent feasible. Some correspondence, including pay requests and payrolls, are also to be provided in paper format with original signatures. Paper documents will govern, in the event of discrepancy with the electronic version.

### 1.3.2 Other Factors

Other portions of this document have a direct relationship to the reporting accomplished through RMS. Particular attention is directed to

FAR 52.236-15 Schedules for Construction Contracts; FAR 52.232-27 Prompt Payment for Construction Contracts; FAR 52.232-5 Payments Under Fixed-Priced Construction Contracts; Section 01 32 01.00 06 PROJECT SCHEDULE; Section 01 33 00 SUBMITTAL PROCEDURES; Section 01 35 26.00 06 GOVERNMENTAL SAFETY REQUIREMENTS; and Section 01 45 00.15 10 CONTRACTOR QUALITY CONTROL.

## 1.4 RMS SOFTWARE

RMS is a web based application. Download, install and be able to utilize the latest version of RMS within 7 calendar days of receipt of the Notice to Proceed. RMS software, user manuals, access and installation instructions, program updates and training information are available from the RMS website (<u>https://rms.usace.army.mil</u>). The Government and the Contractor will have different access authorities to the same contract database through RMS. The common database will be updated automatically each time a user finalizes an entry or change.

## 1.5 CONTRACT DATABASE - GOVERNMENT

The Government will enter the basic contract award data in RMS prior to granting the Contractor access. The Government entries into RMS will generally be related to submittal reviews, correspondence status, and Quality Assurance(QA)comments, as well as other miscellaneous administrative information.

## 1.6 CONTRACT DATABASE - CONTRACTOR

Contractor entries into RMS establish, maintain, and update data throughout the duration of the contract. Contractor entries generally include prime and subcontractor information, daily reports, submittals, RFI's, schedule updates and payment requests. RMS includes the ability to import attachments and export reports in many of the modules, including submittals. The Contractor responsibilities for entries in RMS typically include the following items:

# 1.6.1 Administration

# 1.6.1.1 Contractor Information

Enter all current Contractor administrative data and information into RMS within 7 calendar days of receiving access to the contract in RMS. This includes, but is not limited to, Contractor's name, address, telephone numbers, management staff, and other required items.

# 1.6.1.2 Subcontractor Information

Enter all missing subcontractor administrative data and information into RMS CM within 7 calendar days of receiving access to the contract in RMS or within 7 calendar days of the signing of the subcontractor agreement for agreements signed at a later date. This includes name, trade, address, phone numbers, and other required information for all subcontractors. A subcontractor is listed separately for each trade to be performed.

## 1.6.1.3 Correspondence

Identify all Contractor correspondence to the Government with a serial number. Prefix correspondence initiated by the Contractor's site office

with "S". Prefix letters initiated by the Contractor's home (main) office with "H". Letters are numbered starting from 0001. (e.g., H-0001 or S-0001). The Government's letters to the Contractor will be prefixed with "C" or "RFP".

## 1.6.1.4 Equipment

Enter and maintain a current list of equipment planned for use or being used on the jobsite, including the most recent and planned equipment inspection dates.

#### 1.6.1.5 Reports

Track the status of the project utilizing the reports available in RMS. The value of these reports is reflective of the quality of the data input. These reports include the Progress Payment Request worksheet, Quality Control (QC) comments, Submittal Register Status, and Three-Phase Control worksheets.

1.6.1.6 Request For Information (RFI)

Create and track all Requests For Information (RFI) in the RMS Administration Module for Government review and response.

- 1.6.2 Finances
- 1.6.2.1 Pay Activity Data

Develop and enter a list of pay activities in conjunction with the project schedule. The sum of pay activities equals the total contract amount, including modifications. Each pay activity must be assigned to a Contract Line Item Number (CLIN). The sum of the activities assigned to a CLIN equals the amount of each CLIN.

#### 1.6.2.2 Payment Requests

Prepare all progress payment requests using RMS. Update the work completed under the contract at least monthly, measured as percent or as specific quantities. After the update, generate a payment request and prompt payment certification using RMS. Submit the signed prompt payment certification and payment request as well as supporting data either electronically or by hard copy. Unless waived by the Contracting Officer, a signed paper copy of the approved payment certification and request is also required and will govern in the event of discrepancy with the electronic version.

#### 1.6.3 Quality Control (QC)

Enter and track implementation of the 3-phase QC Control System, QC testing, transferred and installed property and warranties in RMS. Prepare daily reports, identify and track deficiencies, document progress of work, and support other Contractor QC requirements in RMS. Maintain all data on a daily basis. Insure that RMS reflects all quality control methods, tests and actions contained within the Contractor Quality Control (CQC) Plan and Government review comments of same within 7 calendar days of Government acceptance of the CQC Plan.

#### 1.6.3.1 Quality Control (QC) Reports

The Contractor's Quality Control (QC) Daily Report in RMS is the official report. The Contractor can use other supplemental formats to record QC data, but information from any supplemental formats are to be consolidated and entered into the RMS QC Daily Report. Any supplemental information may be entered into RMS as an attachment to the report. QC Daily Reports must be finalized and signed in RMS within 24 hours after the date covered by the report. Provide the Government a printed signed copy of the QC Daily Report, unless waived by the Contracting Officer.

#### 1.6.3.2 Deficiency Tracking.

Use the QC Daily Report Module to enter and track deficiencies. Deficiencies identified and entered into RMS by the Contractor or the Government will be sequentially numbered with a QC or QA prefix for tracking purposes. Enter each deficiency into RMS the same day that the deficiency is identified. Monitor, track and resolve all QC and QA entered deficiencies. A deficiency is not considered to be corrected until the Government indicates concurrence in RMS.

#### 1.6.3.3 Three-Phase Control Meetings

Maintain scheduled and actual dates and times of preparatory and initial control meetings in RMS. Worksheets for the three-phase control meetings are generated within RMS.

#### 1.6.3.4 Labor and Equipment Hours

Enter labor and equipment exposure hours on a daily basis. Roll up the labor and equipment exposure data into a monthly exposure report.

## 1.6.3.5 Accident/Safety Reporting

Both the Contractor and the Government enter safety related comments in RMS as a deficiency. The Contractor must monitor, track and show resolution for safety issues in the QC Daily Report area of the RMS QC Module. In addition, follow all reporting requirements for accidents and incidents as required in EM 385-1-1, Section 01 35 26.00 06 GOVERNMENTAL SAFETY REQUIREMENTS and as required by any other applicable Federal, State or local agencies.

# 1.6.3.6 Definable Features of Work

Enter each feature of work, as defined in the approved CQC Plan, into the RMS QC Module. A feature of work may be associated with a single or multiple pay activities, however a pay activity is only to be linked to a single feature of work.

## 1.6.3.7 Activity Hazard Analysis

Import activity hazard analysis electronic document files into the RMS QC Module utilizing the document package manager.

#### 1.6.4 Submittal Management

Enter all current submittal register data and information into RMS within 7 calendar days of receiving access to the contract in RMS. The information shown on the submittal register following the specification

Section 01 33 00 SUBMITTAL PROCEDURES will already be entered into the RMS database when access is granted. Group electronic submittal documents into transmittal packages to send to the Government, except very large electronic files, samples, spare parts, mock ups, color boards, or where hard copies are specifically required. Track transmittals and update the submittal register in RMS on a daily basis throughout the duration of the contract. Submit hard copies of all submittals unless waived by the Contracting Officer.

## 1.6.5 Schedule

Enter and update the contract project schedule in RMS by either manually entering all schedule data or by importing the Standard Data Exchange Format (SDEF) file, based on the requirements in Section 01 32 01.00 06 PROJECT SCHEDULE.

#### 1.6.6 Closeout

Closeout documents, processes and forms are managed and tracked in RMS by both the Contractor and the Government. Ensure that all closeout documents are entered, completed and documented within RMS.

#### 1.7 IMPLEMENTATION

Use of RMS as described in the preceding paragraphs is mandatory. Ensure that sufficient resources are available to maintain contract data within the RMS system. RMS is an integral part of the Contractor's required management of quality control.

#### 1.8 NOTIFICATION OF NONCOMPLIANCE

Take corrective action within 7 calendar days after receipt of notice of RMS non-compliance by the Contracting Officer.

#### PART 2 PRODUCTS

Not Used

# PART 3 EXECUTION

Not Used

-- End of Section --

## SECTION 01 45 04.10 06

# CONTRACTOR QUALITY CONTROL 04/20

#### PART 1 GENERAL

#### 1.1 REFERENCES

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

#### ASTM INTERNATIONAL (ASTM)

ASTM D3740	(2019) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM E329	(2018) Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection

## 1.2 PAYMENT

Separate payment will not be made for providing and maintaining an effective Quality Control program, and all costs associated therewith shall be included in the applicable unit prices or lump-sum prices contained in the Bidding Schedule.

#### 1.3 SUBMITTALS

Government approval/acceptance is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval, or for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with LRL Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Construction Quality Control Plan; G, RO

- PART 2 PRODUCTS (Not Applicable)
- PART 3 EXECUTION

#### 3.1 GENERAL REQUIREMENTS

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with FAR 52.246-12 - Inspection of Construction. The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all design and construction operations, both onsite and offsite, and shall be keyed to the proposed construction sequence. The site project

superintendent will be held responsible for the quality of work on the job and is subject to removal by the Contracting Officer for non-compliance with the quality requirements specified in the contract. The site project superintendent in this context shall be the highest level manager responsible for the overall construction activities at the site, including quality and production. The site project superintendent shall maintain a physical presence at the site at all times, except as otherwise acceptable to the Contracting Officer, and shall be responsible for all construction and construction related activities at the site.

#### 3.2 NOT USED

3.3 CONSTRUCTION QUALITY CONTROL PLAN (CQCP)

The Contractor shall furnish for review by the Government, not later than thirty (30) days after receipt of notice to proceed, the Contractor Construction Quality Control (CQC) Plan proposed to implement the requirements of FAR 52.246-12 - Inspection of Construction. The plan shall identify personnel, procedures, control, instructions, tests, records, and forms to be used. The Government will consider an interim plan for the first thirty (30) days of operation. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the features of work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started.

#### 3.3.1 Content of the CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents:

- a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. The staff shall include a CQC System Manager who shall report to someone higher in the Contractor's organization than the project superintendent, shall not be the superintendent.
- b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.
- c. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters shall also be furnished to the Government.
- d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents. These procedures

shall be in accordance with LRL Section 01 33 00 SUBMITTAL PROCEDURES.

- e. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (Laboratory facilities will be approved by the Contracting Officer.)
- f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.
- g. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures shall establish verification that identified deficiencies have been corrected.
- h. Reporting procedures, including proposed reporting formats.
- i. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable features under a particular section. This list will be agreed upon during the coordination meeting.

## 3.3.2 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes in his CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

## 3.3.3 Notification of Changes

After acceptance of the CQC Plan, the Contractor shall notify the Contracting Officer in writing of any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

# 3.4 COORDINATION MEETING

After the Preconstruction Conference, before start of construction, and prior to acceptance by the Government of the CQC Plan, the Contractor shall meet with the Contracting Officer or Authorized Representative and discuss the Contractor's quality control system. The CQC Plan shall be submitted for review a minimum of thirty (30) calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting shall be prepared by the Government and signed by both the Contractor and the Contracting Officer. The minutes

shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

# 3.4.1 Subcontractor CQC Orientation

Before a Subcontractor begins work on the jobsite, the CQC System Manager will train the Subcontractor and answer any questions pertaining to quality control operations. This requirement is waived only if a Subcontractor attended the initial coordination meeting described above. A record of the orientation shall be documented in the QC Report.

## 3.5 CONSTRUCTION QUALITY CONTROL ORGANIZATION

#### 3.5.1 Personnel Requirements

a. The requirements for the CQC organization are a CQC System Manager and sufficient number of additional qualified personnel to ensure safety and contract compliance. A Site Safety Health Officer (SSHO) will be required for this contract. See LRL Section 01 35 26.00 06 GOVERNMENT SAFETY REQUIREMENTS for the SSHO qualifications and duties.

b. Personnel identified in the technical provisions as requiring specialized skills to assure the required work is being performed properly will also be included as part of the CQC organization. The Contractor's CQC staff shall maintain a presence at the site at all times during progress of the work and have complete authority and responsibility to take any action necessary to ensure contract compliance. The CQC staff shall be subject to acceptance by the Contracting Officer. The Contractor shall provide adequate office space, filing systems and other resources as necessary to maintain an effective and fully functional CQC, and safety/health organization. Complete records of all letters, material submittals, shop drawing submittals, schedules and all other project documentation shall be promptly furnished to the CQC organization by the Contractor. The CQC organization shall be responsible to maintain these documents and records at the site at all times and made available to the SSHO, except as otherwise acceptable to the Contracting Officer.

3.5.2 CQC System Manager Qualifications and Duties

a. The Contractor shall identify as CQC System Manager an individual within the onsite work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a graduate engineer, graduate architect, or a graduate of construction management, with a minimum of 5 years construction experience on construction similar to this contract, or a construction person with a minimum of 10 years in related quality management work.

b. This CQC System Manager shall be employed by the Prime Contractor and be on the site at all times during construction. Alternate(s) for the CQC System Manager shall be identified in the CQC Plan to serve in the event of the CQC System Manager's absence. The requirements for the alternates shall be the same as for the designated CQC System Manager.

c. The CQC System Manager shall be:

assigned no other duties except being the CQC System Manager. Shall

not be the SSHO or the superintendent.

# 3.5.3 CQC Personnel

a. The word "graduate" below indicates an individual possessing a four-year college degree accredited in the respective field listed-with experience obtained following graduation in the type of work being performed on the project.

# Experience Matrix Table

AREA		QUALIFICATIONS
a.	NOT USED	
b.	Civil	Graduate Civil Engineer with 2 years related experience or person with 5 yrs related experience
c.	Geotechnical	Graduate Geotechnical Engineer or Civil Engineer specializingin Geotechnical Engineering with 3 yrs relevant experience or Engineering Technician, working under the direction of a Licensed Professional Engineer, with 5 yrs relevant experience
d.	Mechanical	Graduate Mechanical Engineer with 2 yrs related experience or person with 5 yrs related experience
e.	Electrical	Graduate Electrical Engineer with 2 yrs related experience or person with 5 yrs related experience
f.	Structural	Graduate Structural Engineer with 2 yrs related experience or person with 5 yrs related experience
g.	Architectural	Graduate Architect with 2 yrs related experience or person with 5 yrs related experience
h.	Environmental	Graduate Environmental Engineer with 3 yrs related experience
i.	LEED-AP BD+C	LEED Accredited by GBCI (Green Building Certification Institute)
j.	Submittals	Submittal Clerk with lyr experience
k.	Occupied family housing	Customer relations person with related coordinator experience in the type of construction proposed

	AREA	QUALIFICATIONS
a.	NOT USED	
1.	Concrete, Pavements and Soils	Civil Engineer identified in item B or C above, and supplemented with the Corps validated QC testing laboratory
m.	Kitchen Equipment Specialist	Must have 5 years minimum experience in the installation of commercial kitchen equipment and food service equipment
n.	IT/Communications	BICSI Certified RCDD Registered Communication Distribution Designer)with 2 yrs related experience
ο.	Roofing	RCI Registered Roof Observer

## 3.5.3.1 Registered Roof Observer

a. The Contractor shall hire an independent RCI Registered Roof Observer (RRO) to perform roof installation quality control during the course of this contract. The independent RRO shall not be employed by the prime contractor but shall be subcontracted and responsible for reporting conditions simultaneously to the Government and the Contractor. The RRO shall be on site for the duration of the roofing operations. The Registered Roof Observers will perform daily oversight and quality control on all roof work to assure compliance with the projects plans and specifications.

b. The Government will supply the format of the daily report file which is intended to supplement the daily QC report instead of replacing same. The RRO shall provide daily reports per CQC requirements, number of squares of roof places and the contractors compliance with specifications and details. The RRO shall take daily color photographs (a minimum 24 photos total for the project) of every type of activity performed that shall include (but not limited to) insulation attachment, application of roofing membrane and flashings, sheet metal installation, kettle operation, material storage/handling and compliance with safety requirements. Photos may be digital but one hard color copy shall be made daily and kept on site.

# 3.5.3.2 RRO COMMUNICATION WITH THE GOVERNMENT

The Registered Roof Observer shall submit all plans, schedules, reports, and documentation directly to the Contracting Officer's Representative concurrent with submission to the CQC System Manager. The RRO shall have direct communication with the Contracting Officer's Representative regarding all elements of the roofing installation process.

# 3.5.4 Additional Requirement

In addition to the above experience and/or education requirements the CQC System Manager and Alternate(s) shall have completed and passed the course entitled "Construction Quality Management For Contractors" within the last 5 years. A copy of the certification shall be provided with the CQCP.

This course is periodically offered by the Associated Builders and Constructors, Inc., or Associated General Contractor, Inc., and the U.S. Army Corps of Engineers.

3.5.5 Organizational Changes

The Contractor shall maintain the CQC staff at full strength at all times. When it is necessary to make changes to the CQC staff, the Contractor shall revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

#### 3.6 SUBMITTALS AND DELIVERABLES

Submittals, if needed, shall be made as specified in LRL Section 01 33 00 SUBMITTAL PROCEDURES. The CQC organization shall be responsible for certifying that all submittals and deliverables are in compliance with the contract requirements. When LRL Section 01 46 00.00 06 TOTAL BUILDING COMMISSIONING is included in the contract, the submittals required by those sections shall be coordinated with LRL Section 01 33 00 SUBMITTAL PROCEDURES to ensure adequate time is allowed for each type of submittal required.

3.7 CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. At least three phases of control shall be conducted by the CQC System Manager for each definable feature of work as follows:

## 3.7.1 Preparatory Phase

This phase shall be performed prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase shall include:

- a. A review of each paragraph of applicable specifications, reference codes, and standards. A copy of those sections of referenced codes and standards applicable to that portion of the work to be accomplished in the field shall be made available by the Contractor at the preparatory inspection. These copies shall be maintained in the field and available for use by Government personnel until final acceptance of the work.
- b. A review of the contract drawings.
- c. A check to assure that all materials and/or equipment have been tested, submitted, and approved.
- d. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.
- e. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.
- f. A review of the appropriate activity hazard analysis to assure

safety requirements are met.

- g. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.
- h. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.
- i. Resolve all differences.
- j. Discussion of the initial control phase.
- k. Review of provisions that have been made to provide required control inspection and testing.
- 1. Review of the CQC plan, specifically its organization chart and delegation letters. Insure all required members of the CQC organization for this feature of work are qualified, have been appointed, accepted and have requisite authority delegated.
- m. The Government shall be notified at least 24 hours in advance of beginning the preparatory control phase. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC System Manager and attached to the daily CQC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

# 3.7.2 Initial Phase

This phase shall be accomplished at the beginning of a definable feature of work. The following shall be accomplished:

- a. A check of work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.
- Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing.
- c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.
- d. Resolve all differences.
- e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.
- f. The Government shall be notified at least 72 hours in advance of beginning the initial phase. Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the daily CQC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.

> g. The initial phase should be repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.

#### 3.7.3 Follow-up Phase

Daily checks shall be performed to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work which may be affected by the deficient work. The Contractor shall not build upon nor conceal non-conforming work.

## 3.7.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted on the same definable features of work if: the quality of on-going work is unacceptable; if there are changes in the applicable CQC staff, onsite production supervision or work crew; if work on a definable feature is resumed after a substantial period of inactivity; or if other problems develop.

3.8 TESTS

# 3.8.1 Testing Procedure

The Contractor shall perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Upon request, the Contractor shall furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and/or acceptance tests when specified. For QC testing of construction materials including soil, rock, aggregate, asphalt, concrete, and steel, the Contractor shall procure the services of a Corps of Engineers (COE) validated testing laboratory or establish a COE validated testing laboratory at the project site. Technical specifications included in the contract that require materials testing by an approved commercial testing laboratory shall be intended to mean by a COE validated laboratory. The Contractor shall perform the following activities and record and provide the following data:

- a. Verify that testing procedures comply with contract requirements.
- b. Verify that facilities and testing equipment are available and comply with testing standards.
- c. Check test instrument calibration data against certified standards.
- d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
- e. Results of all tests taken, both passing and failing tests, shall be recorded on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test shall be given. If approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date

> taken. An information copy of tests performed by an offsite or commercial test facility shall be provided directly to the Contracting Officer. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract.

#### 3.8.2 Testing Laboratories

## 3.8.2.1 Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel shall meet criteria detailed in ASTM D3740 and ASTM E329.

3.8.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a charge of \$1,375.00 to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

3.8.3 Onsite Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests, and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

## 3.8.4 Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials shall be borne by the Contractor. Samples of materials for test verification and acceptance testing by the Government shall be delivered to the Corps of Engineers Division Laboratory, f.o.b., at the following address:

For delivery by mail:

Geotechnical & Structures Laboratory Material Testing Center (GS-E) U.S. Army Engineer Research and Development Center 3909 Halls Ferry Road Vicksburg, MS 39180-6199

Coordination for each specific test, exact delivery location, and dates will be made through the Area Office.

# 3.9 COMPLETION INSPECTION

#### 3.9.1 Punch-Out Inspection

Near the end of the work, or any increment of the work established by a time stated in the FAR 52.211-10 - Commencement, Prosecution, and Completion of Work, or by the specifications, the CQC System Manager shall conduct an inspection of the work. A punch list of items which do not conform to the approved drawings and specifications shall be prepared and

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included in the CQC documentation, as required by paragraph DOCUMENTATION. The list of deficiencies shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government Pre-Final inspection.

## 3.9.2 Pre-Final Inspection

The Government will perform the pre-final inspection to verify that the facility is complete and ready to be occupied. A Government Pre-Final Punch List may be developed as a result of this inspection. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected before notifying the Government, so that a Final inspection with the customer can be scheduled. Any items noted on the Pre-Final inspection shall be corrected in a timely manner. These inspections and any deficiency corrections required by this paragraph shall be accomplished within the time slated for completion of the entire work or any particular increment of the work if the project is divided into increments by separate completion dates.

### 3.9.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative shall be in attendance at the final acceptance inspection. Additional Government personnel including, but not limited to, those from Base/Post Civil Facility Engineer user groups, and major commands may also be in attendance. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final inspection. Notice shall be given to the Contracting Officer at least fourteen (14) days prior to the final acceptance inspection and shall include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with FAR 52.246-12 - Inspection of Construction.

### 3.10 DOCUMENTATION

The Contractor shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers and shall be on an acceptable form that includes, as a minimum, the following information:

- a. Contractor/subcontractor and their area of responsibility.
- b. Operating plant/equipment with hours worked, idle, or down for repair.
- c. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.

- d. Test and/or control activities performed with results and references to specifications/drawings requirements. The control phase shall be identified (Preparatory, Initial, Follow-up). List of deficiencies noted, along with corrective action.
- e. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.
- f. Submittals and deliverables reviewed, with contract reference, by whom, and action taken.
- g. Offsite surveillance activities, including actions taken.
- h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
- i. Instructions given/received and conflicts in plans and/or specifications.
- j. Contractor's verification statement.
- k. These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Government daily within 24 hours after the date covered by the report. All calendar days shall be accounted for throughout the life of the contract. Reports shall be signed and dated by the CQC System Manager. The report from the CQC System Manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.
- Deficiency Tracking System. The Contractor shall maintain a cumulative list of deficiencies identified for the duration of the project. Deficiencies to be listed include those failures, Government oral observations and Notifications of Noncompliance. The list shall be maintained at the project site. Copies of updated listings shall be submitted to the Government at least every thirty (30) days.

### 3.11 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

-- End of Section --

#### SECTION 01 45 35

# SPECIAL INSPECTIONS 11/20

#### PART 1 GENERAL

#### 1.1 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.

INTERNATIONAL CODE COUNCIL (ICC)

ICC IBC

(2021) International Building Code

#### 1.2 GENERAL REQUIREMENTS

Perform Special Inspections in accordance with the Statement of Special Inspections, Schedule of Special Inspections and Chapter 17 of ICC IBC. The Statement of Special Inspections and Schedule of Special Inspections are included as an attachment to this specification. Special Inspections are to be performed by an independent third party and are intended to ensure that the work of the Prime Contractor is in accordance with the Contract Documents and applicable building codes. Special inspections do not take the place of the three phases of control inspections performed by the Contractor's QC Manager or any testing and inspections required by other sections of the specifications.

#### 1.3 DEFINITIONS

#### 1.3.1 Continuous Special Inspections

Continuous Special Inspections is the constant monitoring of specific tasks by a special inspector. These inspections must be carried out continuously over the duration of the particular tasks.

### 1.3.2 Perform

Perform these Special Inspections tasks for each welded joint or member.

1.3.3 Observe

Observe these Special Inspections items on a periodic daily basis. Operations need not be delayed pending these inspections.

### 1.3.4 Special Inspector (SI)

A qualified person retained by the Contractor and approved by the Contracting Officer as having the competence necessary to inspect a particular type of construction requiring Special Inspections. The SI must be an independent third party hired directly by the Prime Contractor.

### 1.3.5 Associate Special Inspector (ASI)

A qualified person who assists the SI in performing Special Inspections but must perform inspection under the direct supervision of the SI and

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cannot perform inspections without the SI on site.

#### 1.3.6 Third Party

A Special inspector must not be an employee of the Contractor or of any Sub-Contractor performing the work to be inspected.

1.3.7 Contracting Officer

The Government official having overall authority for administrative contracting actions. Certain contracting actions may be delegated to the Contracting Officer's Representative (COR).

1.3.8 Contractor's Quality Control (QC) Manager

An individual retained by the Prime Contractor and qualified in accordance with the Section 01 45 00.15 06 CONTRACTOR QUALITY CONTROL having the overall responsibility for the Contractor's QC organization.

1.3.9 Structural Engineer of Record (SER)

A registered design professional contracted by the Government as an A/E responsible for the overall design and review of submittal documents prepared by others. The SER is registered or licensed to practice their respective design profession as defined by the statutory requirements of the professional registration laws in the state in which the design professional works. The SER is also referred to as the Engineer of Record (EOR) in design code documents.

1.3.10 Statement of Special Inspections (SSI)

A document developed by the SER identifying the material, systems, components and work required to have Special Inspections. This statement is included at the end of this specification.

1.3.11 Schedule of Special Inspections (SSI)

A schedule which lists each of the required Special Inspections, the extent to which each Special Inspection is to be performed, and the required frequency for each in accordance with ICC IBC Chapter 17. This schedule is included at the end of this specification.

1.3.12 Definable Feature of Work (DFOW)

An inspection group that is separate and distinct from other inspection groups, having inspection requirements or inspectors that are unique.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Special Inspections Agency's Written NDT Practices with method and

evidence of regular equipment calibration where applicable

SD-06 Test Reports

Special Inspections Daily Reports

Special Inspections Biweekly Reports

SD-07 Certificates

AISC Certified Steel Fabricator

Steel Joist Institute Membership

Precast Concrete Institute (PCI) Certified Plant

Certificate of Compliance

Special Inspector Qualifications; G

Qualification Records for NDT technicians

SD-11 Closeout Submittals

Interim Report of Special Inspections for Each DFOW; G

Comprehensive Final Report of Special Inspections; G

1.5 SPECIAL INSPECTOR QUALIFICATIONS

Submit qualifications for each special inspector.

- 1.5.1 Steel Construction and High Strength Bolting
- 1.5.1.1 Special Inspector
  - a. ICC Structural Steel and Bolting Special Inspector certificate with two yeasr of related ICC inspection experience, or
  - b. Registered Professional Engineer with three years of related experience
- 1.5.1.2 Associate Special Inspector

Engineer-In-Training with two years of related experience.

- 1.5.2 Welding Structural Steel
- 1.5.2.1 Special Inspector

a. AWS Certified Welding Inspector

1.5.2.2 Associate Special Inspector

AWS Certified Associate Welding Inspector

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- 1.5.3 Nondestructive Testing of Welds
- 1.5.3.1 Special Inspector

NDT Level III Certificate

1.5.3.2 Associate Special Inspector

NDT Level II Certificate plus two years of related experience

- 1.5.4 Cold Formed Steel Framing
- 1.5.4.1 Special Inspector
  - a. ICC Structural Steel and Bolting Special Inspector certificate with two years of ICC inspection related experience, or
  - b. ICC Commercial Building Inspector with two years of ICC inspection experience, or
  - c. Registered Professional Engineer with three years related experience
- 1.5.4.2 Associate Special Inspector

Engineer-In-Training with two years of related experience.

- 1.5.5 Concrete Construction
- 1.5.5.1 Special Inspector
  - a. ICC Reinforced Concrete Special Inspector Certificate with one year of related ICC inspection experience, or
  - b. ACI Concrete Construction Special Inspector, or
  - c. Registered Professional Engineer with three years of related experience
- 1.5.5.2 Associate Special Inspector
  - a. ACI Concrete Construction Special Inspector in Training, or
  - b. Engineer-In-Training with two years of related ACI inspection experience
- 1.5.6 Prestressed Concrete Construction
- 1.5.6.1 Special Inspector
  - a. ICC Pre-stressed Special Inspector Certificate with one year of related ICC inspection experience, or
  - b. PCI Quality Control Technician/ Inspector Level II Certificate with one year of related ICC inspection experience, or
  - c. Registered Professional Engineer with three years of related experience
- 1.5.6.2 Associate Special Inspector
  - a. PCI Quality Control Technician/ Inspector Level I Certificate with two

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years of related experience, or

- b. Engineer-In-Training with two years of related experience
- 1.5.7 Masonry Construction
- 1.5.7.1 Special Inspector
  - a. ICC Structural Masonry Special Inspector Certificate with two years of related ICC inspection experience, or
  - b. Registered Professional Engineer with three years of related experience
- 1.5.7.2 Associate Special Inspector

Engineer-In-Training with one year of related experience.

1.5.8 Verification of Site Soil Condition, Fill Placement and Load-Bearing Requirements

- 1.5.8.1 Special Inspector
  - a. ICC Soils Special Inspector Certificate with two years of related ICC inspection experience, or
  - b. NICET Soils Technician Level II Certificate in Construction Material Testing, or
  - c. Registered Professional Engineer with three years of related experience
- 1.5.8.2 Associate Special Inspector
  - a. NICET Soils Technician Level I Certificate in Construction Material Testing with two years of related NICET inspection experience, or
  - b. Engineer-In-Training with two years of related experience
- 1.5.9 Fire-Resistant Penetrations and Joints
- 1.5.9.1 Special Inspector
  - a. Passed the UL Firestop Exam with one year of related experience, or
  - b. Passed the FM Firestop Exam with one year of related experience, or
  - c. Registered Professional Engineer with related experience
- 1.5.9.2 Associate Special Inspector

Engineer-In-Training with one year of related experience.

### PART 2 PRODUCTS

#### 2.1 FABRICATOR SPECIAL INSPECTIONS

Special Inspections of fabricator's work performed in the fabricator's shop is required to be inspected in accordance with the Statement of Special Inspections and the Schedule of Special Inspections unless the fabricator is certified by the approved agency to perform such work

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without Special Inspections. Submit the following certifications to the Contracting Officer for information to allow work performed in the fabricator's shop to not be subjected to Special Inspections.

AISC Certified Steel Fabricator. Steel Joist Institute Membership Precast Concrete Institute (PCI) Certified Plant, Category AC Architectural Precast Concrete

At the completion of fabrication, submit a certificate of compliance, to be included with the comprehensive final report of Special Inspections, stating that the materials supplied and work performed by the fabricator are in accordance with the construction documents.

### PART 3 EXECUTION

3.1 RESPONSIBILITIES

3.1.1 Quality Control Manager

- a. Supervise all Special Inspectors required by the Contract Documents and the IBC.
- b. Verify the qualifications of all of the Special Inspectors.
- c. Verify the qualifications of fabricators.
- d. Maintain a 3-ring binder for the Special Inspector's daily and biweekly reports. This file must be located in a conspicuous place in the project trailer/office to allow review by the Contracting Officer and the SER.
- e. Maintain a rework items list that includes discrepancies noted on the Special Inspectors daily report.
- 3.1.2 Special Inspectors
  - a. Inspect all elements of the project for which the special inspector is qualified to inspect and are identified in the Schedule of Special Inspections.
  - Attend preparatory phase meetings related to the Definable Feature of Work (DFOW) for which the special inspector is qualified to inspect.
  - c. Submit Special Inspections agency's written NDT practices for the monitoring and control of the agency's operations to include the following:
    - The agency's procedures for the selection and administration of inspection personnel, describing the training, experience and examination requirements for qualifications and certification of inspection personnel.
    - (2) The agency's inspection procedures, including general inspection, material controls, and visual welding inspection.
  - d. Submit qualification records for nondestructive testing (NDT)

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technicians designated for the project.

- e. Submit NDT procedures and equipment calibration records for NDT to be performed and equipment to be used for the project.
- f. Submit a copy of the daily reports to the QC Manager.
- g. Report discrepancies that are observed during Special Inspections to the QC Manager for correction. If discrepancies are not corrected before the special inspector leaves the site the observed discrepancies must be documented in the daily report.
- h. Submit a biweekly Special Inspection Report until all inspections are complete. A report is required for each biweekly period in which Special Inspections activity occurs, and must include the following:
  - (1) A brief summary of the work performed during the reporting time frame.
  - (2) Changes and discrepancies with the drawings, specifications and mechanical or electrical component certification, that were observed during the reporting period.
  - (3) Discrepancies which were resolved or corrected.
  - (4) A list of nonconforming items requiring resolution.
  - (5) All applicable test result including nondestructive testing reports.
- i. At the completion of each DFOW requiring Special Inspections, submit an interim report of Special Inspections that documents the Special Inspections completed for that DFOW. Identify the inspector responsible for each item inspected and corrections of all discrepancies noted in the daily reports. The interim report of Special Inspections must be signed, dated and indicate the certification of the special inspector qualifying them to conduct the inspection.
- j. At the completion of the project submit a comprehensive final report of Special Inspections that documents the Special Inspections completed for the project and corrections of all discrepancies noted in the daily reports. The comprehensive final report of Special Inspections must be signed, dated and indicate the certification of the special inspector qualifying them to conduct the inspection.

### 3.2 DEFECTIVE WORK

Check work as it progresses, but failure to detect any defective work or materials must in no way prevent later rejection if defective work or materials are discovered, nor obligate the Contracting Officer to accept such work.

-- End of Section --

# **STATEMENT OF SPECIAL INSPECTIONS**

Seismic Design Category:	В		
Risk Category:	П		
Design Wind Speed (mph):	108		
Number of Stories:	1		
Structure Height Above Grade (ft):	32FT		
Hazard Occupancy	No		
Special Inspector of Record (SIC A Special Inspector of Record (SIC	<b>DR)</b> DR)	IS NOT	_ required for this project.
SIOR Name (Registered Profession	al):		
Professional Registration Numb	er:		
Consulting Firm Name (if applicabl	le):		
CIOD Office and Mahile Dhane Numb	or		

This statement has been prepared in accordance with the special inspection and testing requirements of IBC 2021 Section 1704. The following materials, systems, components, and work are required to have special inspections and tests in accordance with IBC 2021 Section 1705. Refer to the SCHEDULE OF SPECIAL INSPECTIONS for the type, extent and frequency of each special inspection and test.

				Insp	oection R	equired
		Type of Construction	<b>IBC</b> Section	Yes	No	N/A
1.		Special Cases	1705.1.1	-	-	Х
2.		Steel Construction	1705.2	Х	-	-
	Α.	Structural Steel	1705.2.1	Х	-	-
	В.	Cold-Formed Steel Deck	1705.2.2	Х	-	-
	C.	Open-Web Steel Joist and Joists Girders	1705.2.3	Х	-	-
	D.	Cold-Formed Steel Trusses Span ≥ 60 Feet	1705.2.4	-	-	Х
3.		Concrete Construction	1705.3	Х	-	-
4.		Masonry Construction	1705.4	Х	-	-
5.		Wood Construction	1705.5	-	-	Х
6.		Soils	1705.6	Х	-	-
7.		Driven Deep Foundations	1705.7	-	-	Х
8.		Cast-in-Place Deep Foundations	1705.8	-	-	Х
9.		Helical Pile Foundations	1705.9	-	-	Х
10.		Structural Integrity of Deep Foundations	1705.10	-	-	Х
11.		Fabricated Items	1705.11	Х	-	-
12.		Special Inspections for Wind Resistance	1705.12	-	Х	-
13.		Special Inspections for Seismic Resistance	1705.13	-	Х	-
14.		Testing for Seismic Resistance	1705.14	-	Х	-
15.		Sprayed Fire-Resistant Materials	1705.15	-	-	Х
16.		Mastic & Intumescent Fire-Resistant Coatings	1705.16	-	-	Х
17.		Exterior Insulation and Finish Systems (EIFS)	1705.17	-	-	Х
18.		Fire-Resistant Penetrations and Joints	1705.18	Х	-	-
19.		Testing for Smoke Control	1705.19	-	-	Х

Special Inspections for Wind Resistance	IS NOT	required for this project.
Special Inspections for Seismic Resistance	IS NOT	required for this project.
Testing for Seismic Resistance	IS NOT	required for this project.

## Lateral Force Resisting System (LFRS)

When special inspections for wind or seismic resistance, or testing for seismic resistance are required, the following list of main wind force-resisting systems and wind-resisting components, or seismic force-resisting systems shall be subject to special inspections or tests in accordance with IBC 2021 Section 1704.3.2 and 1704.3.3. Each LFRS element shall be carefully inspected as indicated in the SCHEDULE OF SPECIAL INSPECTIONS.

Vertical LFRS Elements	Location Notes
Not Applicable	
Horizontal LFRS Elements	Location Notes
Horizontal LFRS Elements Not Applicable	Location Notes
Horizontal LFRS Elements Not Applicable	Location Notes

## **Designated Seismic Systems (DSS)**

When special inspections or tests for seismic resistance are required, the following list of Designated Seismic Systems (DSS) for nonstructural components shall be certified by the manufacturer to remain operational and/or contain hazardous substances in accordance with IBC 2021 Section 1704.14.3 and ASCE 7 Section 13.2.2. Certificates of Compliance for each DSS shall be reviewed and accepted by the Contracting Officer and Registered Design Professional in Responsible Charge. Each DSS shall be carefully inspected as indicated in the SCHEDULE OF SPECIAL INSPECTIONS.

**ELECTRICAL Designated Seismic Systems (DSS) Requiring a Certificate of Compliance** 

1. Not Applicable

## MECHANICAL/PLUMBING Designated Seismic Systems (DSS) Requiring a Certificate of Compliance

1. Not Applicable

## OTHER Designated Seismic Systems (DSS) Requiring a Certificate of Compliance

1. Not Applicable

## **Final Walk-Down Inspection and Report**

All Designated Seismic Systems (DSS) shall receive a final walk-down inspection and report by the Registered Design Professional in Responsible Charge in accordance with UFC 3-301-01 Section 2-5.4.

## Final Walk-Down Report shall include the following:

- 1. Record observations of the final walk-down inspection
- 2. Document that inspections were performed as indicated in the SCHEDULE OF SPECIAL INSPECTIONS
- 3. Document that all DSS have been installed in accordance with the construction documents and that the Certificates of Compliance have been received.

Special Inspections for Progressive Collapse Resistance IS NOT required for this project.

## Progressive Collapse Resisting Systems and Components – Quality Assurance Plan

When Progressive Collapse Resistance is required, the following list of Designated Progressive Collapse Resisting Systems and Components shall receive Special Inspections and Tests in accordance with IBC 2018 Section 1705 and UFC 4-023-03 Appendix H. Refer to the SCHEDULE OF SPECIAL INSPECTIONS for the type, extent and frequency of each special inspection and test.

## **Designated Progressive Collapse Resisting Systems and Components**

1. Not Applicable

## Progressive Collapse Resisting Systems and Components – Contractor Responsibilities

When Progressive Collapse Resistance is required, each contractor responsible for the construction of the progressive collapse resisting systems or progressive collapse components listed in the Quality Assurance Plan shall submit a written contractor's statement of responsibility to the contracting officer prior to the commencement of work on the system or component in accordance with UFC 4-023-03 Appendix H.

### Contractor's Statement of Responsibility shall include the following:

- 1. Acknowledgement of awareness of the special requirements contained in the Quality Assurance Plan.
- 2. Acknowledgement that control will be exercised to obtain conformance with the construction documents approved by the building official or Contracting Officer.
- 3. Procedures for exercising control within the contractor's organization, the method and frequency of reporting, and the distribution of report.
- 4. Identification and qualification of the person(s) exercising such control and their position(s) in the organization.

# SCHEDULE OF SPECIAL INSPECTIONS

Reference Specification 01 45 35 for all requirements not noted as part of this schedule.

Definitions for Sections located at end of Schedule.

The Seismic Design Category for this project is:  $\Box$  A,  $\boxtimes$  B,  $\Box$  C,  $\Box$  D,  $\Box$  E,  $\Box$  F (check appropriate box)

# A. STRUCTURAL – STEEL CONSTRUCTION - STRUCTURAL STEEL - WELDING SECTION THIS SECTION APPLICABLE IF BOX IS CHECKED: ☑

STEEL CONSTRUCTION - STRUCTURAL STEEL - WELDING - INSPECTION TASKS PRIOR TO WELDING - VERIFY THE					
FOLLOWING ARE IN COMPLIANCE	FOLLOWING ARE IN COMPLIANCE				
IBC 2021 SECTION 1705.2.1, AISC 360-16: CHAPTER N, SECTION N5.4, TABLE N5.4	-1				
INSPECTION TASKS PRIOR TO WELDING	QC	QA			
1. Welder qualification records and continuity records	Perform	Observe			
2. WPS available	Perform	Perform			
3. Manufacturer certifications for welding consumables available	Perform	Perform			
4. Material identification (type/grade)	Observe	Observe			
5. Welder identification system <sup>a</sup>	Observe	Observe			
6. Fit-up of groove welds (including joint geometry)					
Joint preparation					
<ul> <li>Dimensions (alignment, root opening, root face, bevel)</li> </ul>	Observe	Observe			
<ul> <li>Cleanliness (condition of steel surfaces)</li> </ul>					
<ul> <li>Tacking (tack weld quality and location)</li> </ul>					
<ul> <li>Backing type and fit (if applicable)</li> </ul>					
7. Fit-up of CJP groove welds of HSS T-, Y- and K-joints without backing					
(including joint geometry)					
Joint preparation	Perform	Observe			
<ul> <li>Dimensions (alignment, root opening, root face, bevel)</li> </ul>					
<ul> <li>Cleanliness (condition of steel surfaces)</li> </ul>					
<ul> <li>Tacking (tack weld quality and location)</li> </ul>					
8. Configuration and finish of access holes	Observe	Observe			
9. Fit-up of fillet welds					
<ul> <li>Dimensions (alignment, gaps at root</li> </ul>	Observe	Observe			
<ul> <li>Cleanliness (condition of steel surfaces)</li> </ul>					
<ul> <li>Tacking (tack weld quality and location)</li> </ul>					
10. Check welding equipment	Observe	Observe			
a. The fabricator or erector, as applicable, shall maintain a system by which a we	lder who has wel	ded a joint or			
member can be identified. Stamps, if used, shall be the low-stress type.	member can be identified. Stamps, if used, shall be the low-stress type.				

## A. STRUCTURAL – STEEL CONSTRUCTION - STRUCTURAL STEEL - WELDING SECTION (CONTINUED)

STEEL CONSTRUCTION - STRUCTURAL STEEL - WELDING - INSPECTION TASKS <u>DURING</u> WELDING - VERIFY THE				
FOLLOWING ARE IN COMPLIANCE				
IBC 2021 SECTION 1705.2.1, AISC 360-16: CHAPTER N, SECTION N5.4, TABLE N5.4	1-2			
INSPECTION TASKS DURING WELDING	QC	QA		
1. Control and handling of welding consumables				
Packaging	Observe	Observe		
Exposure Control				
2. No welding over cracked tack welds	Observe	Observe		
3. Environmental conditions				
Wind speed within limits	Observe	Observe		
Precipitation and temperature				
4. Welding Procedures Specification (WPS) followed				
<ul> <li>Settings on welding equipment</li> </ul>				
Travel speed				
<ul> <li>Selected welding materials</li> </ul>	Observe	Observe		
<ul> <li>Shielding gas type/flow rate</li> </ul>				
Preheat applied				
<ul> <li>Interpass temperature maintained (min./max.)</li> </ul>				
<ul> <li>Proper position (F, V, H, OH)</li> </ul>				
5. Welding techniques				
<ul> <li>Interpass and final cleaning</li> </ul>	Observe	Observe		
Each pass within profile limitations				
Each pass meets quality requirements				
6. Placement and installation of steel headed stud anchors	Perform	Perform		

# A. STRUCTURAL – STEEL CONSTRUCTION - STRUCTURAL STEEL - WELDING SECTION (CONTINUED)

STEEL CONSTRUCTION - STRUCTURAL STEEL - WELDING - INSPECTION TASKS AFTER WELDING - VERIFY THE				
FOLLOWING ARE IN COMPLIANCE				
IBC 2021 SECTION 1705.2.1, AISC 360-16: CHAPTER N, SECTION N5.4, TABLE N5.4	-3			
INSPECTION TASKS AFTER WELDING	QC	QA		
1. Welds cleaned	Observe	Observe		
2. Size, length, and location of welds	Perform	Perform		
3. Welds meet visual acceptance criteria				
Crack prohibition				
Weld/base-metal fusion				
Crater cross section	Perform	Perform		
Weld profiles				
Weld size				
Undercut				
Porosity				
4. Arc strikes	Perform	Perform		
5. k-area <sup>a</sup>	Perform	Perform		
6. Weld access holes in rolled heavy shapes and built-up shapes <sup>b</sup>	Perform	Perform		
7. Backing removed and weld tabs removed (if required)	Perform	Perform		
8. Repair activities	Perform	Perform		
9. Document acceptance or rejection of welded joint or member	Perform	Perform		
10. No prohibited welds have been added without the approval of the EOR	Observe	Observe		
a. When welding of doubler plates, continuity plates or stiffeners has been perf	ormed in the k-are	ea, visually		
inspect the web k-area for cracks within 3 in. (75mm) of the weld.				
b. After rolled heavy shapes and built-up heavy shapes are welded, visually insp	ect the weld acces	ss hole for		
cracks.				

# B. STRUCTURAL – STEEL CONSTRUCTION - STRUCTURAL STEEL - NON-DESTRUCTIVE TESTING (NDT) OF WELDED JOINTS SECTION

## THIS SECTION APPLICABLE IF BOX IS CHECKED:

STEEL CONSTRUCTION – STRUCTURAL STEEL - NON-DESTRUCTIVE TESTING (NDT) OF WELDED JOINTS - VERIFY THE FOLLOWING ARE IN COMPLIANCE

IBC 2021 SECTION 1705.2.1, AISC 360-16: CHAPTER N, SECTION N5.5

	TASK	INSPECTION TYPE	DESCRIPTION		
1.	Procedures	Perform	Ultrasonic testing (UT), magnetic particle testing (MT), penetrant testing (PT), and radiographic testing (RT), where required, shall be performed by QA in accordance with AWS D1.1/D1.1M.		
2.	CJP Groove Weld NDT	Perform	For structures in Risk Category III or IV, UT shall be performed by QA on all complete-joint-penetration (CJP) groove welds subject to transversely applied tension loading in butt, T- and corner joints, in material 5/16 inch thick or greater. For structures in Risk Category II, UT shall be performed by QA on 10% of CJP groove welds in butt, T- and corner joints subject to transversely applied tension loading, in materials 5/16 inch thick or greater.		
3.	Welded Joints Subjected to Fatigue	Perform	When required by AISC 360 Appendix 3, Table A-3.1, welded joints requiring weld soundness to be established by radiographic or ultrasonic inspection shall be tested by QA as prescribed. Reduction in the rate of UT is prohibited.		
4.	Ultrasonic Testing Rejection Rate	Perform	The ultrasonic testing rejection rate shall be determined as the number of welds containing defects divided by the number of welds completed. Welds that contain acceptable discontinuities shall not be considered as having defects when the rejection rate is determined. For evaluating the rejection rate of continuous welds over 3 feet in length where the effective throat is 1 inch or less, each 12-inch increment of fraction thereof shall be considered as one weld. For evaluating the rejection rate on continuous welds over 3 feet in length where the effective throat is greater than 1 inch, each 6-inch of length, or fraction thereof, shall be considered one weld.		
5.	Reduction of Ultrasonic Testing Rate	Perform	For projects that contain 40 or fewer welds, there shall be no reduction in the ultrasonic testing rate. The rate of UT is permitted to be reduced if approved by the EOR and the AHJ. Where the initial rate of UT is 100%, the NDT rate for an individual welder or welding operator is permitted to be reduced to 25%, provided the rejection rate, the number of welds containing unacceptable defects divided by the number of welds completed, is demonstrated to be 5% or less of the welds tested for the welder of welding operator. A sampling of at least 40 completed welds shall be made for such reduced evaluation on each project.		

# B. STRUCTURAL – STEEL CONSTRUCTION - STRUCTURAL STEEL - NON-DESTRUCTIVE TESTING (NDT) OF WELDED JOINTS SECTION (CONTINUED)

STEEL CONSTRUCTION – STRUCTURAL STEEL - NON-DESTRUCTIVE TESTING (NDT) OF WELDED JOINTS - VERIFY THE FOLLOWING ARE IN COMPLIANCE

IBC 2021 SECTION 1705.2.1, AISC 360-16: CHAPTER N, SECTION N5.5

TASK INSPECTION TYPE		DESCRIPTION
6. Increase in Ultrasonic Testing Rate	Perform	For structures in Risk Category II and higher (where the initial rate for UT is 10%) the NDT rate for an individual welder or welding operator shall be increased to 100% should the rejection rate (the number of welds containing unacceptable defects divided by the number of welds completed) exceed 5% of the welds tested for the welder or welding operator. A sampling of at least 20 completed welds on each project shall be made prior to implementing such an increase. If the rejection rate for the welder or welding operator falls to 5% or less on the basis of at least 40 completed welds, the rate of UT may be decreased to 10%.
7. Documentation	Document	All NDT performed shall be documented. For shop fabrication, the NDT report shall identify the tested weld by piece mark and location in the piece. For field work, the NDT report shall identify the tested weld by location in the structure, piece mark, and location in the piece, When a weld is rejected on the basis of NDT, the NDT record shall indicate the location of the defect and the basis of rejection.

# C. STRUCTURAL – STEEL CONSTRUCTION - STRUCTURAL STEEL - BOLTING SECTION THIS SECTION APPLICABLE IF BOX IS CHECKED: ☑

STEEL CONSTRUCTION - STRUCTURAL STEEL - BOLTING - INSPECTION TASKS PRIOR TO BOLTING - VERIFY THE				
FOLLOWING ARE IN COMPLIANCE				
IBC 2021 SECTION 1705.2.1, AISC 360-16: CHAPTER N, SECTION N5.6, TABLE N5.6	-1			
INSPECTION TASKS PRIOR TO BOLTING	QC	QA		
1. Manufacturer's certifications available for fastener materials	Observe	Perform		
2. Fasteners marked in accordance with ASTM requirements	Observe	Observe		
3. Correct fasteners selected for joint detail (grade, type, bolt length if threads	Observe	Observe		
are to be excluded from shear plane)				
4. Correct bolting procedure selected for joint detail	Observe	Observe		
5. Connecting elements, including the appropriate faying surface condition	Observe	Observe		
and hole preparation, if specified, meet applicable requirements				
6. Pre-installation verification testing by installation personnel observed and	Perform	Observe		
documented for fastener assemblies and methods used.				
7. Protected storage provided for bolts, nuts, washers, and other fastener	Observe	Observe		
components				
STEEL CONSTRUCTION - STRUCTURAL STEEL - BOLTING - INSPECTION TASKS DURI	<u>NG</u> BOLTING - VE	RIFY THE		
FOLLOWING ARE IN COMPLIANCE				
IBC 2021 SECTION 1705.2.1, AISC 360-16: CHAPTER N, SECTION N5.6, TABLE N5.6	-2			
INSPECTION TASKS DURING BOLTING	QC	QA		
1. Fastener assemblies placed in all holes and washers and nuts are positioned	Observe	Observe		
as required				
2. Joint brought to the snug-tight condition prior to pre-tensioning operation	Observe	Observe		
3. Fastener component not turned by the wrench prevented from rotating	Observe	Observe		
4. Fasteners are pretensioned in accordance with RCSC Specification,	Observe	Observe		
progressing systematically from the most rigid point toward the free edges				
STEEL CONSTRUCTION - STRUCTURAL STEEL - BOLTING INSPECTION TASKS AFTER	BOLTING - VERIF	Y THE		
FOLLOWING ARE IN COMPLIANCE				
IBC 2021 SECTION 1705.2.1, AISC 360-16: CHAPTER N, SECTION N5.6, TABLE N5.6	-3			
INSPECTION TASKS AFTER BOLTING	QC	QA		
1. Document acceptance or rejection of all bolted connections	Perform	Perform		

# D. STRUCTURAL – STEEL CONSTRUCTION - STRUCTURAL STEEL – GALVANIZED STRUCTURAL STEEL MAIN MEMBERS & OTHER INSPECTION TASK SECTION

THIS SECTION APPLICABLE IF BOX IS CHECKED:

STEEL CONSTRUCTION - STRUCTURAL STEEL – GALVANIZED STRUCTURAL STEEL MAIN MEMBERS & OTHER INSPECTION TASKS - VERIFY THE FOLLOWING ARE IN COMPLIANCE IBC 2021 SECTION 1705.2.1, AISC 360-16: CHAPTER N, SECTIONS N5.7 & N5.8

			QC		QA	
	OTHER INSPECTION TASK	TASK	DOC.	TASK	DOC.	
1.	Exposed cut surfaces of galvanized structural steel main members and exposed corners of rectangular HSS shall be visually inspected for cracks subsequent to galvanizing. Cracks shall be repaired or the member shall be rejected.	Perform	Document			
2.	The fabricator's QCI shall inspect the fabricated steel to verify compliance with the details shown on the shop drawings, including such items as the correct application of shop joint details at each connection.	Perform	Document			
3.	The erector's QCI shall inspect the erected steel frame to verify compliance with the field installed details shown on the erection drawings, including such items as braces, stiffeners, member locations, and correct application of field joint details at each connection.	Perform	Document			
4.	structural steel – QAI shall be on the premises for inspection during the placement of anchor bolts and other embedments supporting structural steel for compliance with the construction documents. As a minimum, the diameter, grade, type and length of the anchor rod or embedded item, and the extent or depth of embedment into the concrete, shall be verified and documented prior to placement of concrete.			Perform	Document	
5.	Fabricated steel or erected steel frame – QAI shall inspect the fabricated steel or erected steel frame, as applicable, to verify compliance with the details shown on the construction documents. This includes such items as braces, stiffeners, member locations and proper application of joint details at each connection. The acceptance or rejection of joint details and the correct application of joint details shall be documented.			Perform	Document	

# E. STRUCTURAL – STEEL CONSTRUCTION - STRUCTURAL STEEL - AISC 341 SEISMIC PROVISIONS - VISUAL WELDING INSPECTION SECTION

THIS SECTION APPLICABLE IF BOX IS CHECKED:

STEEL CONSTRUCTION - STRUCTURAL STEEL – AISC 341 SEISMIC PROVISIONS - WELDING - VISUAL INSPECTION TASKS <u>PRIOR TO</u> WELDING - VERIFY THE FOLLOWING ARE IN COMPLIANCE

IBC 2021 SECTION 1705.13.1, AISC 341-16: CHAPTER J, SECTION J6, TABLE J6.1

		QC		QA	
	VISUAL INSPECTION TASKS PRIOR TO WEEDING		DOC.	TASK	DOC.
1.	Material identification (type/grade)	Observe		Observe	
2.	Welder identification system <sup>a</sup>	Observe		Observe	
3.	<ul> <li>Fit-up of groove welds (including joint geometry)</li> <li>Joint preparation</li> <li>Dimensions (alignment, root opening, root face, bevel)</li> <li>Cleanliness (condition of steel surfaces)</li> <li>Tacking (tack weld quality and location)</li> <li>Backing type and fit (if applicable)</li> </ul>	Perform/ Observe **		Observe	
4.	Configuration and finish of access holes	Observe		Observe	
5.	<ul> <li>Fit-up of fillet welds</li> <li>Dimensions (alignment, gaps at root</li> </ul>	Perform/		Observe	
	<ul> <li>Cleanliness (condition of steel surfaces)</li> <li>Tacking (tack weld quality and location)</li> </ul>	Ubserve **			

\*\* Following performance of this inspection task for ten welds to be made by a given welder, with the welder demonstrating understanding of requirements and possession of skills and tools to verify these items, the Perform designation of this task shall be reduced to Observe, and the welder shall perform this task. Should the inspector determine that the welder has discontinued performance of this task, the task shall be returned to Perform until such time as the Inspector has re-established adequate assurance that the welder will perform the inspection tasks listed.

# E. STRUCTURAL – STEEL CONSTRUCTION - STRUCTURAL STEEL - AISC 341 SEISMIC PROVISIONS - VISUAL WELDING INSPECTION SECTION (CONTINUED)

STEEL CONSTRUCTION - STRUCTURAL STEEL - AISC 341 SEISMIC PROVISIONS - WELDING - VISUAL INSPECTION TASKS <u>DURING</u> WELDING - VERIFY THE FOLLOWING ARE IN COMPLIANCE IBC 2021 SECTION 1705.13.1. AISC 341-16: CHAPTER L SECTION 16. TABLE 16.2

	VISUAL INSPECTION TASKS DURING WELDING		C	QA	
			DOC.	TASK	DOC.
1.	<ul> <li>WPS followed</li> <li>Settings on welding equipment</li> <li>Travel Speed</li> <li>Selected welding materials</li> <li>Shielding gas type/flow rate</li> <li>Preheat applied</li> <li>Interpass temperature maintained (min./max.)</li> <li>Proper position (F, V, H, OH)</li> <li>Intermix of filler metals avoided unless approved</li> </ul>	Observe		Observe	
2.	Use of qualified welders	Observe		Observe	
3.	<ul> <li>Control and handling of welding consumables</li> <li>Packaging</li> <li>Exposure Control</li> </ul>	Observe		Observe	
4.	<ul><li>Environmental conditions</li><li>Wind speed within limits</li><li>Precipitation and temperature</li></ul>	Observe		Observe	
5.	<ul> <li>Welding techniques</li> <li>Interpass and final cleaning</li> <li>Each pass within profile limitations</li> <li>Each pass meets quality requirements</li> </ul>	Observe		Observe	
6.	No welding over cracked tacks	Observe		Observe	

# E. STRUCTURAL – STEEL CONSTRUCTION - STRUCTURAL STEEL - AISC 341 SEISMIC PROVISIONS - VISUAL WELDING INSPECTION SECTION (CONTINUED)

STEEL CONSTRUCTION - STRUCTURAL STEEL - AISC 341 SEISMIC PROVISIONS - WELDING - VISUAL INSPECTION TASKS <u>AFTER</u> WELDING - VERIFY THE FOLLOWING ARE IN COMPLIANCE IBC 2021 SECTION 1705.13.1, AISC 341-16: CHAPTER J, SECTION J6, TABLE J6.3

		Q	C QA		A
	VISUAL INSPECTION TASKS AFTER WELDING	TASK	DOC.	TASK	DOC.
1.	Welds cleaned	Observe		Observe	
2.	Size, length, and location of welds	Perform		Perform	
3.	Welds meet visual acceptance criteria				
	Crack prohibition				
	Weld/base-metal fusion				
	Crater cross section	Perform	Document	Perform	Document
	Weld profiles and size				
	Undercut				
	Porosity				
4.	k-area <sup>1</sup>	Perform	Document	Perform	Document
5.	Placement of reinforcing or contouring fillet welds (if	Perform	Document	Perform	Document
	required)				
6.	Backing removed, weld tabs removed and finished, and fillet	Perform	Document	Perform	Document
	welds added (if required)				
7.	Repair activities	Perform		Perform	Document
	1. When welding of doubler plates, continuity plates or stiffene	ers has been	performed in	n the k-area,	visually
	inspect the web k-area for cracks within 3 in. (75mm) of the we	eld. The visu	al inspection	shall be perf	ormed no
	sooner than 48 hours following completion of the welding.				

## F. STRUCTURAL – STEEL CONSTRUCTION - STRUCTURAL STEEL - AISC 341 SEISMIC PROVISIONS -WELDING INSPECTION AND NONDESTRUCTIVE TESTING OF WELDED JOINTS SECTION THIS SECTION APPLICABLE IF BOX IS CHECKED:

STEEL CONSTRUCTIONJ - STRUCTUAL STEEL - AISC 341 SEISMIC PROVISIONS - WELDING INSPECTION AND NONDESTRUCTIVE TESTING OF WELDED JOINTS - VERIFY THE FOLLOWING ARE IN COMPLIANCE IBC 2021 SECTION 1705.13.1. AISC 341-16: CHAPTER J. SECTION 16

	TASK	INSPECTION TYPE	DESCRIPTION
1.	Welding Inspection and Nondestructive Testing	Perform	Welding inspection and nondestructive testing shall satisfy the requirements of the <i>Specification</i> (AISC 360), AISC 341 Section J6, and AWS D1.8/D1.8M.
2.	Visual Welding Inspection	Perform	All requirements of the <i>Specification</i> (AISC 360) shall apply, except as specifically modified by AWS D1.8/D1.8M.
3.	NDT of Welded Joints	Perform	In addition to the requirements of <i>Specification</i> (AISC 360) Section N5.5, nondestructive testing of welded joints shall be as required by AISC 341 Section J6.
4.	CJP Groove Weld NDT	Perform	Ultrasonic testing (UT) shall be performed on 100% of complete- joint-penetration (CJP) groove welds in materials 5/16 inch or greater. UT in material less than 5/16 inch thick is not required. Weld discontinuities shall be accepted of rejected on the basis of AWS D1.1/D1.1M Table 6.2. Magnetic particle testing (MT) shall be performed on 25% of all beam-to-column CJP groove welds. The rate of UT and MT is permitted to be reduced in accordance with Sections J6.2g and J6.2h, respectively. Exception: for ordinary moment frames in structures in Risk Categories I or II, UT and MT of CJP groove welds are required only for demand critical welds.
5.	Column Splice and Column to Base Plate PJP Groove Weld NDT	Perform	UT shall be performed by QA on 100% of partial-joint-penetration (PJP) groove welds in column splices and column to base plate welds. The rate of UT is permitted to be reduced in accordance with AISC 341 Section J6.2g. UT shall be performed using written procedures and UT technicians qualified in accordance with AWS D1.8/D1.8M. UT examination of welds using alternative techniques in compliance with AWS D1.1/D1.1M Annex Q is permitted. Weld discontinuities located within the groove weld throat shall be accepted or rejected on the basis of criteria of AWS D1.1/D1.1M Table 6.2, except when alternative techniques are used, the criteria shall be as provided in AWS D1.1/D1.1M Annex Q.
6.	Base Metal NDT for Lamellar Tearing and Laminations	Perform	After joint completion, base metal thicker than 1 ½ inches loaded in tension in the through-thickness direction in T- and corner-joints, where the connected material is greater than ¾ inch and contains CJP groove welds, shall be ultrasonically tested for discontinuities behind and adjacent to the fusion line of such welds. An base metal discontinuities found within t/4 of the steel surface shall be accepted or rejected on the basis of criteria of AWS D1.1/D1.1M Table 6.2, where t is the thickness of the part subjected to the through-thickness strain.

# F. STRUCTURAL – STEEL CONSTRUCTION - STRUCTURAL STEEL - AISC 341 SEISMIC PROVISIONS -WELDING INSPECTION AND NONDESTRUCTIVE TESTING OF WELDED JOINTS SECTION (CONTINUED)

STE	STEEL CONSTRUCTION - STRUCTUAL STEEL - AISC 341 SEISMIC PROVISIONS - WELDING INSPECTION AND						
NO	NONDESTRUCTIVE TESTING OF WELDED JOINTS - VERIFY THE FOLLOWING ARE IN COMPLIANCE						
IBC	2021 SECTION 1705.	13.1, AISC 341-16: CH	APTER J, SECTION J6				
	TASK	INSPECTION TYPE	DESCRIPTION				
			At welded splices and connections, thermally cut surfaces of beam				
7.	Beam Cope and	Perform	copes and access holes shall be tested using magnetic particle testing				
	Access Hole NDT.		or penetrant testing, when the flange thickness exceeds 1 1/2 inches				
			for rolled shapes, or when the web thickness exceeds 1 1/2 inches				
			for built-up shapes.				
8.	Reduced Beam		MT shall be performed on any weld and adjacent area of the reduced				
	Section Repair	Perform	beam section (RBS) cut surface that has been repaired by welding, or				
	NDT		on the base metal of the RBS cut surface if a sharp notch has been				
			removed by grinding.				
			At the end of welds where tabs have been removed, MT shall be				
9.	Weld Tab Removal	Perform	performed on the same beam-to-column joints receiving UT as				
	Sites		required under AISC 341 Section J6.2a. The rate of MT is permitted				
			to be reduced in accordance with Section J6.2h. MT of continuity				
			plate weld tab removal sites is not required.				
10.	Reduction of		The reduction of percentage of UT is permitted to be reduced in				
	Percentage of	Perform	accordance with Specification (AISC 360) Section N5.5e, except no				
	Ultrasonic Testing		reduction is permitted for demand critical welds.				
			The amount of MT on CJP groove welds is permitted to be reduced if				
			approved by the engineer of record and the authority having				
11.	Reduction of		jurisdiction. The MT rate for an individual welder or welding				
	Percentage of	Perform	operator is permitted to be reduced to 10%, provided the reject rate				
	Magnetic Particle is demonstrated to be 5% or less of the welds tested for the welder						
	Testing		or welding operator. A sampling of at least 20 completed welds for				
			a job shall be made for such reduction evaluation. Reject rate is the				
			number of welds completed. This reduction is prohibited on welds				
	in the k-area, at repair sites, backing removal sites, and access holes.						

# G. STRUCTURAL – STEEL CONSTRUCTION - STRUCTURAL STEEL - AISC 341 SEISMIC PROVISIONS - BOLTING SECTION

## THIS SECTION APPLICABLE IF BOX IS CHECKED: $\Box$

STEEL CONSTRUCTION - STRUCTURAL STEEL - AISC 341 SEISMIC PROVISIONS - BOLTING - INSPECTION TASKS <u>PRIOR</u> <u>TO</u> BOLTING - VERIFY THE FOLLOWING ARE IN COMPLIANCE

IBC 2021 SECTION 1705.13.1, AISC 341-16: CHAPTER J, SECTION J7, TABLE J7.1

		QC QA			A
	INSPECTION TASKS PRIOR TO BOLTING	TASK	DOC.	TASK	DOC.
1.	Proper fasteners selected for the joint detail	Observe		Observe	
2.	Proper bolting procedure selected for joint detail	Observe		Observe	
3.	Connecting elements, including the appropriate faying				
	surface condition and hole preparation, if specified, meet	Observe		Observe	
	applicable requirements				
4.	Pre-installation verification testing by installation personnel	Perform	Document	Observe	Document
	observed for fastener assemblies and methods used				
5.	Protected storage provided for bolts, nuts, washers, and	Observe		Observe	
	other fastener components				
STE	EEL CONSTRUCTION - STRUCTURAL STEEL - AISC 341 SEISMIC PRO	OVISIONS - BO	OLTING - INS	PECTION TAS	KS <u>DURING</u>
BO	LTING - VERIFY THE FOLLOWING ARE IN COMPLIANCE				
IBC	2021 SECTION 1705.13.1, AISC 341-16: CHAPTER J, SECTION J7,	TABLE J7.2			
		Q	QA QA		
		TASK	DOC.	TASK	DOC.
1.	Fastener assemblies placed in all holes and washers (if	Observe		Observe	
	required) are positioned as required				
2.	Joint brought to the snug-tight condition prior to the pre-	Observe		Observe	
	tensioning operation				
3.	Fastener component not turned by the wrench prevented	Observe		Observe	
	from rotating				
4.	Bolts are pretensioned progressing systematically from the	Observe		Observe	
	most rigid point toward the free edges				
STE	EEL CONSTRUCTION - STRUCTURAL STEEL - AISC 341 SEISMIC PRO	OVISIONS - BO	OLTING - INS	PECTION TAS	KS <u>AFTER</u>
BOLTING - VERIFY THE FOLLOWING ARE IN COMPLIANCE					
IBC	2021 SECTION 1705.13.1, AISC 341-16: CHAPTER J, SECTION J7,	TABLE J7.3			
		Q	С	Q	A
	INSPECTION TASKS AFTER BOLTING	TASK	DOC.	Observe          Observe          t       Observe       Document         Observe          NSPECTION TASKS AFTER         QA          QA          QA          QA          Image: Document          Image: Document          Image: Document	
1.	Document accepted and rejected connections	Perform	Document	Perform	Document
					_ <b>.</b>

# H. STRUCTURAL – STEEL CONSTRUCTION - STRUCTURAL STEEL - AISC 341 SEISMIC PROVISIONS - OTHER INSPECTION TASKS SECTION

THIS SECTION APPLICABLE IF BOX IS CHECKED:

STEEL CONSTRUCTION - STRUCTURAL STEEL - AISC 341 SEISMIC PROVISIONS - OTHER INSPECTION TASKS - VERIFY THE FOLLOWING ARE IN COMPLIANCE

IBC 2021 SECTION 1705.13.1, AISC 341-16: CHAPTER J, SECTION J8, TABLE J8.1

OTHER INSPECTION TASKS		Q	C QA		
		TASK	DOC.	TASK	DOC.
1.	<ul> <li>RBS requirements, if applicable</li> <li>Contour and finishing</li> <li>Dimensional tolerances</li> </ul>	Perform	Document	Perform	Document
2.	Protected zone – no holes and unapproved attachments made by fabricator or erector, as applicable	Perform	Document	Perform	Document

## I. STRUCTURAL – STEEL CONSTRUCTION - STRUCTURAL STEEL - AISC 341 SEISMIC PROVISIONS -COMPOSITE STRUCTURES SECTION

THIS SECTION APPLICABLE IF BOX IS CHECKED:

STEEL CONSTRUCTION - STRUCTURAL STEEL - AISC 341 SEISMIC PROVISIONS - INSPECTION OF COMPOSITE STRUCTURES <u>PRIOR TO</u> CONCRETE PLACEMENT - VERIFY THE FOLLOWING ARE IN COMPLIANCE IBC 2021 SECTION 1705.13.1, AISC 341-16: CHAPTER J. SECTION J9. TABLE J9.1

INSPECTION OF COMPOSITE STRUCTURES PRIOR TO CONCRETE	QC		QA	
PLACEMENT	TASK	DOC.	TASK	DOC.
1. Material identification of reinforcing steel (Type/Grade)	Observe		Observe	
2. Determination of carbon equivalent for reinforcing steel	Observe		Observe	
other than ASTM A706/A706M				
3. Proper reinforcing steel size, spacing and orientation	Observe		Observe	
4. Reinforcing steel has not been rebent in the field	Observe		Observe	
5. Reinforcing steel has been tied and supported as required	Observe		Observe	
6. Required reinforcing steel clearances have been provided	Observe		Observe	
7. Composite member has required size	Observe		Observe	
STEEL CONSTRUCTION - STRUCTURAL STEEL - AISC 341 SEISMIC PRO	OVISIONS - IN	SPECTION O	F COMPOSIT	E
STRUCTURES DURING CONCRETE PLACEMENT - VERIFY THE FOLLOW	WING ARE IN	COMPLIANC	Έ	
IBC 2021 SECTION 1705.13.1, AISC 341-16: CHAPTER J, SECTION J9,	TABLE J9.2			
INSPECTION OF COMPOSITE STRUCTURES DURING CONCRETE	QC QA			A
PLACEMENT	TASK	DOC.	TASK	DOC.
1. Concrete: Material identification (mix design, compressive	Observe	Document	Observe	Document
strength, maximum large aggregate size, maximum slump)				
2. Limits on water added at the truck or pump	Observe	Document	Observe	Document
3. Proper placement techniques to limit segregation	Observe		Observe	
STEEL CONSTRUCTION - STRUCTURAL STEEL - AISC 341 SEISMIC PRO	OVISIONS - IN	SPECTION O	F COMPOSIT	E
STRUCTURES AFTER CONCRETE PLACEMENT - VERIFY THE FOLLOW	ING ARE IN CO	OMPLIANCE		
IBC 2021 SECTION 1705.13.1, AISC 341-16: CHAPTER J, SECTION J9,	TABLE J9.3			
INSPECTION OF COMPOSITE STRUCTURES AFTER CONCRETE	Q	C	Q	A
PLACEMENT	TASK	DOC.	TASK	DOC.
1. Achievement of minimum specified concrete compressive		Document		Document
strength at specified age				

END SECTION

# J. STRUCTURAL – STEEL CONSTRUCTION - STRUCTURAL STEEL - AISC 341 SEISMIC PROVISIONS - H-PILES SECTION

## THIS SECTION APPLICABLE IF BOX IS CHECKED:

STEEL CONSTRUCTION - STRUCTURAL STEEL - AISC 341 SEISMIC PROVISIONS - INSPECTION OF H-PILES - VERIFY THE FOLLOWING ARE IN COMPLIANCE

IBC 2021 SECTION 1705.13.1, AISC 341-16: CHAPTER J, SECTION J10, TABLE J10.1

	Q	С	QA	
INSPECTION OF PILING		DOC.	TASK	DOC.
1. Protected zone – no holes and unapproved attachments	Perform	Document	Perform	Document
made by the responsible contractor, as applicable				

# K. STRUCTURAL – STEEL CONSTRUCTION - COLD-FORMED STEEL DECK - PLACEMENT SECTION THIS SECTION APPLICABLE IF BOX IS CHECKED: ⊠

STEEL CONSTRUCTION - COLD-FORMED STEEL DECK - INSPECTION OR EXECUTION TASK <u>PRIOR TO</u> DECK PLACEMENT - VERIFY THE FOLLOWING ARE IN COMPLIANCE IBC 2021 SECTION 1705.2.2, SDI QA/QC-2017, APPENDIX 1: TABLE 1.1					
INSPECTION OR EXECUTION TASKS PRIOR TO DECK PLACEMENT QC QA					
<ol> <li>Verify compliance of materials (deck and all deck accessories) with construction documents, including profiles, material properties, and base</li> </ol>	Perform	Perform			
metal thickness					
2. Document acceptance or rejection of deck and deck accessories	Perform	Perform			
STEEL CONSTRUCTION - COLD-FORMED STEEL DECK - INSPECTION OR EXECUTIO	N TASK <u>AFTER</u> DECH	K PLACEMENT -			
VERIFY THE FOLLOWING ARE IN COMPLIANCE					
IBC 2021 SECTION 1705.2.2, SDI QA/QC-2017, APPENDIX 1: TABLE 1.2					
INSPECTION OR EXECUTION TASKS AFTER DECK PLACEMENT	QC	QA			
1. Verify compliance of deck and all deck accessories installation with	Perform	Perform			
construction documents					
2. Verify deck materials are represented by the mill certifications that comply	NA	Perform			
with the construction documents					
3. Document acceptance or rejection of installation of deck and deck	Perform	Perform			
accessories					
STEEL CONSTRUCTION - COLDED-FORMED STEEL DECK - INSPECTION OR EXECUT	ION TASK PRIOR TO	) WELDING -			
VERIFY THE FOLLOWING ARE IN COMPLIANCE					
IBC 2021 SECTION 1705.2.2, SDI QA/QC-2017, APPENDIX 1: TABLE 1.3					
INSPECTION OR EXECUTION TASKS PRIOR TO WELDING	QC	QA			
1. Welding procedure specification (WPS) available	Observe	Observe			
2. Manufactures certifications for welding consumables available	Observe	Observe			
3. Material identification (type/grade)	Observe	Observe			
4. Check welding equipment	Observe	Observe			

## L. STRUCTURAL – STEEL CONSTRUCTION - COLD-FORMED STEEL DECK - WELDING SECTION THIS SECTION APPLICABLE IF BOX IS CHECKED:

STEEL CONSTRUCTION - COLD-FORMED STEEL DECK - INSPECTION OR EXECUTION TASK DURING WELDING - VERIFY					
THE FOLLOWING ARE IN COMPLIANCE	THE FOLLOWING ARE IN COMPLIANCE				
IBC 2021 SECTION 1705.2.2, SDI QA/QC-2017, APPENDIX 1: TABLE 1.4					
INSPECTION OR EXECUTION TASKS DURING WELDING	QC	QA			
1. Use of qualified welders	Observe	Observe			
2. Control and handling of welding consumables	Observe	Observe			
3. Environmental conditions (wind speed, moisture, temperature) Observe Observe					
4. WPS followed Observe Observe					
STEEL CONSTRUCTION - COLD-FORMED STEEL DECK - INSPECTION OR EXECUTIO	N TASK <u>AFTER</u> WEL	DING - VERIFY			
THE FOLLOWING ARE IN COMPLIANCE					
IBC 2021 SECTION 1705.2.2, SDI QA/QC-2017, APPENDIX 1: TABLE 1.5					
INSPECTION OR EXECUTION TASKS AFTER WELDING	INSPECTION OR EXECUTION TASKS AFTER WELDING QC QA				
1. Verify size and location of welds, including support, sidelap, and perimeter	1. Verify size and location of welds, including support, sidelap, and perimeter Perform Perform				
welds.					
2. Welds meet visual acceptance criteria Perform Perform					
3. Verify repair activities Perform Perform					
4. Document acceptance or rejection of welds	Perform	Perform			

## **END SECTION**

# M. STRUCTURAL – STEEL CONSTRUCTION - COLD-FORMED STEEL DECK - MECHANICAL FASTENING SECTION

## THIS SECTION APPLICABLE IF BOX IS CHECKED:

STEEL CONSTRUCTION - COLD-FORMED STEEL DECK - INSPECTION OR EXECUTION TASK PRIOR TO MECHANICAL					
FASTENING - VERIFT THE FULLOWING ARE IN COMPLIANCE	FASTENING - VERIFY THE FULLOWING ARE IN COMPLIANCE				
IBC 2021 SECTION 1705.2.2, SDI QA/QC-2017, APPENDIX 1: TABLE 1.6					
INSPECTION OR EXECUTION TASKS PRIOR TO MECHANICAL FASTENING	QC	QA			
1. Manufacturer installation instructions available for mechanical fasteners	Observe	Observe			
2. Proper tools available for fastener installation	Observe	Observe			
3. Proper storage for mechanical fasteners	Observe	Observe			
STEEL CONSTRUCTION - COLD-FORMED STEEL DECK - INSPECTION OR EXECUTIO	NI TASKS <u>DURING</u> N	IECHANICAL			
FASTENING - VERIFY THE FOLLOWING ARE IN COMPLIANCE					
IBC 2021 SECTION 1705.2.2, SDI QA/QC-2017, APPENDIX 1: TABLE 1.7					
INSPECTION OR EXECUTION TASKS DURING MECHANICAL FASTENING QC QA					
1. Fasteners are positioned as required Observe Obser					
2. Fasteners are installed in accordance with manufacturer's instructions Observe Observe					
STEEL CONSTRUCTION - COLD-FORMED STEEL DECK - INSPECTION OR EXECUTIO	N TASK <u>AFTER</u> MEC	HANICAL			
FASTENING - VERIFY THE FOLLOWING ARE IN COMPLIANCE					
IBC 2021 SECTION 1705.2.2, SDI QA/QC-2017, APPENDIX 1:					
TABLE 1.8					
INSPECTION OR EXECUTION TASKS AFTER MECHANICAL FASTENING	QC	QA			
1. Check spacing, type, and installation of support fasteners	Perform	Perform			
2. Check spacing, type, and installation of sidelap fasteners Perform Perform		Perform			
3. Check spacing, type, and installation of perimeter fasteners Perform Perform					
4. Verify repair activities Perform Perform					
5. Document acceptance or rejection of mechanical fasteners	Perform	Perform			

## N. STRUCTURAL – STEEL CONSTRUCTION - OPEN-WEB STEEL JOISTS AND JOIST GIRDERS SECTION THIS SECTION APPLICABLE IF BOX IS CHECKED: ☑

STEEL CONSTRUCTION - OPEN-WEB STEEL JOISTS AND JOIST GIRDERS - VERIFY THE FOLLOWING ARE IN COMPLIANCE						
IBC 2021 SECTION 1705.2.3: TABLE 1705.2.3						
CONTINUOUS PERIODIC						
ТҮРЕ	SPECIAL	SPECIAL	REFERENCED STANDARD <sup>a</sup>			
	INSPECTION	INSPECTION				
1. Installation of open-web steel joists and jo	ist girders.					
a. End connections – welded or		Х	SJI specifications listed in IBC			
bolted.			2021 Section 2207.1			
b. Bridging – horizontal or diagonal						
1. Standard bridging		Х	SJI specifications listed in IBC			
			2021 Section 2207.1			
2. Bridging that differs from						
the SJI specifications		Х				
listed in IBC 2021 Section						
2207.1						
a. Where applicable, see IBC 2021 Section 170	5.13, Special ins	pections for seis	mic resistance.			

## **END SECTION**

# O. STRUCTURAL – STEEL CONSTRUCTION - COLD-FORMED STEEL TRUSSES SPANNING 60 FEET OR GREATER SECTION

## THIS SECTION APPLICABLE IF BOX IS CHECKED:

STEEL CONSTRUCTION - COLD-FORMED STEEL TRUSSES SPANNING 60 FEET OR GREATER - VERIFY THE FOLLOWING ARE IN COMPLIANCE

IBC 2021 SECTION 1705.2.4

TASK		CONTINUOUS	PERIODIC			
		SPECIAL	SPECIAL	DESCRIPTION		
		INSPECTION	INSPECTION			
1.	Cold-form steel trusses			Verify that temporary installation restraint/bracing		
	spanning 60-feet or	Х		and the permanent individual truss member		
	greater where/if			restraint/bracing are installed in accordance with		
	applies			the approved truss submittal package.		

# P. STRUCTURAL - COLD-FORMED STEEL LIGHT-FRAME CONSTRUCTION - SPECIAL INSPECTIONS FOR WIND RESISTANCE SECTION

## THIS SECTION APPLICABLE IF BOX IS CHECKED:

COLD-FORMED STEEL LIGHT-FRAME CONSTRUCTION – SPECIAL INSPECTIONS FOR WIND RESISTANCE - VERIFY THE FOLLOWING ARE IN COMPLIANCE

IBC 2021 SECTION 1705.12.2

		CONTINUOUS	PERIODIC			
	TASK	SPECIAL	SPECIAL	DESCRIPTION		
		INSPECTION	INSPECTION			
1.	Welding operations of			Visually inspect all welds composing elements of the		
	elements of the main		Х	main wind force-resisting system, including shear		
	wind-force-resisting			walls, braces, diaphragms, collectors (drag struts),		
	system			and hold-downs.		
2.	Connections for main			Visually inspect all screw attachment, bolting,		
	wind-force resisting		Х	anchoring and other fastening of elements of main		
	system			wind-force resisting system, including shear walls,		
				braces, diaphragms, collectors (drag struts) and		
				hold-downs.		
NO	NOTE: This section required for buildings and structures constructed in the following areas: 1.) In wind Exposure					

NOTE: This section required for buildings and structures constructed in the following areas: 1.) In wind Exposure Category B, where Vasd as determined in accordance with IBC 2021 Section 1609.3.1 is 117 mph (Vult = 150 mph) or greater. 2.) In wind Exposure Category C or D, where Vasd as determined in accordance with IBC 2021 Section 1609.3.1 is 109 mph (Vult = 140 mph) or greater.

**END SECTION** 

# Q. STRUCTURAL - COLD-FORMED STEEL LIGHT-FRAME CONSTRUCTION - SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE SECTION

## THIS SECTION APPLICABLE IF BOX IS CHECKED:

COLD-FORMED STEEL LIGHT-FRAME CONSTRUCTION – SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE - VERIFY THE FOLLOWING ARE IN COMPLIANCE

IBC 2021 SECTION 1705.13.3 CONTINUOUS PERIODIC TASK SPECIAL SPECIAL DESCRIPTION INSPECTION INSPECTION 1. Welding operations of Visually inspect all welds composing elements of the elements of the Х seismic force-resisting system, including shear walls, ---braces, diaphragms, collectors (drag struts), and seismic force-resisting system hold-downs. Visually inspect all screw attachment, bolting, 2. Connections for anchoring and other fastening of elements of the seismic force-resisting Х \_\_\_\_ seismic force-resisting system, including shear walls, system braces, diaphragms, collectors (drag struts) and hold-downs.

NOTE: This section required for seismic force-resisting systems of structures assigned to Seismic Design Category C, D, E, or F.

## **R. STRUCTURAL - CONCRETE CONSTRUCTION SECTION**

## THIS SECTION APPLICABLE IF BOX IS CHECKED:

#### CONCRETE CONSTRUCTION - VERIFY THE FOLLOWING ARE IN COMPLIANCE IBC 2021 SECTION 1705.3: TABLE 1705.3 CONTINUOUS PERIODIC REFERENCED TYPE SPECIAL SPECIAL **IBC REFERENCE** STANDARD<sup>a</sup> INSPECTION INSPECTION 1. Inspect reinforcement, including ACI 318: Ch. 20, prestressing tendons, and verify Х 25.2, 25.3, 26.6-----1-26.6.3 placement. 2. Reinforcing bar welding a. Verify weldability of reinforcing bars Х ---other than ASTM A706; Х AWS D1.4 b. Inspect single-pass fillet welds, \_\_\_\_ ACI 318: 26.6.4 maximum 5/16"; and Х \_\_\_\_ c. Inspect all other welds. 3. Inspect anchors cast in concrete. Х ACI 318: 17.8.2 \_\_\_\_ 4. Inspect anchors post-installed in hardened concrete members <sup>b</sup> a. Adhesive anchors installed Х ACI 318: horizontally or upwardly inclined 17.8.2.4 orientations to resist sustained tension loads. b. Mechanical anchors and adhesive \_\_\_\_ Х ACI 318: 17.8.2 anchors not defined in 4.a. 5. Verify use of required design mix. Х ACI 318: Ch. 19, 1904.1, 1904.2 ----26.4.3, 26.4.4 6. Prior to concrete placement, fabricate ASTM C172 specimens for strength tests, perform Х ASTM C31 \_\_\_\_ slump and air content tests, and determine ACI 318: 26.5, 26.12 the temperature of the concrete. 7. Inspect concrete and shotcrete placement Х ACI 318: 26.5 ---for proper application techniques. 8. Verify maintenance of specified curing Х ACI 318: 26.5.3-\_\_\_\_ temperature and techniques. 26.5.5 9. Inspect prestressed concrete for: a. Application of prestressing forces; Х ACI 318: 26.10 and b. Grouting of bonded prestressing Х tendons. 10. Inspect erection of precast concrete ACI 318: 26.9 Х ---members

# R. STRUCTURAL - CONCRETE CONSTRUCTION SECTION (CONTINUED)

CONCRETE CONSTRUCTION - VERIFY THE FOLLOWING ARE IN COMPLIANCE						
IBC 2021 SECTION 1705.3: TABLE 1705.3						
TYPE	CONTINUOUS	PERIODIC	REFERENCED			
IYPE	SPECIAL	SPECIAL	STANDARD <sup>a</sup>	IBC REFERENCE		
	INSPECTION	INSPECTION				
11. For precast concrete diaphragm						
connections or reinforcement at joints			ACI 210.			
doformability (MDE or HDE) in structures			ACI 510.			
assigned to Seismic Design Category C. D. E.			20.15.1.5			
or E inspect such connection and			ACI 550 5			
reinforcing in the field for:			ACI 330.3			
a Installation of the embedded parts	x					
b. Completion of the continuity	x					
reinforcement across joints						
c. Completion of connection in the	х					
field						
12. Inspect installation tolerances of precast			ACI 318:			
concrete diaphragm connections for		х	26.13.1.3			
compliance with ACI 550.5						
13. Verify in-situ concrete strength, prior to						
stressing of tendons in post-tensioned		Х	ACI 318: 26.11.2			
concrete and prior to removal of shores						
and forms from beams and structural slabs.						
14. Inspect formwork for shape, location and		Х	ACI 318:			
dimensions of the concrete member being			26.11.1.2(B)			
formed.						
a. Where applicable, see IBC 2021 Section 1	. Where applicable, see IBC 2021 Section 1705.13, Special inspections for seismic resistance.					
b. Specific requirements for special inspection	Specific requirements for special inspection shall be included in the research report for the anchor					
issued by an approved source in accordar	issued by an approved source in accordance with 17.8.2 in ACI 318, or other qualification procedures.					
Where specific requirements are not provided, special inspection requirements shall be specified by						
the registered design professional and shall be approved by the building official prior to						
commencement of the work.						

# S. STRUCTURAL - MASONRY CONSTRUCTION - MINIMUM VERIFICATION REQUIREMENTS SECTION THIS SECTION APPLICABLE IF BOX IS CHECKED:

REQUIRED QUALITY ASSURANCE LEVEL LEVEL 1 LEVEL 2 LEVEL 3

MASONRY CONSTRUCTION - MINIMUM VERIFICATION REQUIREMENTS - VERIFY THE FOLLOWING ARE IN COMPLIANCE

IBC 2021 SECTION 1705.4, TMS 602-16: TABLE 3

		REQUIRED FOR		FOR	REFERENCE	
	MINIMUM VERIFICATION	QUALITY ASSURANCE <sup>a</sup>			FOR CRITERIA	
		LEVEL 1	LEVEL 2	LEVEL 3	TMS 602	
1.	Prior to construction, verification of compliance submittals	R	R	R	Art. 1.5	
2.	Prior to construction, verification of $f'_m$ and $f'_{AAC}$ , except where specifically exempted by Code.	NR	R	R	Art. 1.4 B	
3.	During construction, verification of Slump flow and Visual Stability Index (VSI) when self-consolidating grout is delivered to the project site.	NR	R	R	Art. 1.5 & 1.6.3	
4.	During construction, verification of $f'_m$ and $f'_{AAC}$ for every 5,000 sq. ft. (465 sq. m)	NR	NR	R	Art. 1.4 B	
5.	During construction, verification of proportions of materials as delivered to the project site for premixed or preblended mortar, prestressing grout, and grout other than self-consolidating grout.	NR	NR	R	Art. 1.4 B	
а.	<ul> <li>R = Required, NR = Not Required.</li> <li>Refer to TMS 402 Part 1, Chapter 3, Table 3.1 for the required "Minimum Quality Assurance Level" based on the "Design Method" (per TMS 402) and assigned "Risk Category" (as defined by the "Building Code") used for the project.</li> </ul>					
### T. STRUCTURAL - MASONRY CONSTRUCTION - MINIMUM SPECIAL INSPECTION REQUIREMENTS SECTION THIS SECTION APPLICABLE IF BOX IS CHECKED: ⊠

#### FREQUENCY LEVEL

 $\Box$  LEVEL 1  $\boxtimes$  LEVEL 2  $\Box$  LEVEL 3

## MASONRY CONSTRUCTION – MINIMUM SPECIAL INSPECTION REQUIREMENTS - VERIFY THE FOLLOWING ARE IN COMPLIANCE

IBC 2021 SECTION 1705.4, TMS 602-16: TABLE 4

	MINIMUM SPECIAL INSPECTIONS						
			FREQUENCY <sup>a</sup>			REFERENCE FOR CRITERIA	
			LEVEL 1	LEVEL 2	LEVEL 3	TMS 402	TMS 602
1.	As th	masonry construction begins, verify at the following are in compliance:					
	a.	Proportions of site-prepared mortar	NR	Р	Р		Art. 2.1, 2.6 A, & 2.6 C
	b.	Grade and size of prestressing tendons and anchorages	NR	Р	Р		Art. 2.4 B & 2.4 H
	c.	Grade, type and size of reinforcement, connectors, anchor bolts, and prestressing tendons and anchorages	NR	Ρ	Ρ		Art. 3.4 & 3.6 A
	d.	Prestressing technique	NR	Р	Р		Art. 3.6 B
	e.	Properties of thin-bed mortar for AAC masonry	NR	C <sup>b</sup> / P <sup>c</sup>	С		Art. 2.1 C.1
	f.	Sample panel construction	NR	Р	С		Art. 1.6 D
2.	Pr	or to grouting, verify that the					
	fo	lowing are in compliance:					
	a.	Grout space	NR	Р	C		Art. 3.2 D & 3.2 F
	b.	Placement of prestressing tendons and anchorages	NR	Р	Р	Sec. 10.8 & 10.9	Art. 2.4 & 3.6
	C.	Placement of reinforcement, connectors, and anchor bolts	NR	Р	С	Sec. 6.1, 6.3.1, 6.3.6, & 6.3.7	Art. 3.2 E & 3.4
	d.	Proportions of site-prepared grout and prestressing grout for bonded tendons	NR	Ρ	Ρ		Art. 2.6 B & 2.4 G.1.b
3.	Ve du	rify compliance of the following ring construction:					
	a.	Material and procedures with the approved submittals	NR	Р	Р		Art. 1.5
	b.	Placement of masonry units and mortar joint construction	NR	Р	Р		Art. 3.3 B
	C.	Size and location of structural members	NR	Р	Р		Art. 3.3 F
	d.	Type, size and location of anchors, including other details of anchorage of masonry to structural members, frames, or other construction	NR	Р	С	Sec. 1.2.1(e), 6.2.1, & 6.3.1	
	e.	Welding of reinforcement	NR	С	С	Sec. 6.1.6.1.2	

### T. STRUCTURAL - MASONRY CONSTRUCTION - MINIMUM SPECIAL INSPECTION REQUIREMENTS SECTION (CONTINUED)

MASONRY CONSTRUCTION - MINIMUM SPECIAL INSPECTION REQUIREMENTS - VERIFY THE FOLLOWING ARE IN
COMPLIANCE

IBC 2021 SECTION 1705.4, TMS 602-16: TABLE 4

MINIMUM SPECIAL INSPECTIONS					
INSPECTION TASKS	FREQUENCY <sup>a</sup>		REFERENCE FOR CRITERIA		
	LEVEL 1	LEVEL 2	LEVEL 3	TMS 402	TMS 602
<ul> <li>f. Preparation, construction, and protection of masonry during cold weather (temperature below 40°F (4.4°c) or hot weather (temp above 90°F (32.2°C))</li> </ul>	NR	Ρ	Р		Art. 1.8 C & 1.8 D
<ul> <li>g. Placement of AAC masonry units and construction of thin bed mortar joints</li> </ul>	NR	C (b) / P (c)	C		Art. 3.3 B.9 & 3.3 F.1.b
<ol> <li>Observe preparation of grout specimens, mortar specimens, and/or prisms</li> </ol>	NR	Ρ	С		Art. 1.4 B.2.a.3, 1.4 B.2.b.3, 1.4 B.2.c.3, 1.4 B.3, & 1.4 B.4
<ol> <li>Frequency refers to the frequency of inspection, which may be continuous during the listed task or periodically during the listed task, as defined in the table. NR= Not Required, P = Periodic, C = Continuous. Refer to TMS 402 Part 1, Chapter 3, Table 3.1 for the required minimum "Quality Assurance Level" based on the "Design Method" (per TMS 402) and assigned "Risk Category" (as defined by the "Building Code") used for the project.</li> <li>Required for the first 5000 square feet (465 square meters) of AAC masonry.</li> </ol>					

c. Required for the first 5000 square feet (465 square meters) of AAC masonry.

### U. STRUCTURAL - WOOD CONSTRUCTION

R

### THIS SECTION APPLICABLE IF BOX IS CHECKED: $\Box$

IBC 2021 SECTION 1705.5				
TASK	INSPECTION TYPE	DESCRIPTION		
<ol> <li>Prefabricated wood structural elements and assemblies</li> </ol>	Perform	Perform special inspections of prefabricated wood structural elements and assemblies in accordance with IBC 2021 Section 1704.2.5.		
<ol> <li>High-load diaphragms where applicable</li> </ol>	Perform	High-load diaphragms designed in accordance with IBC 2021 Section 2306.2 shall be installed with special inspections as indicated in Section 1704.2. Verify grade and thickness of wood structural panel sheathing, nominal size of framing members at adjoining panel edges, nail or staple diameter and length, the number of fastener lines and that the spacing between fasteners in each line and at edge margins agree with the approved contract documents.		
<ol> <li>Metal-plate connected wood trusses</li> </ol>	Perform	For wood trusses with a clear span of 60 feet or greater, verify during construction that the temporary installation restraint/bracing is installed in accordance with the approved truss submittal package.		

### V. STRUCTURAL – MASS TIMBER CONSTRUCTION & SEALING OF MASS TIMBER

### THIS SECTION APPLICABLE IF BOX IS CHECKED:

#### MASS TIMBER CONOSTRUCTION - REQUIRED SPECIAL INSPECTIONS OF MASS TIMBER CONSTRUCTION & SEALING OF MASS TIMBER - VERIFY THE FOLLOWING ARE IN COMPLIANCE IBC 2021 SECTION 1705 5 3' TABLE 1705 5 3' IBC 2021 SECTION 1705 20

	ТҮРЕ	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
<ol> <li>Inspection of anchorage and connection of mass timber construction to timber deep foundation systems.</li> </ol>			Х
2. Inspect erection	of mass timber construction.		Х
<ol> <li>Inspection of connections where installation methods are required to meet design loads</li> </ol>			
	Verify use of proper installation equipment.		Х
Threaded	Verify use of pre-drilled holes where required.		Х
fasteners	Inspect screws, including diameter, length, head type, spacing, installation angle and depth.		Х
Adhesive anchors ir to resist sustained t	istalled in horizontal or upwardly inclined orientation ension loads	Х	
Adhesive anchors n	ot defined in preceding cell		Х
Bolted Connections			Х
Concealed Connections			Х
Where sealants or adhesive required by Section 703.7 is applied to mass timber building elements as designated in the approved construction documents			Х

#### END SECTION

### W. STRUCTURAL - STRUCTURAL WOOD - SPECIAL INSPECTIONS FOR WIND RESISTANCE SECTION THIS SECTION APPLICABLE IF BOX IS CHECKED:

STRUCTURAL WOOD – SPECIAL INSPECTIONS FOR WIND RESISTANCE - VERIFY THE FOLLOWING ARE IN COMPLIANCE

IBC 2021 SECTION 1705.12.1

TASK		INSPECTION TYPE	DESCRIPTION
1.	Field gluing operations of elements of the main windforce- resisting system	Continuous	Inspect field gluing operations of elements of the main windforce-resisting system.
2.	Connections and attachments of elements of the main windforce-resisting system	Periodic	Inspect nailing, bolting, anchoring and other fastening of elements of the main windforce-resisting system, including wood shear walls, wood diaphragms, drag struts, braces and hold downs.

### X. STRUCTURAL - STRUCTURAL WOOD - SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE SECTION THIS SECTION APPLICABLE IF BOX IS CHECKED:

STI CO	STRUCTURAL WOOD – SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE - VERIFY THE FOLLOWING ARE IN COMPLIANCE				
IBC	2021 SECTION 1705.13.2				
	TASK	INSPECTION TYPE	DESCRIPTION		
1.	Field gluing operations of elements of the seismic force- resisting system	Continuous	Inspect field gluing operations of elements of the seismic force-resisting system.		
2.	Connections and attachments of elements of the seismic force- resisting system	Periodic	Inspect nailing, bolting, anchoring and other fastening of elements of the seismic force-resisting system, including wood shear walls, wood diaphragms, drag struts, braces shear panels and hold downs.		

### **END SECTION**

## Y. STRUCTURAL – WIND RESISTING COMPONENTS - SPECIAL INSPECTIONS FOR WIND RESISTANCE THIS SECTION APPLICABLE IF BOX IS CHECKED:

SPECIAL INSPECTIONS FOR WIND RESISTANCE – WIND RESISTING COMPONENTS - VERIFY THE FOLLOWING ARE IN COMPLIANCE

IBC 2021 SECTION 1705.12.3

TASK	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION	DESCRIPTION
<ol> <li>Roof Covering, roof deck, and roof framing connections</li> </ol>		Х	Visually inspect roof covering, roof deck and roof framing connections. Verify installation is in accordance with manufacturer's recommendations and contract documents.
<ol> <li>Exterior wall covering and wall connections to roof and floor diaphragms and framing</li> </ol>		Х	Visually inspect all exterior wall coverings and wall connections to roof and floor diaphragms and framing. Verify installation is in accordance with manufacturer's recommendations and contract documents.

## Z. STRUCTURAL - SEISMIC ISOLATION SYSTEMS - SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE SECTION THIS SECTION APPLICABLE IF BOX IS CHECKED:

SEISMIC ISOLATION SYSTEMS - SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE - VERIFY THE FOLLOWING ARE IN					
COMPLIANCE					
IBC 2021 SECTION 1705.13.8					
TASK	INSPECTION TYPE	DESCRIPTION			

<ol> <li>Inspections during fabrication and installation of isolator units and energy dissipation devices</li> </ol>	Inspect seismic isolation systems in seismically isolated structures assigned to Seismic Design Category B, C, D, E, or F during the fabrication and installation of isolator units and energy dissipation devices. Verify conformance to manufacturer's recommendations and approved construction documents
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### **END SECTION**

### AA.GEOTECHNICAL - SOILS INSPECTIONS AND TESTS SECTION THIS SECTION APPLICABLE IF BOX IS CHECKED:

SO	SOILS INSPECTIONS AND TESTS - REQUIRED SPECIAL INSPECTIONS AND TESTS OF SOILS - VERIFY THE FOLLOWING					
AR	ARE IN COMPLIANCE					
IBC	2021 SECTION 1705.6: TABLE 1705.6					
		CONTINUOUS	PERIODIC			
	ТҮРЕ	SPECIAL	SPECIAL			
		INSPECTION	INSPECTION			
1.	Verify materials below shallow foundations are adequate to achieve the		Х			
	design bearing capacity.					
2.	Verify excavations are extended to proper depth and have reached proper		Х			
	material.					
3.	Perform classification and testing of compacted fill materials.		Х			
4.	During fill placement, verify use of proper materials and procedures in	Х				
	accordance with the provisions of the approved geotechnical report. Verify					
	densities and lift thicknesses during placement and compaction of					
	compacted fill.					
5.	Prior to placement of compacted fill, inspect subgrade and verify that site		Х			
	has been prepared properly.					

### **BB. GEOTECHNICAL - DRIVEN DEEP FOUNDATIONS SECTION**

### THIS SECTION APPLICABLE IF BOX IS CHECKED: $\Box$

DR TH IBC	DRIVEN DEEP FOUNDATIONS - SPECIAL INSPECTIONS AND TEST OF DRIVEN DEEP FOUNDATION ELEMENTS - VERIFY THE FOLLOWING ARE IN COMPLIANCE IBC 2021 SECTION 1705.7: TABLE 1705.7				
	ТҮРЕ	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION		
1.	Verify element materials, sizes and lengths comply with requirements.	Х			
2.	Determine capacities of test elements and conduct additional load tests, as required.	х			
3.	Inspect driving operations and maintain complete and accurate records for each element.	Х			
4.	Verify placement locations and plumbness, confirm type and size of hammer, record number of blows per foot of penetration, determine required penetrations to achieve design capacity, record tip and butt elevations and document any damage to foundation element	Х			
5.	For steel elements, perform additional special inspection in accordance with IBC 2021 Section 1705.2.	In accordance wi	th Section 1705.2		
6.	For concrete elements and concrete filled elements, perform tests and additional inspections in accordance with IBC 2021 Section 1705.3.	In accordance wi	th Section 1705.3		
7.	For specialty elements, perform additional inspections as determined by the registered design professional in responsible charge.	In accordance w Special Ir	ith Statement of spections		

**END SECTION** 

### CC. GEOTECHNICAL - CAST IN PLACE DEEP FOUNDATIONS SECTION THIS SECTION APPLICABLE IF BOX IS CHECKED:

CAST IN PLACE DEEP FOUNDATIONS - SPECIAL INSPECTIONS AND TESTS OF CAST-IN-PLACE DEEP FOUNDATION ELEMENTS - VERIFY THE FOLLOWING ARE IN COMPLIANCE IBC 2021 SECTION 1705.8: TABLE 1705.8

	ТҮРЕ	CONTINUOUS SPECIAL	PERIODIC SPECIAL
		INSPECTION	INSPECTION
1.	Inspect drilling operations and maintain complete and accurate records for	Х	
	each element.		
2.	Verify placement locations and plumbness, confirm element diameters, bell		
	diameters (if applicable), lengths, embedment into bedrock (if applicable)	Х	
	and adequate end-bearing strata capacity. Record concrete or grout		
	volumes		
3.	For concrete elements, perform tests and additional special inspections in	In accordance wit	h Section 1705.3
	accordance with IBC 2021 Section 1705.3.		

### DD. GEOTECHNICAL - HELICAL PILE FOUNDATIONS SECTION THIS SECTION APPLICABLE IF BOX IS CHECKED:

#### HELICAL PILE FOUNDATIONS - SPECIAL INSPECTIONS OF HELICAL PILE FOUNDATIONS - VERIFY THE FOLLOWING ARE IN COMPLIANCE IBC 2021 SECTION 1705.9 CONTINUOUS PERIODIC TYPE SPECIAL SPECIAL INSPECTION INSPECTION During installation of helical pile foundations. Record installation 1. equipment used, pile dimensions, tip elevations, final depth, final installation torque and other pertinent installation data as required by the Х \_\_\_\_ registered design professional in responsible charge. The approved geotechnical report and the construction documents prepared by the registered design professional shall be used to determine compliance

### EE. FIRE PROTECTION - SPRAYED FIRE-RESISTANT MATERIALS SECTION THIS SECTION APPLICABLE IF BOX IS CHECKED:

# SPRAYED FIRE-RESISTANT MATERIALS – SPECIAL INSPECTIONS AND TESTS OF SPRAYED FIRE-RESISTANT MATERIALS - VERIFY THE FOLLOWING ARE IN COMPLIANCE

IBC 2021 SECTION 1705.15		
TASK	INSPECTION TYPE	DESCRIPTION
1. Physical and visual tests	Observe	Special inspections and tests of sprayed fire-resistant material
		shall include the following to demonstrate compliance with
		the listing and the fire-resistance rating:
		1. Condition of substrates
		2. Thickness of application
		3. Density in pounds per cubic foot
		4. Bond strength adhesion/cohesion
		5. Condition of finished application
2. Structural member	Observe	Prior to application sprayed fire-resistant material, verify that
surface condition		surfaces of structural members to be sprayed have been
		prepared in accordance with the approved fire-resistance
		design and the written instructions of approved
		manufacturers.
3. Application	Observe	Verify the substrate meets the minimum ambient temperature
		before and after the application as specified in the written
		instructions of approved manufacturers.
4. Material thickness	Observe	Verify that not more than 10 percent of the thickness
		measurements of the sprayed fire-resistant materials (SFRM)
		applied to floor, roof, and wall assemblies and structural
		members shall be less than the thickness required by the
		approved fire-resistance design, and none shall be less than
		minimum allowable thickness required by IBC 2021 Section
		1705.15.4.1. Thickness measurements shall be made in
		accordance with IBC 2021 Sections 1/05.15.4.2 through
		1/05.15.4.9.
5. Material density	Observe	Verify that the density of the sprayed fire-resistant material
		(SFRM) is not less than the density specified in the approved
		fire-resistance design. Density of the SFRM shall be
		determined in accordance with ASTM E 605. Test samples for
		determining the density of the SFRM shall be selected as
		required by IBC 2021 Section 1705.15.5.
6. Bond strength	Observe	Verify cohesive/adhesive bond strength of the cured sprayed
		Tire-resistant material (SFRIVI) applied to floor, root, and wall
		The schedule (adhesive hand strength shall be determined in
		accordance with the field test specified in ASTM 5.720 by
		testing in place complex of the SERV selected in accordance
		using in-place samples of the SFRIVI selected in accordance
		with IBC 2021 Sections 1705.15.6.1 through 1705.15.6.3.

### FF. FIRE PROTECTION - MASTIC AND INTUMESCENT FIRE-RESISTANT COATINGS SECTION THIS SECTION APPLICABLE IF BOX IS CHECKED:

MASTIC AND INTUMESCENT FIRE-RESISTANT COATINGS - SPECIAL INSPECTIONS AND TEST FOR MASTIC AND INTUMESCENT FIRE-RESISTANT COATINGS - VERIFY THE FOLLOWING ARE IN COMPLIANCE IBC 2021 SECTION 1705.16

TASK	INSPECTION TYPE	DESCRIPTION
<ol> <li>Surface preparation and application.</li> </ol>	Observe	Special inspections and test for mastic and intumescent fire- resistant coatings applied to structural elements shall be performed in accordance with AWCI 12-B and based on the fire-resistance design as designated in the approved contraction documents. Special inspections and tests shall be performed during construction. Additional visual inspection shall be performed after the rough installation and, where applicable, prior to the concealment of electrical, automatic sprinkler, mechanical and plumbing systems. Confirm installation is in accordance with the manufacturer's instructions and the terms of their listing.

END SECTION

### GG. FIRE PROTECTION - FIRE RESISTANT PENETRATIONS AND JOINTS SECTION THIS SECTION APPLICABLE IF BOX IS CHECKED: ☑

FIRE RESISTANT PENETRATIONS AND JOINTS – SPECIAL INSPECTIONS FOR FIRE-RESISTANT PENETRATIONS AND JOINTS - VERIFY THE FOLLOWING ARE IN COMPLIANCE

IDC 2021 SECTION 1703.18			
TASK	INSPECTION TYPE	DESCRIPTION	
1. Penetration firestops	Observe	Inspections of penetration firestop systems that are tested and listed in accordance with IBC 2021 Sections 714.4.1.2 and 714.5.1.2 shall be conducted by an approved agency in accordance with ASTM E 2174.	
<ol> <li>Fire-resistant joint systems</li> </ol>	Observe	Inspections of fire-resistant joint systems that are tested and listed in accordance with IBC 2021 Sections 715.3.1 and 715.4 shall be conducted in accordance with ASTM E 2393.	

### HH. FIRE PROTECTION - TESTING FOR SMOKE CONTROL SECTION THIS SECTION APPLICABLE IF BOX IS CHECKED:

TESTING FOR SMOKE CONTROL – SPECIAL INSPECTIONS FOR TESTING FOR SMOKE CONTROL - VERIFY THE					
FOLLOWING ARE IN COMPLIANCE					
IBC 2021 SECTION 1705.19	IBC 2021 SECTION 1705.19				
TASK	INSPECTION TYPE	DESCRIPTION			
1. Test Smoke Control	Observe				
System - Verify duct					
leakage is in accordance		Perform during erection of ductwork and prior to concealment			
with IBC 2021 Section		for the purposes of leakage testing and recording of device			
909.10.2 and verify and		location.			
document locations of all					
fire protection devices.					
2. Test Smoke Control	Observe	Perform prior to occupancy and after sufficient completion for			
System - Verification of		the purposes of pressure difference testing, flow			
pressure differences		measurements and detection and control verification.			
across smoke barriers as					
required in IBC 2021					
Sections 909.5.1 and					
909.18.6, the verification					
of appropriate volumes					
of airflow as noted in the					
design, and the					
verification of the					
appropriate operation of					
the detection and					
control mechanisms as					
required by IBC 2021					
Sections 909.18.1 and					
909.18.7.					
a. Approved agencies for s	moke control testing	shall have expertise in fire protection engineering, mechanical			

engineering and certification as air balancers.

**END SECTION** 

## II. ARCHITECTURAL - EXTERIOR INSULATION AND FINISH SYSTEMS (EIFS) SECTION THIS SECTION APPLICABLE IF BOX IS CHECKED:

EXTERIOR INSULATION AND FINISH SYSTEMS (EIFS) – SPECIAL INSPECTIONS FOR EXTERIOR INSULATION AND FINISH SYSTEMS (EIFS) - VERIFY THE FOLLOWING ARE IN COMPLIANCE IBC 2021 SECTION 1705.17.1

	TASK	INSPECTION TYPE	DESCRIPTION
1.	Water resistive barrier coating applied over a sheathing substrate.	Observe	Verify that water resistive barrier coating complies with ASTM E 2570.
	0		

## JJ. ARCHITECTURAL - ARCHITECTURAL COMPONENTS - SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE SECTION

THIS SECTION APPLICABLE IF BOX IS CHECKED:

## ARCHITECTURAL COMPONENTS – SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE - ARCHITECTURAL COMPONENTS - VERIFY THE FOLLOWING ARE IN COMPLIANCE

IBC 2021 SECTIONS 1705.13.5		
TASK	INSPECTION TYPE	DESCRIPTION
<ol> <li>Erection and fastening of exterior cladding, interior and exterior nonbearing walls and interior and exterior veneer.</li> </ol>	Periodic	<ul> <li>Verify appropriate materials, fasteners and attachment at commencement of work and at completion.</li> <li><u>Exceptions</u>: Special inspection not required for the following:</li> <li>1.) Exterior cladding, interior and exterior nonbearing walls and interior and exterior veneer 30 feet or less in height above grade or walking surface.</li> <li>2.) Exterior cladding and interior and exterior veneer weighing 5 psf or less.</li> <li>3.) Interior nonbearing walls weighing 15 psf or less.</li> </ul>
2. Access floors	Periodic	Verify that anchorage of access floor system complies with approved construction documents. Verify installation and inspection of post-installed anchors used for anchorage of access floor systems comply with manufacturer's instructions and approved ICC-ES reports.
		· · · ·

### **END SECTION**

### KK. ARCHITECTURAL – STORAGE RACKS

### THIS SECTION APPLICABLE IF BOX IS CHECKED:

ARCHITECTURAL COMPONENTS – REQUIRED INSPECTIONS OF STORAGE RACK SYSTEMS - VERIFY THE FOLLOWING ARE IN COMPLIANCE

IDC 2021 SECTIONS 1705.15.7				
TYDE	CONTINUOUS	PERIODIC	REFERENCED	IBC
ITPE	INSPECTION	INSPECTION	STANDARD	REFERENCE
1. Materials used, to verify compliance				
with one or more of the material		Х		
test reports in accordance with the				
approved construction documents				
2. Fabricated storage rack elements		Х		Section
				1704.2.5
3. Storage rack anchorage installation		Х	ANSI/MH16.1	
			Section 7.3.2	
4. Completed storage rack system, to				
indicate compliance with the		Х		
approved construction documents				

### LL. PLUMBING/MECHANICAL/ELECTRICAL - DESIGNATED SEISMIC SYSTEMS - SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE SECTION

### THIS SECTION APPLICABLE IF BOX IS CHECKED:

PLUMBING, MECHANICAL AND ELECTRICAL - DESIGNATED SEISMIC SYSTEMS – SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE - VERIFY THE FOLLOWING ARE IN COMPLIANCE

	DC 2021 SECTION 1705.15.0			
	TASK	INSPECTION TYPE	DESCRIPTION	
1.	Anchorage of electrical equipment for	OBSERVE	<ul> <li>Check for general conformance</li> </ul>	
	emergency and standby power systems			
2.	Anchorage of all other electrical	OBSERVE	<ul> <li>✓ Check for general conformance</li> </ul>	
	equipment in Seismic Design Categories			
	E and F only			
3.	Installation and anchorage of piping	OBSERVE	<ul> <li>✓ Check for general conformance</li> </ul>	
	designed to carry hazardous materials			
	and their associated mechanical units.			
4.	Installation and anchorage of vibration	OBSERVE	<ul> <li>✓ Check for general conformance</li> </ul>	
	isolation systems where the			
	construction documents require a			
	nominal clearance of ¼" or less between			
	support framing and restraint.			
5.	Verification of clearance between fire	OBSERVE	<ul> <li>✓ Check for minimum clearances noted in</li> </ul>	
	sprinkler piping and surrounding		ASCE7-16 13.2.3 or a nominal clearance	
	mechanical and electrical equipment,		of not less than 3 inches	
	including ductwork, piping and their			
	structural supports.			

### **DEFINITIONS FOR SECTIONS A THRU D:**

- A. STRUCTURAL STEEL CONSTRUCTION STRUCTURAL STEEL WELDING SECTION
- B. STRUCTURAL STEEL CONSTRUCTION STRUCTURAL STEEL NON-DESTRUCTIVE TESTING (NDT) OF WELDED JOINTS SECTION
- C. STRUCTURAL STEEL CONSTRUCTION STRUCTURAL STEEL BOLTING SECTION
- D. STRUCTURAL STEEL CONSTRUCTION STRUCTURAL STEEL OTHER INSPECTION TASK SECTION

### General Provisions (AISC 360 Chapter N):

Quality control (QC) as specified in AISC 360 Chapter N shall be provided by the fabricator and erector.

Quality assurance (QA) as specified in AISC 360 Chapter N shall be provided by others when required by the authority having jurisdiction (AHJ), applicable building code, purchaser, owner, or engineer of record (EOR).

Nondestructive testing (NDT) shall be performed by the agency of firm responsible for quality assurance, except as permitted in accordance with AISC 360 Section N6.

Inspection Definitions (AISC 360 Section N5.4 and N5.6):

Observe (O): The inspector shall observe these items on a random basis. Operations need not be delayed pending these inspections.

Perform (P): These tasks shall be performed for each welded joint or member, each bolted connection, and test or verification noted.

Document: Document, with a report, that the work has been performed in accordance with the contract documents. This is in addition to any other reports required in the Special Inspections guide specification.

### **DEFINITIONS FOR SECTIONS E THRU J:**

- E. STRUCTURAL STEEL CONSTRUCTION STRUCTURAL STEEL AISC 341 SEISMIC PROVISIONS VISUAL WELDING INSPECTION SECTION
- F. STRUCTURAL STEEL CONSTRUCTION STRUCTURAL STEEL AISC 341 SEISMIC PROVISIONS -WELDING INSPECTION AND NONDESTRUCTIVE TESTING OF WELDED JOINTS SECTION
- G. STRUCTURAL STEEL CONSTRUCTION STRUCTURAL STEEL AISC 341 SEISMIC PROVISIONS -BOLTING SECTION
- H. STRUCTURAL STEEL CONSTRUCTION STRUCTURAL STEEL AISC 341 SEISMIC PROVISIONS OTHER INSPECTION TASKS SECTION
- I. STRUCTURAL STEEL CONSTRUCTION STRUCTURAL STEEL AISC 341 SEISMIC PROVISIONS COMPOSITE STRUCTURES SECTION
- J. STRUCTURAL STEEL CONSTRUCTION STRUCTURAL STEEL AISC 341 SEISMIC PROVISIONS H-PILES SECTION

### Scope (AISC 341 Chapter J):

Quality control (QC) as specified in AISC 341 Chapter J shall be provided by the fabricator, erector or other responsible contractor as applicable.

Quality assurance (QA) as specified in AISC 341 Chapter J shall be provided by others when required by the authority having jurisdiction (AHJ), applicable building code (ABC), purchaser, owner, or engineer of record (EOR).

Nondestructive testing (NDT) shall be performed by the agency of firm responsible for Quality Assurance, except as permitted in accordance with AISC 360 Section N6.

Inspection Definitions (AISC 341 Section J5, applicable to Sections J6 thru J10):

Observe (O): The inspector shall observe these functions on a random, daily basis. Operations need not be delayed pending these inspections.

Perform (P): The inspections shall be performed prior to the final acceptance of the item.

Document (D): The inspector shall prepare reports indicating that the work has been performed in accordance with the contract documents. The report need not provide detailed measurements for joint fit-up, WPS settings, completed welds, or other individual items listed in the tables. For shop fabrication, the report shall indicate the piece mark of the piece inspected. For field work, the report shall indicate the reference grid lines and floor or elevation inspected. Work not in compliance with the contract documents and whether the noncompliance has been satisfactorily repaired shall be noted in the inspection report.

Coordinated Inspection: Where a task is stipulated to be performed by both QC and QA, coordination of the inspection function between QC and QA is permitted in accordance with Specification (AISC 360) Section N5.3.

### **DEFINITIONS FOR SECTIONS K, L, AND M:**

### K. STRUCTURAL – STEEL CONSTRUCTION - COLD-FORMED STEEL DECK - PLACEMENT SECTION

### L. STRUCTURAL – STEEL CONSTRUCTION - COLD-FORMED STEEL DECK - WELDING SECTION

### M. STRUCTURAL – STEEL CONSTRUCTION - COLD-FORMED STEEL DECK - MECHANICAL FASTENING SECTION

### General (SDI-QA/QC – 2017):

Quality control (QC) as specified in SDI-QA/QC – 2017 shall be provided by the installer.

Quality assurance (QA) as specified in SDI-QA/QC – 2017 shall be provided by others when required by the authority having jurisdiction (AHJ), the applicable building code, Owner, or Designer.

### Inspection Definitions (SDI QA/QC-2017, APPENDIX 1):

"Observe" shall mean to inspect these items on an intermittent basis. Operations need not be delayed pending these inspections. Frequency of observations shall be adequate to confirm that the work has been performed in accordance with the applicable documents. In event that the observations determine that the materials and/or workmanship are not in conformance with the applicable documents, additional inspections shall be performed to determine the extent of non-conformance.

"Perform" shall mean to perform these tasks prior to final acceptance for each item or element.

Within the listed tasks, "Document" shall mean the inspector shall prepare reports or other appropriate written documentation indicating that the work has or has not been performed in accordance with the construction documents.

### **DEFINITIONS FOR SECTIONS N THRU R, U THRU JJ:**

- N. STRUCTURAL STEEL CONSTRUCTION OPEN-WEB STEEL JOISTS AND JOIST GIRDERS SECTION
- O. STRUCTURAL STEEL CONSTRUCTION COLD-FORMED STEEL TRUSSES SPANNING 60 FEET OR GREATER SECTION
- P. STRUCTURAL COLD-FORMED STEEL LIGHT-FRAME CONSTRUCTION SPECIAL INSPECTIONS FOR WIND RESISTANCE SECTION
- Q. STRUCTURAL COLD-FORMED STEEL LIGHT-FRAME CONSTRUCTION SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE SECTION
- **R. STRUCTURAL CONCRETE CONSTRUCTION SECTION**
- **U. STRUCTURAL WOOD CONSTRUCTION SECTION**
- V. STRUCTURAL MASS TIMBER CONSTRUCTION
- W. STRUCTURAL STRUCTURAL WOOD SPECIAL INSPECTIONS FOR WIND RESISTANCE SECTION
- X. STRUCTURAL STRUCTURAL WOOD SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE SECTION
- Y. STRUCTURAL WIND RESISTING COMPONENTS SPECIAL INSPECTIONS FOR WIND RESISTANCE
- Z. STRUCTURAL SEISMIC ISOLATION SYSTEMS SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE

### SECTION

- AA. GEOTECHNICAL SOILS INSPECTIONS AND TESTS SECTION
- **BB. GEOTECHNICAL DRIVEN DEEP FOUNDATIONS SECTION**
- CC. GEOTECHNICAL CAST IN PLACE DEEP FOUNDATIONS SECTION
- DD. GEOTECHNICAL HELICAL PILE FOUNDATIONS SECTION
- EE. FIRE PROTECTION SPRAYED FIRE-RESISTANT MATERIALS SECTION
- FF. FIRE PROTECTION MASTIC AND INTUMESCENT FIRE-RESISTANT COATINGS SECTION
- GG. FIRE PROTECTION FIRE RESISTANT PENETRATIONS AND JOINTS SECTION
- HH. FIRE PROTECTION TESTING FOR SMOKE CONTROL SECTION
- II. ARCHITECTURAL EXTERIOR INSULATION AND FINISH SYSTEMS (EIFS) SECTION
- JJ. ARCHITECTURAL ARCHITECTURAL COMPONENTS SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE SECTION

### **KK. ARCHITECTURAL - STORAGE RACKS**

LL. PLUMBING/MECHANICAL/ELECTRICAL - DESIGNATED SEISMIC SYSTEMS - SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE SECTION

### Inspection Definitions (IBC 2021-Chapter 2 - Definitions):

Continuous Special Inspection: Special inspection by the special inspector who is present continuously when and where the work to be inspected is being performed.

Periodic Special Inspection: Special inspection by the special inspector who is intermittently present where the work to be inspected has been or is being performed.

### Inspection Definitions (Other):

- Perform: Perform these tasks for each welded joint or member, fastener or bolted connection, and noted verification or test.
- Observe: Observe these items randomly during the course of each work day to insure that applicable requirements are being met. Operations need not be delayed pending these inspections at contractor's risk.

### **DEFINITIONS FOR SECTIONS S AND T:**

### S. STRUCTURAL - MASONRY CONSTRUCTION - MINIMUM VERIFICATION REQUIREMENTS SECTION

### T. STRUCTURAL - MASONRY CONSTRUCTION - MINIMUM SPECIAL INSPECTION REQUIREMENTS SECTION

### Inspection Definitions (TMS 602):

Continuous Inspection (C): The Inspection Agency's full-time observation of work by being present in the area where the work is: being performed.

Periodic Inspection (P): The Inspection Agency's part-time or intermittent observation of work during construction by being present in the area where the work has been or is being performed, and observation upon completion of the work.

#### SECTION 01 46 00.00 06

## TOTAL BUILDING COMMISSIONING 04/20

#### PART 1 GENERAL

Commission the building systems listed herein. Zodiac, Inc. will provide Commissioning services and will be subcontract to the Architect-Engineer The Commissioning Specialists must coordinate all aspects of the commissioning process. Conform to the commissioning procedures outlined in this specification.

1.1 SYSTEMS TO BE COMMISSIONED

Commission the following systems:

Heating, Ventilating, Air Conditioning, and Refrigeration Systems (HVAC)

Building Automation System

Utility Monitoring and Control System

Lighting Systems

Power Distribution Systems

Power Generation Systems

Service Water Heating Systems

Plumbing Systems

Hydraulic Power Unit

Process Chilled Water System

Process Cooling Tower Water System

Energy and Water Utility Metering Systems and Sub-Meters

Building Envelope: include moisture, thermal integrity, and air tightness for the entire building envelope including systems such as walls, fenestration, roofing, roof openings.

#### 1.2 REFERENCES

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

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 180

(2018) Standard Practice for Inspection and Maintenance of Commercial Building

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HVAC Systems

ASHRAE 202 (2018) Commissioning Process for Buildings and Systems

ASSOCIATED AIR BALANCE COUNCIL (AABC)

ACG Commissioning Guideline (2005) Commissioning Guideline

NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB)

NEBB Commissioning Standard (2018) Whole Building Technical Commissioning of New Construction

NATIONAL INSTITUTE OF BUILDING SCIENCES (NIBS)

NIBS Guideline 3 (2012) Building Enclosure Commissioning Process BECx

SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)

ANSI/SMACNA 014-2013 (2013) HVAC Systems Commissioning Manual, 2nd Edition

US Army Corps of Engineers (USACE)

ER 25-345-1	Regulation No.	25-345-1Military
	Publications S	YSTEMS MANUAL

#### 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29.00 06 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Commissioning Specialists G, DO

Submit the Commissioning Specialists' certification of qualifications no later than 30 calendar days after Notice to Proceed. Submit one hard copy and an electronic copy.Project Schedule; G, DO

Project construction schedule which includes commissioning milestone activities. Submit within 14 calendar days following the Construction Commissioning Coordination Meeting. Submit one electronic copy.

SD-06 Test Reports

Construction Phase Commissioning Plan; G, DO.

Submit no later than 30 calendar days after the Construction

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Commissioning Coordination Meeting. Submit an electronic copy.

Building Envelope Inspection Checklists; G, DO

Submit the completed and initialed Building Envelope Inspection Checklists no later than 7 calendar days after completion of inspection of all checklists items. Submit an electronic copy.

Pre-Functional Checklists; G, DO

Submit no later than 7 calendar days after completion of all checklist items for each system. Submit an electronic copy.

Issues Log

Submit an electronic copy on the same day each month.

Commissioning Report; G, DO

Submit no later than 14 calendar days following commissioning team acceptance of all Performance Tests. Submit an electronic copy.

Post-Construction Commissioning Report; G, DO

Submit no later than 14 calendar days following completion of all post-construction trend log reviews and building site visit. Submit an electronic copy.

Monthly Monitoring Based Commissioning Update; G, DO

Submit an electronic copy at the same date each month, no later than 7 calendar days following receipt of data.

Monitoring Based Commissioning Report; G, DO

Submit no later than 14 calendar days following completion all monitoring based commissioning activities. Submit an electronic copy.

SD-07 Certificates

Certificate of Readiness; G, DO

Submit no later than 14 calendar days prior to Functional Performance Tests. Submit an electronic copy.

SD-10 Operation and Maintenance Data

Systems Training; G, DO

Submit the Systems Training recording no later than 14 calendar days following completing of the Systems Training.

Training Plan; G, RO

Submit an electronic copy no later than 30 calendar days prior to the associated training.

Training Attendance Rosters; G, RO

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Submit an electronic copy no later than 7 calendar days following the completion of the training for each system to be commissioned.

Systems Manual; G, DO

Submit Systems Manual no later than 30 calendar days following completion of Functional Performance Tests. Submit an electronic copy.

Post-Construction Systems Manual; G, DO

Submit Systems Manual no later than 14 calendar days following completion of all post-construction trend log reviews and building site visits. Submit an electronic copy.

Maintenance and Service Life Plans; G, DO

Submit the Maintenance Plan and Service Life Plan no later than 30 calendar days following the completion of Functional Performance tests. Submit an electronic copy.

SD-11 Closeout Submittals

Final Commissioning Report; S, DO

Copy of the Post-Construction Commissioning Report for the Sustainability eNotebook. Submit an electronic copy concurrent with the Post-Construction Commissioning Report.

Final Construction Phase Commissioning Plan; S

Copy of the Construction Phase Commissioning Plan for the Sustainability eNotebook. Submit an electronic copy concurrent with the Construction Phase Commissioning Plan.

#### 1.4 COMMISSIONING SPECIALISTS

1.4.1 Lead Commissioning Specialist (CxC)

The Lead Commissioning Specialist must lead and oversee all commissioning work specified herein and be the primary point of contact for the Government regarding commissioning work. The Lead Commissioning Specialist (CxC) must have a minimum of five years of commissioning experience, including two projects of similar size and complexity. The Lead Commissioning Specialist must also be one of the following:

- a. AABC Commissioning Group (ACG) Certified Commissioning Authority
- b. Building Commissioning Association (BCA) Certified Commissioning Professional
- c. International Certification Board/Testing, Adjusting, and Balancing Bureau (ICB/TABB) Certified Commissioning Supervisor
- d. National Environmental Balancing Bureau (NEBB) Qualified Systems Commissioning Administrator
- e. University of Wisconsin-Madison Qualified Commissioning Provider

- f. Association of Energy Engineers (AEE) Certified Building Commissioning Specialist
- 1.4.2 Electrical Commissioning Specialist (CxE)

The technical work associated with the power distribution and generation systems must be performed by a Electrical Commissioning Specialist that is an engineering technician certified by the InterNational Electrical Testing Association (NETA) with five years of experience inspecting, testing, and calibrating electrical distribution and generation equipment, systems, and devices.

1.4.3 Building Envelope Commissioning Specialist (CxB)

The technical work associated with the Building Envelope systems must be performed by a Building Envelope Commissioning Specialist (CxB) meeting one of the following qualifications:

- a. Five years of experience coordinating and instructing personnel involved in installation, joining, and sealing of air barrier materials and components and certification as an Air Barrier Installer from the Air Barrier Association of America (ABAA) or other 3rd party air barrier association.
- b. A registered architect with at least five years of building envelope design or construction experience.

Commissioning Specialists with alternative qualifications may be approved at the sole discretion of the Government. The CxB may act as the Air Barrier Inspector required by section 07 27 10.00 10 BUILDING AIR BARRIER SYSTEM provided that all of the qualification requirements of that specification section are met. The CxB may act as the thermographer required by section 07 05 23 PRESSURE TESTING AN AIR BARRIER SYSTEM FOR AIR TIGHTNESS provided that all qualification requirements of that specification section are met. The firm providing the CxB may act as the Pressure Test Agency required by section 07 05 23 provided that all qualification requirements of that specification are met.

1.4.4 Commissioning Specialists Certification

The Commissioning Specialists' qualifications must include the names of the specialists and firms; certifications, licenses, or registrations; years of experience and a listing of representative projects of similar size and complexity. Describe any lapses in certification or disciplinary action taken by the certifying body against the proposed specialists or firms in detail. Any specialist/technician or firm that has been the subject of disciplinary action by the certifying body within the five years preceding the contract award is not eligible to perform any duties related to commissioning.

The Commissioning Specialists' certifications must be maintained for the entire duration of the duties specified herein. If, for any reason, a Commissioning Specialist loses a certification during this period, immediately notify the Contracting Officer's Representative and submit another Commissioning Specialist. All work specified in this specification section to be performed by the Commissioning Specialist is invalid if the Commissioning Specialist loses their certification prior to contract completion and must be performed by an approved successor.

#### 1.4.5 Communication With The Government

The Lead Commissioning Specialist must submit all plans, schedules, reports, and documentation directly to the Contracting Officer's Representative concurrent with submission to the CQC System Manager. The Commissioning Specialists and Contracting Officer's Representative must have direct communication with each other regarding all elements of the commissioning process; however, the Government has no direct contract authority with the Commissioning Specialists.

#### 1.5 COMMISSIONING STANDARD

Comply with the requirements of the commissioning standard under which the Commissioning Specialists qualifications are approved. When the firm and specialists are certified by BCA, AEE, or the University of Wisconsin-Madison, comply with the requirements of one of the acceptable standards unless otherwise stated herein. The acceptable standards are ACG Commissioning Guideline, NEBB Commissioning Standard, ANSI/SMACNA 014-2013, or ASHRAE 202. Comply with NIBS Guideline 3 for commissioning of building envelope systems.

- a. Implement all recommendations and suggested practices contained in the Commissioning Standard and electrical test standards.
- b. Use the Commissioning Standard for all aspects of Commissioning, including calibration of instruments.
- c. Where the instrument manufacturer calibration recommendations are more stringent than those listed in the Commissioning Standard, adhere to the manufacturer calibration recommendations.
- d. All quality assurance provisions of the Commissioning Standard such as performance guarantees are part of this contract.
- e. The Commissioning Specialists must develop commissioning procedures for any systems or system components not covered in the Commissioning Standard.
- f. Use any new requirements, recommendations, and procedures published or adopted prior to contract solicitation by the body responsible for the Commissioning Standard.

#### 1.6 SUSTAINABILITY THIRD PARTY CERTIFICATION (TPC)

The Lead Commissioning Specialist must execute and document the commissioning activities required of the Commissioning Authority for the purposes of complying with LEED requirements for the project in accordance with Section 01 33 29.00 06 SUSTAINABILITY REPORTING. Provide all commissioning documentation required to meet the TPC requirements.

The Final Construction Phase Commissioning Plan and the Final Commissioning Report are copies of the Construction Phase Commissioning Plan and the Post-Construction Commissioning Report for inclusion in the Sustainability eNotebook.

Due to LEED requirements related to Commissioning Authority contractual relationships for design-bid-build projects, a designated Commissioning Authority will be provided by the Government to participate in and monitor

the commissioning process for the Owner. This in no way limits the responsibility of the Lead Commissioning Specialist, as described within this paragraph and within this specification section. The Commissioning Specialists and designated Commissioning Authority must have direct communication with each other regarding all elements of the commissioning process; however, the designated Commissioning Authority has no direct contract authority with the Commissioning Specialists and no authority to modify the contract or obligate the Government.

#### 1.7 ISSUES LOG

The Lead Commissioning Specialist must develop and maintain an Issues Log for tracking and resolution of all deficiencies discovered through submittal review, inspection, and testing. Include the date of final resolution of issues as confirmed by the Commissioning Specialists. Submit the Issues Log on a monthly basis at a minimum. At any point during construction, any commissioning team member finding deficiencies may communicate those deficiencies in writing to the Lead Commissioning Specialist for including into the Issues Log.

Track construction deficiencies identified in the Issues Log using RMS as specified in Specification Section 01 45 00.15 10 RESIDENT MANAGEMENT SYSTEM CONTRACTOR MODE(RMS CM).

#### 1.8 CERTIFICATE OF READINESS

Prior to scheduling Functional Performance Tests for each system, issue a Certificate of Readiness certifying that the building system is ready for Functional Performance Testing. The Certificate of Readiness must include, for each system to be commissioned, all equipment and system start-up reports; Performance Verification Test Reports; completed Building Envelope Inspection Checklists; completed Pre-Functional Checklists; Testing, Adjusting, and Balancing (TAB) Report; Trend Log Review Report; and the Building Air Barrier Air Leakage Test Reports and Diagnostic Test Reports. The Contractor; the Lead Commissioning Specialist; the Contractor's Quality Control Representative; and the Mechanical, Electrical, Controls, and TAB subcontractor representatives must sign and date the Certificate of Readiness. Do not schedule and perform Functional Performance Tests prior to Government approval of the Certificate of Readiness.

#### 1.9 PROJECT SCHEDULE

Include the following tasks in the Project Schedule provided in accordance with section 01 32 01.00 06 PROJECT SCHEDULE. Ensure sufficient time is scheduled to accommodate the requirements of this specification section. The order of items listed are not intended to imply a specified sequence:

- a. Pre-Construction Conference (Section 07 27 10.00 10)
- b. Electrical system energization.
- c. Electrical system acceptance tests and inspections (Section 26 08 00)
- d. Mock-Up Tests (Section 07 27 10.00 10)
- e. Building Enclosure Construction
- f. Building Envelope Inspection Checklist Submittal

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- g. Air Barrier Leakage Test
- h. Drainage and Vent, Building Sewers, Water Supply Systems and Backflow Prevention Assembly Tests
- i. Potable Water System Flushing
- j. Operational Tests of the plumbing systems (Section 22 00 00)
- k. Disinfection of the plumbing systems (Section 22 00 00)
- 1. Duct Air Leakage Tests
- m. Manufacturer Equipment Start-Up for each system to be commissioned.
- n. Testing, Adjusting, and Balancing (TAB)
- o. TAB Field Acceptance Testing
- p. Performance Verification Tests
- q. HVAC Trend Log Report
- r. Pre-Functional Checklist Submittal
- s. Functional Performance Testing
- t. Demand Response Tests
- u. Post-Test Deficiency Correction
- v. Re-Testing
- w. Training for each system to be commissioned
- x. Systems Manual, Maintenance Plan, and Service Life Plan Submission
- y. Submission and approval of the Commissioning Report
- z. Seasonal Tests
- aa. Monitoring Based Commissioning
- bb. Monitoring Based Commissioning Report Submission
- cc. Post-Construction Trend Log Reports
- dd. Post-Construction Building Site Visit
- 1.10 FUNCTIONAL PERFORMANCE TEST PREREQUISITES

Complete the following prior to starting Functional Performance Tests of the mechanical systems:

a. The building envelope is enclosed according to contract documents with final construction completed, the Air Barrier Pressure Tests have been completed and the Air Leakage Test Reports and Diagnostic Test Reports have been submitted and approved in accordance with Section 07 05 23

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PRESSURE TESTING AN AIR BARRIER SYSTEM FOR AIR TIGHTNESS.

- b. All equipment and systems have been completed, cleaned, flushed, disinfected, calibrated, tested, and operate in accordance with the contract documents and construction plans and specifications.
- c. Testing, Adjusting, and Balancing has been completed and the Testing, Adjusting, and Balancing Report has been submitted and approved in accordance with Section 23 05 93.00 06 TESTING, ADJUSTING, AND BALANCING FOR HVAC.
- d. Performance Verification Tests of the controls systems have been completed and the Performance Verification Tests Report has been submitted and approved in accordance with Specification Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC.
- e. The Pre-Functional Checklists have been submitted and approved.
- f. The Certificate of Readiness for the mechanical systems has been submitted and approved.

Complete the following prior to starting Functional Performance Tests of the electrical systems:

- a. The building envelope is enclosed according to contract documents with final construction completed.
- b. All electrical, power generation, and lighting equipment and systems have been completed, calibrated, tested, and operate in accordance with contract documents and construction plans and specifications.
- c. Ceiling tiles, floor coverings, and window coverings are in place.
- d. The Certificate of Readiness for electrical systems has been submitted and approved.
- e. Lamps have completed a minimum 100 hour burn-in period.
- f. Furniture is in place.
- PART 2 PRODUCTS(NOT APPLICABLE)
- PART 3 EXECUTION
- 3.1 GENERAL

For this project, the Commissioning Authority (CxA) is Zodiac, Inc., under a subconsultant agreement with Architect/Engineer of Record, Benham.

- 3.1.1 Construction Phase
- 3.1.2 Construction Commissioning Coordination Meeting

The Lead Commissioning Specialist must lead a Construction Commissioning Coordination Meeting no later than 14 calendar days after approval of the Commissioning Specialiststo discuss the commissioning process including contract requirements, lines of communication, roles and responsibilities, schedules, documentation requirements, inspection and test procedures, and logistics as specified in this specification section. The Contractor's

Superintendent or Project Manager, the Contractor's Quality Control Representative, and the Government must attend this meeting. Invite the User and Base Civil Engineer Representative to attend this meeting.

#### 3.1.3 Commissioning Progress Meetings

The Lead Commissioning Specialist must lead Commissioning Progress Meetings to discuss the progress of commissioning process activities, upcoming commissioning activities, and any issues and deficiencies. The Contractor's Superintendent or Project Manager, the Contractor's Quality Control Representative, and the Government must attend this meeting. A representative from each of the sub-contractors involved in the systems to be commissioned must attend this meeting. Invite the User and Base Civil Engineer Representative to attend these meetings.

The Mechanical, Electrical, and Architectural designers of record must participate in the Commissioning Progress Meetings, at the request of the Lead Commissioning Specialist, to address any design issues or issues regarding technical adequacy.

Commissioning Progress Meetings must occur monthly following the Construction Commissioning Coordination Meeting. When installation of interior mechanical or electrical systems begins, the Commissioning Progress Meetings must occur every 2 weeks.

#### 3.1.4 Construction Phase Commissioning Plan

The Lead Commissioning Specialist must prepare the Construction Phase Commissioning Plan identifying the commissioning and testing standards to be used and outlining the overall commissioning process, the commissioning schedule, the commissioning team members and responsibilities, lines of communication, and the documentation requirements for the construction phase of the project. Include the template building envelope inspection checklists, pre-functional checklists, monitoring based commissioning plan, ongoing commissioning plan, and Functional Performance Test checklists.

#### Download example checklists at the following location:

http://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/forms-graphic The checklists submitted with the Construction Phase Commissioning Plan are required to have the same level of detail as the example checklists, but are not required to match the format of the examples.

The construction phase commissioning plan must include the monitoring and control points, sample frequency, and duration of trends for the trend log reviews.

#### 3.1.4.1 Template Building Envelope Inspection Checklists

The Building Envelope Commissioning Specialist must develop the Template Building Envelope Inspection Checklists. Include all items that verify the building materials and construction maintain the required thermal and moisture integrity and air tightness of the building envelope system. Incorporate requirements, including additional activities, of NIBS Guideline 3 into the template building envelope checklists and the Construction Phase Commissioning Plan.

#### 3.1.4.2 Pre-Functional Checklists

The Commissioning Specialists must develop the Pre-Functional Checklists.

Pre-Functional Checklists include items for physical inspection or testing that demonstrate that installation and start-up of all equipment and systems is complete. Refer to paragraph "Pre-Functional Checks" for more information.

#### 3.1.4.3 Functional Performance Test Checklists

The Commissioning Specialists must develop the Functional Performance Test Checklists including procedures that explain, step-by-step, the actions and expected results that will demonstrate that the system performs in accordance with the contract. Refer to paragraph "Functional Performance Tests" for more information.

Include the following sections and details appropriate to the systems being tested:

a. Notable system features including information about controls to facilitate understanding of system operation.

b. Conclusions and recommendations. Conclusions must clearly indicate if system does or does not perform in accordance with contract requirements. Recommendation must clearly indicate that the system should or should not be accepted by the Government.

c. Test conditions including date, beginning and ending time, and beginning and ending outdoor air conditions.

- d. Attendees.
- e. Identification of the equipment involved in the test.
- f. Control system feature identification.

g. Point-to-point observations including demonstrating system sensors and flow meters have been calibrated and are correctly displayed on the Operator work station.

h. Actuator operation observations demonstrating actuator responses to commands from the control system.

i. As-found condition of the system operation.

j. List of test items with step numbers along with the corresponding feature or control operation, intended test procedure, expected system response, and pass/fail indication.

k. Space for comments for each test item.

3.1.4.4 Monitoring Based Commissioning Plan

The Lead Commissioning Specialist must prepare a Monitoring Based Commissioning Plan to include:

a. Roles and responsibilities of commissioning team members.

b. Description of metering and building automation system with respect to available data and access.

c. List of the points to be tracked and frequency and durations for

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trend monitoring.

d. Identification of the limits of acceptable values for tracked points and meter data.

e. Detailed description of the method used to evaluate performance, including conflict between systems, out-of-sequence system operation, and energy and water usage profiles.

f. Action plan to identify and correct errors and deficiencies.

g. The frequency of analyses in the first year of operation. Minimum frequency is monthly following construction completion.

h. Information that must be included in systems training and training plans, systems manual, O&M manuals, and maintenance plan to prevent errors and maintain performance of systems in order to successfully execute Monitoring Based Commissioning.

3.1.4.5 Ongoing Commissioning Plan

The Lead Commissioning Specialist must prepare an Ongoing Commissioning Plan complying with the requirements for LEED Enhanced Commissioning,to include:

- a. Definition of the ongoing commissioning process
- b. Roles and responsibilities
- c. Recommended schedule for recommissioning systems

d. Continuous documentation and updating of the building operating plan and current facility requirements through the building life-cycle

e. Blank Functional Performance Test checklists for all commissioned systems and a blank Issues Log

f. Direction for testing new and retrofitted equipment.

#### 3.1.5 Construction Submittals

Provide all submittals associated with the systems to be commissioned, including shop drawings; equipment submittals; test plans, procedures, and reports; and resubmittals to the Commissioning Specialists. The Commissioning Specialists must review the submittals to the extent necessary verify that the equipment and system installation will comply with the contract requirements and the requirements of the Basis of Design and the Owner's Project Requirements Document.

#### 3.1.6 Inspection and Testing

Demonstrate that all system components have been installed, that each control device and item of equipment operates, and that the systems operate and perform in accordance with contract documents and the Owner's Project Requirements. Requirements in related Sections are independent from the requirements of this Section and do not satisfy any of the requirements specified in this specification section. Provide all materials, services, and labor required to perform and submit the Pre-Functional Checks, Building Envelope Inspection, HVAC system trend

logs, and Functional Performance Tests.

#### 3.1.6.1 Commissioning Team

Provide a commissioning representative for each sub-contractor associated with the systems to be commissioned. Each commissioning representative is responsible for coordination of their respective sub-contractor's execution of the commissioning activities and participation in the inspection and testing required by this specification section.

Designate team members to participate in the building envelope inspections, Pre-Functional checks, and the Functional Performance Testing specified herein.

#### 3.1.6.1.1 Building Envelope Inspections Team

The following team members must participate in building envelope inspections:

Designation	Function
CxB	Building Envelope Commissioning Specialist
QAR	Contracting Officer's Quality Assurance Representative
CQC	Contractor's Quality Control Personnel
BEC	Contractor's Building Envelope Commissioning Representative

#### 3.1.6.1.2 Mechanical Systems Team

The following team members must participate in Pre-Functional Checks and Functional Performance Testing of mechanical systems:

Designation	Function
CxC	Lead Commissioning Specialist
QAR	Contracting Officer's Quality Assurance Representative
CQC	Contractor's Quality Control Personnel
MC	Contractor's Mechanical Commissioning Representative
EC	Contractor's Electrical Commissioning Representative
CC	Contractor's Controls Commissioning Representative
TABC	Contractor's TAB Commissioning Representative
PC	Contractor's Plumbing Commissioning Representative

#### 3.1.6.1.3 Electrical Systems Team

The following team members must participate in Pre-Functional Checks and Functional Performance Testing of electrical systems:

Designation	Function	
CxCxE	Lead Commissioning SpecialistElectrical Commissioning Specialist	
QAR	Contracting Officer's Quality Assurance Representative	
CQC	Contractor's Quality Control Personnel	
EC	Contractor's Electrical Commissioning Representative	

#### 3.1.6.1.4 Other Pre-Functional and Functional Performance Participants

The following may participate as team members during Pre-Functional Checks and Functional Performance Testing:

Designation	Function	
BCE	Base Civil Engineer Office Representative	
User	Using Agent's Representative	

#### 3.1.6.2 Building Envelope Inspection and Pressure Tests

Document building envelope inspection by the commissioning team using the approved Template Building Envelope Inspection Checklists. Indicate commissioning team member inspection and acceptance of each Building Envelope Inspection Checklist item by initials at the time they are inspected and found to be in conformance with contract requirements. Inspect checklist items before they become hidden as construction progresses. Submit the completed and initialed Building Envelope Inspection Checklists no later than 7 calendar days after completion of inspection of all checklist items.

The Building Envelope Technical Commissioning Specialist must make at least two site visits to the site to observe construction of the building envelope in-progress. On each visit, the Building Envelope Commissioning Specialist must review the Contractor's in-progress checklists to ensure that the commissioning team is inspecting the building envelope as required. Perform additional activities as required by NIBS Guideline 3 and the approved Construction Phase Commissioning Plan.

The Building Envelope Technical Commissioning Specialist must witness the building envelope pressure tests and diagnostic tests specified in Specification Section 07 05 23 PRESSURE TESTING AN AIR BARRIER SYSTEM FOR AIR TIGHTNESS. The Building Envelope Technical Commissioning Specialist must review the resulting reports and provide recommendations for correction of any deficiencies or further testing.

#### 3.1.6.3 Pre-Functional Checks

Pre-Functional Checklists from the approved Construction Phase Commissioning Plan must be completed by the commissioning team. Complete one Pre-Functional Checklist for each individual item of equipment or system for each system required to be commissioned including, but not limited to, ductwork, piping, equipment, fixtures (lighting and plumbing), panels, and controls. Indicate commissioning team member inspection and acceptance of each Pre-Functional Checklist item by initials. Acceptance of each Pre-Functional Checklist item by each team member indicates that item has been installed correctly and conforms to the construction contract

requirements in their area of responsibility. Commissioning Specialist acceptance of each Pre-Functional Checklist item indicates that each item has been installed correctly and in accordance with contract documents and the Owner's Project Requirements. Submit the completed and initialed Pre-Functional Checklists upon completion. Include manufacturer start-up checklists associated with the equipment with the submission of the Pre-Functional Checklists.

3.1.6.4 Testing, Adjusting, and Balancing (TAB) Verification

The Lead Commissioning Specialist must witness the TAB Field Acceptance Testing performed in accordance with section 23 05 93.00 06 TESTING, ADJUSTING, AND BALANCING OF HVAC. Identify any deficiencies in the Issues Log.

#### 3.1.6.5 Tests

#### 3.1.6.5.1 Functional Performance Tests

Schedule personnel to attend the Functional Performance Tests for each system only after the Certificate of Readiness has been approved by the Government for the system and all deficiencies identified through any prior review, inspection, or test activity have been corrected. Functional Performance Tests must be performed with the Contracting Officer's Quality Assurance Representative present. The Lead Commissioning Specialist must lead and document all Functional Performance Tests for the systems to be commissioned with the Contractor and appropriate sub-contractors performing the Functional Performance Tests. The Electrical Commissioning Specialist must lead and document Functional Performance Tests for power distribution and generation systems. The representatives listed in the paragraph "Commissioning Team" must attend the Functional Performance Tests. Abort the Functional Performance Tests when any required commissioning team member is not present for the test.

Abort Functional Performance Tests when any system deficiency prevents the successful completion of the test.

#### 3.1.6.5.1.1 Checklists

Use the Functional Performance Test Checklists from the approved Construction Phase Commissioning Plan to guide the Functional Performance Tests. Functional Performance Tests must be performed for each item of equipment and each system required to be commissioned and verify all sensor calibrations, control responses, safeties, interlocks, operating modes, sequences of operation, capacities, lighting levels, and all other system performance requirements comply with the construction contract requirements regardless of the specific items listed within the Functional Performance Test Checklists provided. Testing must progress from equipment

or components to subsystems to systems to interlocks and connections between systems. The order of components and systems to be tested must be determined by the Lead Commissioning Specialist, and by the Electrical Commissioning Specialist for power distribution and generation systems.

#### 3.1.6.5.1.2 Acceptance

Indicate acceptance of each item of equipment and systems tested by signature of each commissioning team member for each Functional Performance Test. The Contractor's Quality Control Representative and the Lead Commissioning Specialist must indicate acceptance after the equipment and systems are free of deficiencies. The Electrical Commissioning Specialist must indicate acceptance after the power distribution and generation equipment and systems are free of deficiencies.

#### 3.1.6.5.2 Sample Strategy

Perform Functional Performance Tests using the following sample strategy. Prepare and complete a Functional Performance Test Checklist for each item of equipment or system to be tested. For sample sizes less than 100 percent for all similar equipment, the Government will select the specific equipment or system to be tested during testing. Equipment Identifiers are as indicated on the design drawings:

Equipment Identifier	Sample Size (Percent)
АНИ	20
VAV	20
СИН	20
CWP	20
DWH	100
P-3 Water Closet	20
Lighting Controls	25

Perform Functional Performance Tests for all equipment and systems. Prepare and complete a Functional Performance Test Checklist for each item of equipment or system.

#### 3.1.6.5.3 Seasonal Tests

Regardless of the season, perform initial Functional Performance Tests of equipment and systems at the time of system completion. Develop and implement means of artificial loading to demonstrate, to a reasonable level of confidence, the ability of the HVAC systems to handle peak seasonal loads.

In addition to the initial Functional Performance Tests, perform Functional Performance Tests of the HVAC systems during peak heating and cooling seasons during outdoor air condition design extremes. Schedule the seasonal Functional Performance Tests in coordination with the Government.

Systems may be partially accepted by the Government prior to seasonal testing if they comply with all construction contract requirements that can be tested during the initial Functional Performance Tests. All Functional Performance Test procedures must be completed prior to full systems acceptance.

#### 3.1.6.5.4 Aborted Tests and Re-Testing

Abort Functional Performance Tests or Seasonal Tests if any deficiency prevents successful completion of the test or if any required commissioning team member is not present for the test. Reimburse the Government for all costs associated with effort lost caused by re-testing due to test failures and aborted tests. These costs must include salary, travel costs, and per diem for Government commissioning team members. Re-test only after all deficiencies identified during the original tests have been corrected.

#### 3.1.6.5.4.1 100% Sample

Systems or items of equipment for which 100% sample are tested fail if one or more of the test procedures results in a discovery of a deficiency and the deficiency can not be resolved within 5 minutes during the test. Upon test failure, abort the test of the system or item of equipment. Schedule a re-test, in coordination with the Government, only after all deficiencies for all failed equipment and systems have been corrected.

Re-test to the extent necessary to confirm that the deficiencies have been corrected. At the sole discretion of the Government, all test procedures for the failed item of equipment or system must be repeated to confirm that no deficiencies remain within that equipment or system.

#### 3.2 SYSTEMS TRAINING

The training specified by the specification sections associated with commissioned systems must be provided by factory certified technicians or trainers. Include both demonstration of proper equipment and system operation both at the equipment and classroom training. For the classroom training, include proper operating and maintenance procedures, preventative maintenance requirements and procedures, trouble-shooting procedures, and calibration frequency and procedures. Include identification of the equipment and system warranties and procedures for correction under the warranties. Include a review of the draft systems manual, maintenance plan, and service life plans.

Visibly and audibly record the systems training. All instruction on the recording must be clear and intelligible.

#### 3.3 TRAINING PLAN

Develop a training plan which identifies all training required by specification sections associated with commissioned systems. Include a matrix listing each training requirement, content of the training, the trainer name, trainer contact information, and schedule and location of training.

Document training attendance using Training Attendance Rosters and provide completed attendance rosters to the Lead Commissioning Specialist and the Government.

#### 3.4 SYSTEMS MANUAL

Prepare and submit a Systems Manual including a signed certification or letter from the Lead Commissioning Specialist and Electrical Commissioning Specialist stating that the Systems Manual is complete, clear, and accurate. The Systems Manual, for all commissioned systems, must conform to Appendix A SYSTEMS MANUAL ORGANIZATION AND CONTENT to ER 25-345-1, available at the USACE Publications website at the following location: https://www.publications.usace.army.mil/USACE-Publications/Engineer-Regulations/ Update and resubmit the Systems Manual based on any corrective action taken during the warranty period.

#### 3.5 MAINTENANCE AND SERVICE LIFE PLANS

Prepare and submit a Maintenance Plan for the project mechanical, electrical, plumbing, and fire protection systems. Prepare the Maintenance Plan in accordance with ASHRAE 180 for heating, ventilation, air conditioning, and refrigeration systems. Develop required inspection and maintenance tasks similar to Section 5 of ASHRAE 180 for the other commissioned systems and fire protection systems.

Prepare and submit a Service Life Plan for the building envelope, structural systems, and site hardscape that includes the following for each assembly or component:

- a. A description of each including the materials or products.
- b. The estimated service life, in years.
- c. The estimated maintenance frequency and description of maintenance tasks.
- d. The point of maintenance access for the components with estimated service life less than service life of the building.
- 3.6 CURRENT FACILITIES REQUIREMENTS AND O&M PLAN

Prepare and submit a Current Facilities Requirements and O&M Plan document that contains information necessary to operate the building efficiently. Include the following:

- a. Sequences of operation for all commissioned systems.
- b. Building occupancy schedule.
- c. Equipment run-time schedules.
- d. Setpoints for all HVAC equipment.
- e. Set lighting levels throughout the building.
- f. Minimum outside air requirements.
- g. Changes in schedules or setpoints for different seasons, days of the week, and times of the day.
- h. Systems narrative describing the mechanical and electrical systems and equipment.

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- i. Preventative maintenance plan for building equipment described in the systems narrative.
- j. Commissioning program including periodic commissioning requirements, ongoing commissioning tasks, and continuous tasks for critical facilities.

Information from other submitted documents may be referenced from the current facilities requirements and O&M plan in lieu of repeating information provided that the reference includes the location of the information in those other submitted documents such as page number or chapter or part and section.

#### 3.7 COMMISSIONING REPORT

Following the completion of Functional Performance Tests, with the exception of Seasonal Tests, the Lead Commissioning Specialist must prepare a Commissioning Report including an executive summary describing the overall commissioning process, describing the results of the commissioning process, listing any outstanding deficiencies and recommended resolutions, and describing any seasonal testing and monitoring based commissioning that must be scheduled for a later date. Indicate, in the executive summary, whether the systems meet the requirements of the construction contract and the Owner's Project Requirements.

Detail any deficiencies discovered during the commissioning process and the corrective actions taken. Include the completed Building Envelope Inspection Checklists, Pre-Functional Checklists, Functional Performance Test Checklists, the Construction Phase Commissioning Plan, the Issues Log, Performance Verification Test Reports, Trend Log Reports, Training Attendance Rosters, the Design Review Report, and the final TAB Report.

Following any Seasonal Tests or Post-Construction Activities, update the Commissioning Report to reflect any changes and resubmit.

## 3.8 POST-CONSTRUCTION SUPPORT

Submit a Post-Construction Commissioning Report and Post-Construction Systems Manual with documentation of the results of the post-construction site visit and monitoring based commissioning. Include the Monitoring Based Commissioning Report in the Post-Construction Commissioning Report.

#### 3.8.1 Monitoring Based Commissioning

The Lead Commissioning Specialist must perform Monitoring Based Commissioning in accordance with LEED Enhanced and Monitoring-Based Commissioning requirements for one year. For all data required to have availability for trending in accordance with the contract plans and specifications, review the trends on a monthly basis at a minimum. Duration and frequency of trends must be in accordance with the approve Monitoring Based Commissioning Plan. Also include review of all meter data available to the building automation system concurrently with trend review. Set-up and review additional trends as necessary to diagnose and test the correction of any system errors or deficiencies. Submit a Monthly Monitoring Based Commissioning Update to include graphical representation of all trends reviewed, meter data received, and identification of any system errors or deficiencies discovered and recommendations for correction, and an updated Issues Log with errors and deficiencies.

Submit a Monitoring Based Commissioning Report including an executive summary describing the results of the monitoring based commissioning process, listing any outstanding deficiencies and recommended resolutions, and including an updated Issue Log and all Monthly Monitoring Based Commissioning Updates.

3.8.2 Post-Construction Site Visit

The Lead Commissioning Specialist must visit the building site concurrent with the 9 month warranty inspection to inspect building system equipment and review building operation with the building operating/maintenance staff. The Lead Commissioning Specialist must identify any deficiency of the building systems to operate in accordance with the contract and accepted design requirements and the Owner's Project Requirements. The Lead Commissioning Specialist must advise the Contracting Officer's Representative of any identified deficiencies and the proposed corrective action.

-- End of Section --

# SECTION 01 50 00

# TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS 11/20, CHG 1: 08/21

#### PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C511 (2017) Reduced-Pressure Principle Backflow Prevention Assembly

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2020; ERTA 20-1 2020; ERTA 20-2 2020; TIA
	20-1; TIA 20-2; TIA 20-3; TIA 20-4)
	National Electrical Code

NFPA 241 (2022) Standard for Safeguarding Construction, Alteration, and Demolition Operations

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 (2014) Safety -- Safety and Health Requirements Manual

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)

MUTCD (2009; Rev 2012) Manual on Uniform Traffic Control Devices

# 1.2 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Construction Site Plan; G

Traffic Control Plan; G

Haul Road Plan; G

Contractor Computer Cybersecurity Compliance Statements; G

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Contractor Temporary Network Cybersecurity Compliance Statements; G

SD-03 Product Data

Backflow Preventers; G

SD-06 Test Reports

Backflow Preventer Tests

SD-07 Certificates

Backflow Tester Certification

Backflow Preventers Certificate of Full Approval

#### 1.3 CONSTRUCTION SITE PLAN

Prior to the start of work, submit for Government approval a site plan showing the locations and dimensions of temporary facilities (including layouts and details, equipment and material storage area (onsite and offsite), and access and haul routes, avenues of ingress/egress to the fenced area and details of the fence installation. Identify any areas which may have to be graveled to prevent the tracking of mud. Indicate if the use of a supplemental or other staging area is desired. Show locations of safety and construction fences, site trailers, construction entrances, trash dumpsters, temporary sanitary facilities, and worker parking areas.

1.4 BACKFLOW PREVENTERS CERTIFICATE

## 1.4.1 Backflow Tester Certificate

Prior to testing, submit to the Contracting Officer certification issued by the State or local regulatory agency attesting that the backflow tester has successfully completed a certification course sponsored by the regulatory agency. Tester must not be affiliated with a company participating in other phases of this Contract.

1.4.2 Backflow Prevention Training Certificate

Submit a certificate recognized by the State or local authority that states the Contractor has completed at least 10 hours of training in backflow preventer installations. The certificate must be current.

1.5 DOD CONDITION OF READINESS (COR)

DOD will set the Condition of Readiness (COR) based on the weather forecast for sustained winds 50 knots (58 mph) or greater. Contact the Contracting Officer for the current COR setting.

Monitor weather conditions a minimum of twice a day and take appropriate actions according to the approved Emergency Plan in the accepted Accident Prevention Plan, EM 385-1-1 Section 01 Emergency Planning and the instructions below.

Unless otherwise directed by the Contracting Officer, comply with:

a. Condition FOUR (Sustained winds of 58 mph or greater expected within 72 hours): Normal daily jobsite cleanup and good housekeeping

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> practices. Collect and store in piles or containers scrap lumber, waste material, and rubbish for removal and disposal at the close of each work day. Maintain the construction site including storage areas, free of accumulation of debris. Stack form lumber in neat piles less than 3.3 feet high. Remove all debris, trash, or objects that could become missile hazards. Review requirements pertaining to "Condition THREE" and continue action as necessary to attain "Condition FOUR" readiness. Contact Contracting Officer for weather and COR updates and completion of required actions.

- b. Condition THREE (Sustained winds of 58 mph or greater expected within 48 hours): Maintain "Condition FOUR" requirements and commence securing operations necessary for "Condition ONE" which cannot be completed within 18 hours. Cease all routine activities which might interfere with securing operations. Commence securing and stow all gear and portable equipment. Make preparations for securing buildings. Reinforce or remove formwork and scaffolding. Secure machinery, tools, equipment, materials, or remove from the jobsite. Expend every effort to clear all missile hazards and loose equipment from general base areas. Contact Contracting Officer for weather and COR updates and completion of required actions. Review requirements pertaining to "Condition TWO" and continue action as necessary to attain "Condition THREE" readiness.
- c. Condition TWO (Sustained winds of 58 mph or greater expected within 24 hours): Secure the jobsite, and leave Government premises.
- d. Condition ONE. (Sustained winds of 58 mph or greater expected within 12 hours): Contractor access to the jobsite and Government premises is prohibited.
- 1.6 CYBERSECURITY DURING CONSTRUCTION

{For Reference Only: This subpart (and its subparts) relates to AC-18, SA-3, CCI-00258.} Meet the following requirements throughout the construction process.

1.6.1 Contractor Computer Equipment

Contractor owned computers may be used for construction. When used, contractor computers must meet the following requirements:

# 1.6.1.1 Operating System

The operating system must be an operating system currently supported by the manufacturer of the operating system. The operating system must be current on security patches and operating system manufacturer required updates.

#### 1.6.1.2 Anti-Malware Software

The computer must run anti-malware software from a reputable software manufacturer. Anti-malware software must be a version currently supported by the software manufacturer, must be current on all patches and updates, and must use the latest definitions file. All computers used on this project must be scanned using the installed software at least once per day.

## 1.6.1.3 Passwords and Passphrases

The passwords and passphrases for all computers must be changed from their default values. Passwords must be a minimum of eight characters with a minimum of one uppercase letter, one lowercase letter, one number and one special character.

## 1.6.1.4 Contractor Computer Cybersecurity Compliance Statements

Provide a single submittal containing completed Contractor Computer Cybersecurity Compliance Statements for each company using contractor owned computers. Contractor Computer Cybersecurity Compliance Statements must use the template published at <u>http://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/forms-graphics-tables</u>. Each Statement must be signed by a cybersecurity representative for the relevant company.

#### 1.6.2 Temporary IP Networks

Temporary contractor-installed IP networks may be used during construction. When used, temporary contractor-installed IP networks must meet the following requirements:

1.6.2.1 Network Boundaries and Connections

The network must not extend outside the project site and must not connect to any IP network other than IP networks provided under this project or Government furnished IP networks provided for this purpose. Any and all network access from outside the project site is prohibited.

# 1.6.3 Government Access to Network

Government personnel must be allowed to have complete and immediate access to the network at any time in order to verify compliance with this specification.

1.6.4 Temporary Wireless IP Networks

In addition to the other requirements on temporary IP networks, temporary wireless IP (WiFi) networks must not interfere with existing wireless network and must use WPA2 security. Network names (SSID) for wireless networks must be changed from their default values.

1.6.5 Passwords and Passphrases

The passwords and passphrases for all network devices and network access must be changed from their default values. Passwords must be a minimum 8 characters with a minimum of one uppercase letter, one lowercase letter, one number and one special character.

# 1.6.6 Contractor Temporary Network Cybersecurity Compliance Statements

Provide a single submittal containing completed Contractor Temporary Network Cybersecurity Compliance Statements for each company implementing a temporary IP network. Contractor Temporary Network Cybersecurity Compliance Statements must use the template published at <a href="http://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/forms-graphics-tables">http://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/forms-graphics-tables</a>. Each Statement must be signed by a cybersecurity representative for the relevant company. If no temporary IP networks will

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be used, provide a single copy of the Statement indicating this.

# PART 2 PRODUCTS

2.1 TEMPORARY SIGNAGE

#### 2.1.1 Bulletin Board

Prior to the commencement of work activities, provide a clear weatherproof covered bulletin board not less than 36 by 48 inches in size for displaying the Equal Employment Opportunity poster, a copy of the wage decision contained in the Contract, Wage Rate Information poster, Safety and Health Information as required by EM 385-1-1 Section 01 and other information approved by the Contracting Officer. Coordinate requirements herein with 01 35 26.00 06 GOVERNMENTAL SAFETY REQUIREMENTS. Locate the bulletin board at the project site in a conspicuous place easily accessible to all employees, and in location as approved by the Contracting Officer.

## 2.1.2 Project Identification Signs

The requirements for the signs, their content, and location are as specified in Section00 80 00.00 06 SPECIAL PROVISIONS. Erect signs within 15 days after receipt of the notice to proceed. Correct the data required by the safety sign daily, with light colored metallic or non-metallic numerals.

# 2.1.3 Warning Signs

Post temporary signs, tags, and labels to give workers and the public adequate warning and caution of construction hazards according to the EM 385-1-1 Section 04. Attach signs to the perimeter fencing every 150 feet warning the public of the presence of construction hazards. Signs must require unauthorized persons to keep out of the construction site. Correct the data required by safety signs daily. Post signs at all points of entry designating the construction site as a hard hat area.

## 2.2 TEMPORARY TRAFFIC CONTROL

# 2.2.1 Haul Roads

Construct access and haul roads necessary for proper prosecution of the work under this Contract in accordance with EM 385-1-1 Section 04. Construct with suitable grades and widths; avoid sharp curves, blind corners, and dangerous cross traffic. Submit haul road plan for approval. Provide necessary lighting, signs, barricades, and distinctive markings for the safe movement of traffic. The method of dust control, although optional, must be adequate to ensure safe operation at all times. Location, grade, width, and alignment of construction and haul roads are subject to approval by the Contracting Officer. Lighting must be adequate to assure full and clear visibility for full width of haul road and work areas during any night work operations.

## 2.2.2 Barricades

Erect and maintain temporary barricades to limit public access to hazardous areas. Barricades are required whenever safe public access to paved areas such as roads, parking areas or sidewalks is prevented by construction activities or as otherwise necessary to ensure the safety of

both pedestrian and vehicular traffic. Securely place barricades clearly visible with adequate illumination to provide sufficient visual warning of the hazard during both day and night.

# 2.3 FENCING

Provide fencing along the construction site and at all open excavations and tunnels to control access by unauthorized personnel. Safety fencing must be highly visible to be seen by pedestrians and vehicular traffic. All fencing must meet the requirements of EM 385-1-1. Remove the fence upon completion and acceptance of the work.

#### 2.3.1 Polyethylene Mesh Safety Fencing

Temporary safety fencing must be a high visibility orange colored, high density polyethylene grid, a minimum of 48 inches high and maximum mesh size of 2 inches. Fencing must extend from the grade to a minimum of 48 inches above the grade and be tightly secured to T-posts spaced as necessary to maintain a rigid and taut fence. Fencing must remain rigid and taut with a minimum of 200 pounds of force exerted on it from any direction with less than 4 inches of deflection.

## 2.3.2 Chain Link Panel Fencing

Temporary panel fencing must be galvanized steel chain link panels 6 feet high. Multiple fencing panels may be linked together at the bases to form long spans as needed. Each panel base must be weighted down using sand bags or other suitable materials in order for the fencing to withstand anticipated winds while remaining upright. Fencing must remain rigid and taut with a minimum of 200 pounds of force exerted on it from any direction with less than 4 inches of deflection.

## 2.3.3 Post-Driven Chain Link Fencing

Temporary post-driven fencing must be galvanized chain link fencing 6 feet high supported by an tightly secured to galvanized steel posts driven below grade. Fence posts must be located on minimum 10 foot centers. Posts may be set in various surfaces such as sand, soil, asphalt or concrete as necessary. Chain link fencing must remain rigid and taut with a minimum of 200 pounds of force exerted on it from any direction with less than 4 inches of deflection. Completely remove fencing and posts at the completion of construction and restore surfaces disturbed or damaged to its original condition. Locate and identify underground utilities prior to setting fence posts. Equip fence with a lockable gate. Gate must remain locked when construction personnel are not present.

## 2.4 TEMPORARY WIRING

Provide temporary wiring in accordance with EM 385-1-1 Section 11, NFPA 241 and NFPA 70. Include monthly inspection and testing of all equipment and apparatus.

## 2.5 BACKFLOW PREVENTERS

Certificate of Full Approval from FCCCHR List, University of Southern California, attesting that the design, size and make of each backflow preventer has satisfactorily passed the complete sequence of performance testing and evaluation for the respective level of approval. Certificate of Provisional Approval is not acceptable.

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Reduced pressure principle type conforming to the applicable requirements AWWA C511. Provide backflow preventers complete with 150 pound flanged, bronze, mounted gate valve and strainer, 304 stainless steel or bronze, internal parts.

## PART 3 EXECUTION

## 3.1 EMPLOYEE PARKING

Construction Contract employees must park privately owned vehicles in an area designated by the Contracting Officer. Employee parking must not interfere with existing and established parking requirements of the Government installation.

## 3.2 AVAILABILITY AND USE OF UTILITY SERVICES

#### 3.2.1 Temporary Utilities

Provide temporary utilities required for construction. Materials may be new or used, must be adequate for the required usage, not create unsafe conditions, and not violate applicable codes and standards.

#### 3.2.2 Payment for Utility Services

a. The Contractor must provide their own utilities.

# 3.2.3 Sanitation

Provide and maintain within the construction area minimum field-type sanitary facilities in accordance with EM 385-1-1 Section 02. Locate the facilities behind the construction fence or out of the public view. Clean units and empty wastes at least once a week or more frequently into a municipal, district, or station sanitary sewage system, or remove waste to a commercial facility. Obtain approval from the system owner prior to discharge into a municipal, district, or commercial sanitary sewer system. Penalties or fines associated with improper discharge will be the responsibility of the Contractor. Coordinate with the Contracting Officer and follow station regulations and procedures when discharging into the station sanitary sewer system. Maintain these conveniences at all times. Include provisions for pest control and elimination of odors. Government toilet facilities will not be available to Contractor's personnel.

## 3.2.4 Telephone

Make arrangements and pay all costs for telephone facilities desired.

# 3.2.5 Fire Protection

Provide temporary fire protection equipment for the protection of personnel and property during construction. Remove debris and flammable materials daily to minimize potential hazards.

- 3.3 NOT USED
- 3.4 TRAFFIC PROVISIONS
- 3.4.1 Maintenance of Traffic
  - a. Conduct operations in a manner that will not close a thoroughfare or interfere with traffic on railways or highways except with written permission of the Contracting Officer at least 15 calendar days prior to the proposed modification date, and provide a Traffic Control Plan for Government approval detailing the proposed controls to traffic movement for approval. The plan must be in accordance with State and local regulations and the MUTCD, Part VI. Contractor may move oversized and slow-moving vehicles to the worksite provided requirements of the highway authority have been met.
  - b. Conduct work so as to minimize obstruction of traffic, and maintain traffic on at least half of the roadway width at all times. Obtain approval from the Contracting Officer prior to starting any activity that will obstruct traffic.
  - c. Provide, erect, and maintain, at Contractor's expense, lights, barriers, signals, passageways, detours, and other items, that may be required by the Life Safety Signage, overhead protection authority having jurisdiction.
  - d. Provide cones, signs, barricades, lights, or other traffic control devices and personnel required to control traffic. Do not use foil-backed material for temporary pavement marking because of its potential to conduct electricity during accidents involving downed power lines.

## 3.4.2 Protection of Traffic

Maintain and protect traffic on all affected roads during the construction period except as otherwise specifically directed by the Contracting Officer. Measures for the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, placing of lights around and in front of equipment the work, and the erection and maintenance of adequate warning, danger, and direction signs, will be as required by the State and local authorities having jurisdiction. Provide self-illuminated (lighted) barricades during hours of darkness. Brightly-colored (orange) vests are required for all personnel working in roadways. Protect the traveling public from damage to person and property. Minimize the interference with public traffic on roads selected for hauling material to and from the site. Investigate the adequacy of existing roads and their allowable load limit. Contractor is responsible for the repair of damage to roads caused by construction operations.

3.4.3 Rush Hour Restrictions

Do not interfere with the peak traffic flows preceding and during normal operations without notification to and approval by the Contracting Officer.

# 3.4.4 Dust Control

Dust control methods and procedures must be approved by the Contracting Officer. Coordinate dust control methods with 01 57 19.00 06 TEMPORARY ENVIRONMENTAL CONTROLS AND PERMITS.

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#### 3.5 REDUCED PRESSURE BACKFLOW PREVENTERS

Provide an approved reduced pressure backflow prevention assembly at each location where the Contractor taps into the Government potable water supply.

Perform backflow preventer tests using test equipment, procedures, and certification forms conforming to those outlined in the latest edition of the Manual of Cross-Connection Control published by the FCCCHR Manual. Test and tag each reduced pressure backflow preventer upon initial installation (prior to continued water use) and quarterly thereafter. Tag must contain the following information: make, model, serial number, dates of tests, results, maintenance performed, and signature of tester. Record test results on certification forms conforming to requirements cited earlier in this paragraph.

3.6 CONTRACTOR'S TEMPORARY FACILITIES

Contractor is responsible for security of their property. Provide adequate outside security lighting at the temporary facilities. Trailers must be anchored to resist high winds and meet applicable state or local standards for anchoring mobile trailers. Coordinate anchoring with EM 385-1-1 Section 04. The Contract Clause entitled "FAR 52.236-10, Operations and Storage Areas" and the following apply:

## 3.6.1 NOT USED

3.6.2 Quality Control Manager Records and Field Office

Provide on the jobsite an office with approximately 100 square feet of useful floor area for the exclusive use of the QC Manager. Provide a weathertight structure with adequate heating and cooling, toilet facilities, lighting, ventilation, a 4 by 8 foot plan table, a standard size office desk and chair, computer station, and working communications facilities. Provide either a 1,500 watt radiant heater and a window-mounted air conditioner rated at 9,000 Btus minimum or a window-mounted heat pump of the same minimum heating and cooling ratings. Provide a door with a cylinder lock and windows with locking hardware. Make utility connections. Locate as directed. File quality control records in the office and make available at all times to the Government. After completion of the work, remove the entire structure from the site.

## 3.6.3 Storage Area

Construct a temporary 6 foot high chain link fence around trailers and materials. Include plastic strip inserts, colored brown, so that visibility through the fence is obstructed. Fence posts may be driven, in lieu of concrete bases, where soil conditions permit. Do not place or store trailers, materials, or equipment outside the fenced area unless such trailers, materials, or equipment are assigned a separate and distinct storage area by the Contracting Officer away from the vicinity of the construction site but within the installation boundaries. Trailers, equipment, or materials must not be open to public view with the exception of those items which are in support of ongoing work on the current day. Do not stockpile materials outside the fence in preparation for the next day's work. Park mobile equipment, such as tractors, wheeled lifting equipment, cranes, trucks, and like equipment within the fenced area at the end of each work day.

Keep fencing in a state of good repair and proper alignment. Grassed or unpaved areas, which are not established roadways, and will be traversed with construction equipment or other vehicles, must be covered with a layer of gravel as necessary to prevent rutting and the tracking of mud onto paved or established roadways, should the Contractor elect to traverse them with construction equipment or other vehicles. Mow and maintain grass located within the boundaries of the construction site for the duration of the project. Grass and vegetation along fences, buildings, under trailers, and in areas not accessible to mowers must be edged or trimmed neatly.

# 3.6.4 Supplemental Storage Area

Upon request, and pending availability, the Contracting Officer will designate another or supplemental area for the use and storage of trailers, equipment, and materials. This area may not be in close proximity of the construction site but will be within the installation boundaries. Maintain the area in a clean and orderly fashion and secured if needed to protect supplies and equipment. Utilities will not be provided to this area by the Government.

## 3.6.5 Appearance of Trailers

- a. Trailers must be roadworthy and comply with all appropriate state and local vehicle requirements. Trailers which are rusted, have peeling paint or are otherwise in need of repair will not be allowed on Installation property. Trailers must present a clean and neat exterior appearance and be in a state of good repair.
- b. Maintain the temporary facilities. Failure to do so will be sufficient reason to require their removal at the Contractor's expense.

## 3.6.6 NOT USED

#### 3.6.7 Safety Systems

Protect the integrity of all installed safety systems or personnel safety devices. Obtain prior approval from the Contracting Officer if entrance into systems serving safety devices is required. If it is temporarily necessary to remove or disable personnel safety devices in order to accomplish Contract requirements, provide alternative means of protection prior to removing or disabling any permanently installed safety devices or equipment and obtain approval from the Contracting Officer.

## 3.6.8 Weather Protection of Temporary Facilities and Stored Materials

Take necessary precautions to ensure that roof openings and other critical openings in the building are monitored carefully. Take immediate actions required to seal off such openings when rain or other detrimental weather is imminent, and at the end of each workday. Ensure that the openings are completely sealed off to protect materials and equipment in the building from damage.

# 3.6.8.1 Building and Site Storm Protection

When a warning of gale force winds is issued, take precautions to minimize danger to persons, and protect the work and nearby Government property. Precautions must include, but are not limited to, closing openings;

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removing loose materials, tools and equipment from exposed locations; and removing or securing scaffolding and other temporary work. Close openings in the work when storms of lesser intensity pose a threat to the work or any nearby Government property.

3.7 NOT USED

#### 3.8 PLANT COMMUNICATIONS

Whenever the individual elements of the plant are located so that operation by normal voice between these elements is not satisfactory, install a satisfactory means of communication, such as telephone or other suitable devices and make available for use by Government personnel.

## 3.9 TEMPORARY PROJECT SAFETY FENCING

As soon as practicable, but not later than 15 days after the date established for commencement of work, furnish and erect temporary project safety fencing at the work site. Maintain the safety fencing during the life of the Contract and, upon completion and acceptance of the work, remove from the work site.

## 3.10 DUMPSTERS

Equip dumpsters with a secure cover and paint the standard installation color. Keep dumpster closed, except when being loaded with trash and debris. Locate dumpsters behind the construction fence or out of the public view. Empty site dumpsters at least once a week, or as needed to keep the site free of debris and trash. If necessary, provide 55 gallon trash containers painted the darker installation color to collect debris in the construction site area. For large demolitions, large dumpsters without lids are acceptable, but must not have debris higher than the sides before emptying.

## 3.11 CLEANUP

Remove construction debris, waste materials, packaging material and the like from the work site daily. Any dirt or mud which is tracked onto paved or surfaced roadways must be cleaned away. Store all salvageable materials resulting from demolition activities within the fenced area described above or at the supplemental storage area. Neatly stack stored materials not in trailers, whether new or salvaged.

# 3.12 RESTORATION OF STORAGE AREA

Upon completion of the project remove the bulletin board, signs, barricades, haul roads, and all other temporary products from the site. After removal of trailers, materials, and equipment from within the fenced area, remove the fence. Restore areas used during the performance of the Contract to the original or better condition. Remove gravel used to traverse grassed areas and restore the area to its original condition, including top soil and seeding as necessary.

-- End of Section --

# SECTION 01 57 19.00 06

# TEMPORARY ENVIRONMENTAL CONTROLS AND PERMITS $04/20\,$

## PART 1 GENERAL

1.1 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 E1527-13	Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process
U.S. ARMY	
AR 200-1	Environmental Protection and Enhancement
AR 200-2	Environmental Effects of Army Actions, and the Application of Total Quality Mangement (TQM) Principles
AR 200-3	Natural Resources - Land, Forest and Wildlife Management
U.S. ARMY CORPS OF ENGL	NEERS (USACE)
EM 385-1-1	(2014) Safety and Health Requirements Manual
ER 200-2-2	(1988) Environmental Quality - Procedures for Implementing NEPA
WETLANDS DELINEATION MANUAL	(1987) Corps of Engineers Wetlands Delineation Manual
Wetland Supplement	Regional Supplement to the Corps of Engineers Wetland Delineation Manual; Midwest Region (Version 2.0) April 2010 ERDC/R; TR-10-16
U.S. NATIONAL ARCHIVES	AND RECORDS ADMINISTRATION (NARA)
29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1910.120	Hazardous Waste Operations and Emergency Response
29 CFR 1915	Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment

SECTION 01 57 19.00 06 Page 1 Certified Final Submittal P2#: 506474 - Manned/Unmanned Tactical Vehicle Lab (MUMT) Detroit Arsenal, MI 29 CFR 1926 Safety and Health Regulations for Construction Oil Pollution Prevention 40 CFR 112 40 CFR 152 Pesticide Registration and Classification Procedures 40 CFR 152 - 186 Pesticide Programs 40 CFR 241 Guidelines for Disposal of Solid Waste 40 CFR 243 Guidelines for the Storage and Collection of Residential, Commercial, and Institutional Solid Waste 40 CFR 258 Subtitle D Landfill Requirements 40 CFR 260 Hazardous Waste Management System: General 40 CFR 261 Identification and Listing of Hazardous Waste 40 CFR 261.7 Residues of Hazardous Waste in Empty Containers 40 CFR 262 Standards Applicable to Generators of Hazardous Waste 40 CFR 262.31 Standards Applicable to Generators of Hazardous Waste-Labeling 40 CFR 262.34 Standards Applicable to Generators of Hazardous Waste-Accumulation Time 40 CFR 263 Standards Applicable to Transporters of Hazardous Waste 40 CFR 264 Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities 40 CFR 265 Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities 40 CFR 266 Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities 40 CFR 268 Land Disposal Restrictions 40 CFR 273 Standards for Universal Waste Management 40 CFR 273.2 Standards for Universal Waste Management -Batteries 40 CFR 273.3 Standards for Universal Waste Management -Pesticides

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40 CFR 273.4		Standards for Universal Waste Management - Mercury Containing Equipment
40 CFR 273.5		Standards for Universal Waste Management - Lamps
40 CFR 279		Standards for the Management of Used Oil
40 CFR 300		National Oil and Hazardous Substances Pollution Contingency Plan
40 CFR 300.12	:5	National Oil and Hazardous Substances Pollution Contingency Plan - Notification and Communications
40 CFR 355		Emergency Planning and Notification
40 CFR 372-SU	IBPART D	Specific Toxic Chemical Listings
40 CFR 403		General Pretreatment Regulations for Existing and New Sources of Pollution
40 CFR 50		National Primary and Secondary Ambient Air Quality Standards
40 CFR 60		Standards of Performance for New Stationary Sources
40 CFR 63		National Emission Standards for Hazardous Air Pollutants for Source Categories
40 CFR 64		Compliance Assurance Monitoring
40 CFR 82		Protection of Stratospheric Ozone
49 CFR 171		General Information, Regulations, and Definitions
49 CFR 172		Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
49 CFR 172.10	1	Hazardous Material Regulation-Purpose and Use of Hazardous Material Table
49 CFR 173		Shippers - General Requirements for Shipments and Packagings
49 CFR 178		Specifications for Packagings
CFR 44		(2023)Code of Federal Regulations (CFR)
1.2 DEFINITIO	DNS	

1.2.1 Class I and II Ozone Depleting Substance (ODS)

Class I ODS is defined in Section 602(a) of The Clean Air Act. A list of

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Class I ODS can be found on the EPA website at the following weblink. http://www.epa.gov/ozone/science/ods/classone.html.

Class II ODS is defined in Section 602(s) of The Clean Air Act. A list of Class II ODS can be found on the EPA website at the following weblink. http://www.epa.gov/ozone/science/ods/classtwo.html.

## 1.2.2 Contractor Generated Hazardous Waste

All generated hazardous waste shall be reported and documented at DTA's HAZMAT office.

Contractor generated hazardous waste is materials that, if abandoned or disposed of, may meet the definition of a hazardous waste. These waste streams would typically consist of material brought on site by the Contractor to execute work, but are not fully consumed during the course of construction. Examples include, but are not limited to, excess paint thinners (i.e. methyl ethyl ketone, toluene), waste thinners, excess paints, excess solvents, waste solvents, excess pesticides, and contaminated pesticide equipment rinse water.

#### 1.2.3 Electronics Waste

Electronics waste is discarded electronic devices intended for salvage, recycling, or disposal.

## 1.2.4 Environmental Pollution and Damage

Environmental pollution and damage is the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade the environment aesthetically, culturally or historically.

## 1.2.5 Environmental Protection

Environmental protection is the prevention/control of pollution and habitat disruption that may occur to the environment during construction. The control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

## 1.2.6 Hazardous Debris

As defined in paragraph SOLID WASTE, debris that contains listed hazardous waste (either on the debris surface, or in its interstices, such as pore structure) in accordance with 40 CFR 261. Hazardous debris also includes debris that exhibits a characteristic of hazardous waste in accordance with 40 CFR 261.

## 1.2.7 Hazardous Materials

Hazardous materials as defined in 49 CFR 171 and listed in 49 CFR 172.

Hazardous material is any material that: Is regulated as a hazardous material in accordance with 49 CFR 173; or requires a Safety Data Sheet (SDS) in accordance with 29 CFR 1910.120; or during end use, treatment,

handling, packaging, storage, transportation, or disposal meets or has components that meet or have potential to meet the definition of a hazardous waste as defined by 40 CFR 261 Subparts A, B, C, or D. Designation of a material by this definition, when separately regulated or controlled by other sections or directives, does not eliminate the need for adherence to that hazard-specific guidance which takes precedence over this section for "control" purposes. Such material includes ammunition, weapons, explosive actuated devices, propellants, pyrotechnics, chemical and biological warfare materials, medical and pharmaceutical supplies, medical waste and infectious materials, bulk fuels, radioactive materials, and other materials such as asbestos, mercury, and polychlorinated biphenyls (PCBs).

#### 1.2.8 Hazardous Waste

Hazardous Waste is any material that meets the definition of a solid waste and exhibit a hazardous characteristic (ignitability, corrosivity, reactivity, or toxicity) as specified in 40 CFR 261, Subpart C, or contains a listed hazardous waste as identified in 40 CFR 261, Subpart D.

1.2.9 Installation Pest Management Coordinator

Installation Pest Management Coordinator (IPMC) is the individual officially designated by the Installation Commander to oversee the Installation Pest Management Program and the Installation Pest Management Plan.

# 1.2.10 Land Application

Land Application means spreading or spraying discharge water at a rate that allows the water to percolate into the soil. No sheeting action, soil erosion, discharge into storm sewers, discharge into defined drainage areas, or discharge into the "waters of the United States" must occur. Comply with federal, state, and local laws and regulations.

1.2.11 Municipal Separate Storm Sewer System (MS4) Permit

MS4 permits are those held by installations to obtain NPDES permit coverage for their stormwater discharges.

1.2.12 National Pollutant Discharge Elimination System (NPDES)

The NPDES permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States.

## 1.2.13 Oily Waste

Oily waste are those materials that are, or were, mixed with Petroleum, Oils, and Lubricants (POLs) and have become separated from that POLs. Oily wastes also means materials, including wastewaters, centrifuge solids, filter residues or sludges, bottom sediments, tank bottoms, and sorbents which have come into contact with and have been contaminated by, POLs and may be appropriately tested and discarded in a manner which is in compliance with other state and local requirements.

This definition includes materials such as oily rags, "kitty litter" sorbent clay and organic sorbent material. These materials may be land filled provided that: It is not prohibited in other state regulations or local ordinances; the amount generated is "de minimus" (a small amount);

it is the result of minor leaks or spills resulting from normal process operations; and free-flowing oil has been removed to the practicable extent possible. Large quantities of this material, generated as a result of a major spill or in lieu of proper maintenance of the processing equipment, are a solid waste. As a solid waste, perform a hazardous waste determination prior to disposal. As this can be an expensive process, it is recommended that this type of waste be minimized through good housekeeping practices and employee education.

# 1.2.14 Pesticide

Pesticide is any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest, or intended for use as a plant regulator, defoliant or desiccant.

## 1.2.15 Pesticide Treatment Plan

A plan for the prevention, monitoring, and control to eliminate pest infestation.

1.2.16 Pests

Pests are arthropods, birds, rodents, nematodes, fungi, bacteria, viruses, algae, snails, marine borers, snakes, weeds and other organisms (except for human or animal disease-causing organisms) that adversely affect readiness, military operations, or the well-being of personnel and animals; attack or damage real property, supplies, equipment, or vegetation; or are otherwise undesirable.

## 1.2.17 Project Pesticide Coordinator

The Project Pesticide Coordinator (PPC) is an individual who resides at a Civil Works Project office and who is responsible overseeing of pesticide application on project grounds.

## 1.2.18 Regulated Waste

Regulated waste are solid wastes that have specific additional federal, state, or local controls for handling, storage, or disposal.

1.2.19 Sediment

Sediment is soil and other debris that have eroded and have been transported by runoff water or wind.

## 1.2.20 Solid Waste

Solid waste is a solid, liquid, semi-solid or contained gaseous waste. A solid waste can be a hazardous waste, non-hazardous waste, or non-Resource Conservation and Recovery Act (RCRA) regulated waste. Types of solid waste typically generated at construction sites may include:

## 1.2.20.1 Debris

Debris is non-hazardous solid material generated during the construction, demolition, or renovation of a structure that exceeds 2.5-inch particle size that is: a manufactured object; plant or animal matter; or natural geologic material (for example, cobbles and boulders), broken or removed concrete, masonry, and rock asphalt paving; ceramics; roofing paper and

shingles. Inert materials may not be reinforced with or contain ferrous wire, rods, accessories and weldments. A mixture of debris and other material such as soil or sludge is also subject to regulation as debris if the mixture is comprised primarily of debris by volume, based on visual inspection.

# 1.2.20.2 Green Waste

Green waste is the vegetative matter from landscaping, land clearing and grubbing, including, but not limited to, grass, bushes, scrubs, small trees and saplings, tree stumps and plant roots. Marketable trees, grasses and plants that are indicated to remain, be re-located, or be re-used are not included.

## 1.2.20.3 Material not regulated as solid waste

Material not regulated as solid waste is nuclear source or byproduct materials regulated under the Federal Atomic Energy Act of 1954 as amended; suspended or dissolved materials in domestic sewage effluent or irrigation return flows, or other regulated point source discharges; regulated air emissions; and fluids or wastes associated with natural gas or crude oil exploration or production.

## 1.2.20.4 Non-Hazardous Waste

Non-hazardous waste is waste that is excluded from, or does not meet, hazardous waste criteria in accordance with 40 CFR 263.

## 1.2.20.5 Recyclables

Recyclables are materials, equipment and assemblies such as doors, windows, door and window frames, plumbing fixtures, glazing and mirrors that are recovered and sold as recyclable, wiring, insulated/non-insulated copper wire cable, and structural components. It also includes commercial-grade refrigeration equipment with Freon removed, household appliances where the basic material content is metal, clean polyethylene terephthalate bottles, cooking oil, used fuel oil, textiles, high-grade paper products and corrugated cardboard, stackable pallets in good condition, clean crating material, and clean rubber/vehicle tires. Metal meeting the definition of lead contaminated or lead based paint contaminated may be included as recyclable if sold to a scrap metal company. Paint cans that meet the definition of empty containers in accordance with 40 CFR 261.7 may be included as recyclable if sold to a scrap metal company.

## 1.2.20.6 Surplus Soil

Surplus soil is existing soil that is in excess of what is required for this work, including aggregates intended, but not used, for on-site mixing of concrete, mortars, and paving. Contaminated soil meeting the definition of hazardous material or hazardous waste is not included and must be managed in accordance with paragraph HAZARDOUS MATERIAL MANAGEMENT.

## 1.2.20.7 Scrap Metal

This includes scrap and excess ferrous and non-ferrous metals such as reinforcing steel, structural shapes, pipe, and wire that are recovered or collected and disposed of as scrap. Scrap metal meeting the definition of hazardous material or hazardous waste is not included.

#### 1.2.20.8 Wood

Wood is dimension and non-dimension lumber, plywood, chipboard, hardboard. Treated or painted wood that meets the definition of lead contaminated or lead based contaminated paint is not included. Treated wood includes, but is not limited to, lumber, utility poles, crossties, and other wood products with chemical treatment.

## 1.2.21 Surface Discharge

Surface discharge means discharge of water into drainage ditches, storm sewers, creeks or "waters of the United States". Surface discharges are discrete, identifiable sources and require a permit from the governing agency. Comply with federal, state, and local laws and regulations.

## 1.2.22 Wastewater

Wastewater is the used water and solids from a community that flow to a treatment plant.

## 1.2.22.1 Stormwater

Stormwater is any precipitation in an urban or suburban area that does not evaporate or soak into the ground, but instead collects and flows into storm drains, rivers, and streams.

#### 1.2.23 Waters of the United States

Waters of the United States means Federally jurisdictional waters, including wetlands, that are subject to regulation under Section 404 of the Clean Water Act or navigable waters, as defined under the Rivers and Harbors Act.

#### 1.2.24 Wetlands

Wetlands are those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Official determination of whether or not an area is classified as a wetland must be done in accordance with the WETLANDS DELINEATION MANUAL and Wetland Supplement.

# 1.2.25 Universal Waste

The universal waste regulations streamline collection requirements for certain hazardous wastes in the following categories: batteries, pesticides, mercury-containing equipment (for example, thermostats), and lamps (for example, fluorescent bulbs). The rule is designed to reduce hazardous waste in the municipal solid waste (MSW) stream by making it easier for universal waste handlers to collect these items and send them for recycling or proper disposal. These regulations can be found at 40 CFR 273.

## 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When

used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submittals with an "S" are for inclusion in the Sustainability Notebook, in conformance with LRL Section 01 33 29.00 06 SUSTAINABILITY REPORTING. Submit the following in accordance with LRL Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Preconstruction Survey

Solid Waste Management Permit; G

Regulatory Notifications; G

Environmental Protection Plan; G

Dirt and Dust Control Plan; G

Employee Training Records; G

Environmental Manager Qualifications; G

Notice Of Soil Treatment; G

Stormwater Pollution Prevention Plan (Swppp); G

SD-06 Test Reports

Inspection Reports

Solid Waste Management Report; G

SD-07 Certificates

Employee Training Records; G

Certificate of Competency

Erosion and Sediment Control Inspector Qualifications

# SD-11 Closeout Submittals

Stormwater Pollution Prevention Plan Compliance Notebook; G

Stormwater Notice of Termination (for NPDES coverage under the general permit for construction activities); G

Waste Determination Documentation; G

Disposal Documentation for Hazardous and Regulated Waste; G

Assembled Employee Training Records; G

Solid Waste Management Permit; G

Solid Waste Management Report; G

Hazardous Waste/Debris Management; G

SECTION 01 57 19.00 06 Page 9 Certified Final Submittal

> Regulatory Notifications; G Sales Documentation; G Contractor Certification

As-Built Topographic Survey

# 1.4 ENVIRONMENTAL PROTECTION REQUIREMENTS

Provide and maintain, during the life of the contract, environmental protection as defined. Plan for and provide environmental protective measures to control pollution that develops during construction practice. Plan for and provide environmental protective measures required to correct conditions that develop during the construction of permanent or temporary environmental features associated with the project. Protect the environmental resources within the project boundaries and those affected outside the limits of permanent work during the entire duration of this Contract. Comply with federal, state, and local regulations pertaining to the environment, including water, air, solid waste, hazardous waste and substances, oily substances, and noise pollution.

Tests and procedures assessing whether construction operations comply with Applicable Environmental Laws may be required. Analytical work must be performed by qualified laboratories; and where required by law, the laboratories must be certified.

# 1.4.1 Conformance with the Environmental Management System

Perform work under this contract consistent with the policy and objectives identified in the installation's Environmental Management System (EMS). Perform work in a manner that conforms to objectives and targets of the environmental programs and operational controls identified by the EMS. Support Government personnel when environmental compliance and EMS audits are conducted by escorting auditors at the Project site, answering questions, and providing proof of records being maintained. Provide monitoring and measurement information as necessary to address environmental performance relative to environmental, energy, and transportation management goals. In the event an EMS nonconformance or environmental noncompliance associated with the contracted services, tasks, or actions occurs, take corrective and preventative actions. In addition, employees must be aware of their roles and responsibilities under the installation EMS and of how these EMS roles and responsibilities affect work performed under the contract.

Coordinate with the installation's EMS coordinator to identify training needs associated with environmental aspects and the EMS, and arrange training or take other action to meet these needs. Provide training documentation to the Contracting Officer. The Installation Environmental Office will retain associated environmental compliance records. Make EMS Awareness training completion certificates available to Government auditors during EMS audits and include the certificates in the Employee Training Records. See paragraph EMPLOYEE TRAINING RECORDS.

- 1.5 NOT USED
- 1.6 QUALITY ASSURANCE
- 1.6.1 Preconstruction Survey and Protection of Features

This paragraph supplements the Contract FAR 52.236-9 - Protection of Existing Vegetation, Structures, Equipment, Utilities and Improvements. Prior to start of any onsite construction activities, perform a Preconstruction Survey of the project site with the Contracting Officer, and take photographs showing existing environmental conditions in and adjacent to the site. Submit a report for the record. Include in the report a plan describing the features requiring protection under the provisions of the Contract Clauses, which are not specifically identified on the drawings as environmental features requiring protection along with the condition of trees, shrubs and grassed areas immediately adjacent to the site of work and adjacent to the Contractor's assigned storage area and access route(s), as applicable. The Contractor and the Contracting Officer will sign this survey report upon mutual agreement regarding its accuracy and completeness. Protect those environmental features included in the survey report and any indicated on the drawings, regardless of interference that their preservation may cause to the work under the Contract.

# 1.6.2 Regulatory Notifications

Provide regulatory notification requirements in accordance with federal, state and local regulations. In cases where the Government will also provide public notification (such as stormwater permitting), coordinate with the Contracting Officer. Submit copies of regulatory notifications to the Contracting Officer within 14 days prior to commencement of work activities. Typically, regulatory notifications must be provided for the following (this listing is not all-inclusive): demolition, renovation, NPDES defined site work, construction, removal or use of a permitted air emissions source, and remediation of controlled substances (asbestos, hazardous waste, lead paint).

#### 1.6.3 Environmental Brief

Attend an environmental brief to be included in the preconstruction meeting. Provide the following information: types, quantities, and use of hazardous materials that will be brought onto the installation; and types and quantities of wastes/wastewater that may be generated during the Contract. Discuss the results of the Preconstruction Survey at this time.

Prior to initiating any work on site, meet with the Contracting Officer and installation Environmental Office to discuss the proposed Environmental Protection Plan (EPP). Develop a mutual understanding relative to the details of environmental protection, including measures for protecting natural and cultural resources, required reports, required permits, permit requirements (such as mitigation measures), and other measures to be taken.

## 1.6.4 Environmental Manager

Appoint in writing an Environmental Manager for the project site. The Environmental Manager is directly responsible for coordinating contractor compliance with federal, state, local, and installation requirements. The Environmental Manager must ensure compliance with Hazardous Waste Program

requirements (including hazardous waste handling, storage, manifesting, and disposal); implement the EPP; ensure environmental permits are obtained, maintained, and closed out; ensure compliance with Stormwater Program requirements; ensure compliance with Hazardous Materials (storage, handling, and reporting) requirements; and coordinate any remediation of regulated substances (lead, asbestos, PCB transformers). This can be a collateral position; however, the person in this position must be trained to adequately accomplish the following duties: ensure waste segregation and storage compatibility requirements are met; inspect and manage Satellite Accumulation areas; ensure only authorized personnel add wastes to containers; ensure Contractor personnel are trained in 40 CFR requirements in accordance with their position requirements; coordinate removal of waste containers; and maintain the Environmental Records binder and required documentation, including environmental permits compliance and close-out. Submit Environmental Manager Qualifications to the Contracting Officer.

#### 1.6.5 Employee Training Records

Prepare and maintain Employee Training Records throughout the term of the contract meeting applicable 40 CFR requirements. Provide Employee Training Records in the Environmental Records Binder. Submit these Assembled Employee Training Records to the Contracting Officer at the conclusion of the project, unless otherwise directed.

Train personnel to meet EPA and state requirements. Conduct environmental protection/pollution control meetings for personnel prior to commencing construction activities. Contact additional meetings for new personnel and when site conditions change. Include in the training and meeting agenda: methods of detecting and avoiding pollution; familiarization with statutory and contractual pollution standards; installation and care of devices, vegetative covers, and instruments required for monitoring purposes to ensure adequate and continuous environmental protection/pollution control; anticipated hazardous or toxic chemicals or wastes, and other regulated contaminants; recognition and protection of archaeological sites, artifacts, waters of the United States, and endangered species and their habitat that are known to be in the area. Provide copy of the Erosion and Sediment Control Inspector Qualifications as defined by EPA and Certification as required by EGLE.

## 1.6.5.1 Pest Control Training

Trained personnel in pest control. Conduct a pest control meeting for personnel prior to commencing construction activities. Conduct additional meetings for new personnel and when site conditions change. Include in the training and meeting agenda: methods of detecting and pest infestation; familiarization with statutory and contractual pest control standards; installation and care of devices, and instruments, if required, for monitoring purposes to ensure adequate and continuous pest control; anticipated hazardous or toxic chemicals or wastes, and other regulated contaminants; recognition and protection of waters of the United States, and endangered species and their habitat that are known to be in the area. Provide a Certificate of Competency for the personnel who will be conducting the pesticide application and management of pest control.

## 1.6.6 Non-Compliance Notifications

The Contracting Officer will notify the Contractor in writing of any observed noncompliance with federal, state or local environmental laws or

regulations, permits, and other elements of the Contractor's EPP. After receipt of such notice, inform the Contracting Officer of the proposed corrective action and take such action when approved by the Contracting Officer. The Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions will be granted or equitable adjustments allowed for any such suspensions. This is in addition to any other actions the Contracting Officer may take under the contract, or in accordance with the Federal Acquisition Regulation or Federal Law.

#### 1.7 ENVIRONMENTAL PROTECTION PLAN

The purpose of the EPP is to present an overview of known or potential environmental issues that must be considered and addressed during construction. Incorporate construction related objectives and targets from the installation's EMS into the EPP. Include in the EPP measures for protecting natural and cultural resources, required reports, and other measures to be taken. Meet with the Contracting Officer or Contracting Officer Representative to discuss the EPP and develop a mutual understanding relative to the details for environmental protection including measures for protecting natural resources, required reports, and other measures to be taken. Submit the EPP within fifteen (15) days after notice to proceed and not less than ten (10) days before the preconstruction meeting. Revise the EPP throughout the project to include any reporting requirements, changes in site conditions, or contract modifications that change the project scope of work in a way that could have an environmental impact. No requirement in this section will relieve the Contractor of any applicable federal, state, and local environmental protection laws and regulations. During Construction, identify, implement, and submit for approval any additional requirements to be included in the EPP. Maintain the current version onsite.

The EPP includes, but is not limited to, the following elements:

1.7.1 General Overview and Purpose

# 1.7.1.1 Descriptions

A brief description of each specific plan required by environmental permit or elsewhere in this Contract such as stormwater pollution prevention plan, spill control plan, solid waste management plan, wastewater management plan, air pollution control plan, contaminant prevention plan, pesticide treatment plan, traffic control plan Non-Hazardous Solid Waste Disposal Plan.

# 1.7.1.2 Duties

The duties and level of authority assigned to the person(s) on the job site who oversee environmental compliance, such as who is responsible for adherence to the EPP, who is responsible for spill cleanup and training personnel on spill response procedures, who is responsible for manifesting hazardous waste to be removed from the site (if applicable), and who is responsible for training the Contractor's environmental protection personnel.

# 1.7.1.3 Procedures

A copy of any standard or project-specific operating procedures that will be used to effectively manage and protect the environment on the project

site.

# 1.7.1.4 Communications

Communication and training procedures that will be used to convey environmental management requirements to Contractor employees and subcontractors.

## 1.7.1.5 Contact Information

Emergency contact information contact information (office phone number, cell phone number, and e-mail address).

# 1.7.2 General Site Information

## 1.7.2.1 Drawings

Drawings showing locations of proposed temporary excavations or embankments for haul roads, stream crossings, jurisdictional wetlands, material storage areas, structures, sanitary facilities, storm drains and conveyances, and stockpiles of excess soil.

## 1.7.2.2 Work Area

Work area plan showing the proposed activity in each portion of the area and identify the areas of limited use or nonuse. Include measures for marking the limits of use areas, including methods for protection of features to be preserved within authorized work areas and methods to control runoff and to contain materials on site, and a traffic control plan.Concrete trucks are prohibited from being washed on station, without approval from Base Environmental Office. Submit proposed Wash Procedure within the HMW and Stormwater Plan for Government review and approval.

# 1.7.2.3 Documentation

A letter signed by an officer of the firm appointing the Environmental Manager and stating that person is responsible for managing and implementing the Environmental Program as described in this contract. Include in this letter the Environmental Manager's authority to direct the removal and replacement of non-conforming work. Per LRL Section 01 45 04.10 06, Contractor Quality Control and more specifically paragraph Construction Quality Control Organization, the Environmental Manager shall be included as part of the CQC organization.

#### 1.7.3 Management of Natural Resources

- a. Land resources
- b. Tree protection
- c. Replacement of damaged landscape features
- d. Temporary construction
- e. Stream crossings
- f. Fish and wildlife resources
- g. Wetland areas

- 1.7.4 Protection of Historical and Archaeological Resources
  - a. Objectives
  - b. Methods
- 1.7.5 Stormwater Management and Control
  - a. Ground cover
  - b. Erodible soils
  - c. Temporary measures
    - (1) Structural Practices
    - (2) Temporary and permanent stabilization
  - d. Effective selection, implementation and maintenance of Best Management Practices (BMPs).

1.7.6 Protection of the Environment from Waste Derived from Contractor Operations

Control and disposal of solid and sanitary waste. Control and disposal of hazardous waste.

If the project is located on a military installation, management procedures for hazardous waste to be generated shall be followed. The elements of those procedures will coincide with the Installation Hazardous Waste Management Plan. The Contracting Officer will provide a copy of the Installation Hazardous Waste Management Plan. For all projects, as a minimum, include the following:

- a. List of the types of hazardous wastes expected to be generated
- b. Procedures to ensure a written waste determination is made for appropriate wastes that are to be generated
- c. Sampling/analysis plan, including laboratory method(s) that will be used for waste determinations and copies of relevant laboratory certifications
- d. Methods and proposed locations for hazardous waste accumulation/storage (that is, in tanks or containers)
- e. Management procedures for storage, labeling, transportation, and disposal of waste (treatment of waste is not allowed unless specifically noted)
- f. Management procedures and regulatory documentation ensuring disposal of hazardous waste complies with Land Disposal Restrictions (40 CFR 268 )
- g. Management procedures for recyclable hazardous materials such as lead-acid batteries, used oil, and similar
- h. Used oil management procedures in accordance with 40 CFR 279;

Hazardous waste minimization procedures

- i. Plans for the disposal of hazardous waste by permitted facilities; and Procedures to be employed to ensure required employee training records are maintained.
- 1.7.7 Prevention of Releases to the Environment

Procedures to prevent releases to the environment

Notifications in the event of a release to the environment

1.7.8 Regulatory Notification and Permits

List what notifications and permit applications must be made. Some permits require up to 180 days to obtain. Demonstrate that those permits have been obtained or applied for by including copies of applicable environmental permits. The EPP will not be approved until the permits have been obtained.

1.7.9 Clean Air Act Compliance

#### 1.7.9.1 Haul Route

Submit truck and material haul routes along with a Dirt and Dust Control Plan for controlling dirt, debris, and dust on Installation roadways. As a minimum, identify in the plan the subcontractor and equipment for cleaning along the haul route and measures to reduce dirt, dust, and debris from roadways.

# 1.7.9.2 Pollution Generating Equipment

Identify air pollution generating equipment or processes that may require federal, state, or local permits under the Clean Air Act. Determine requirements based on any current installation permits and the impacts of the project. Provide a list of all fixed or mobile equipment, machinery or operations that could generate air emissions during the project to the Installation Environmental Office (Air Program Manager).

#### 1.7.9.3 Stationary Internal Combustion Engines

Identify portable and stationary internal combustion engines that will be supplied, used or serviced. Comply with 40 CFR 60 Subpart IIII, 40 CFR 60 Subpart JJJJ, 40 CFR 63 Subpart ZZZZ, and local regulations as applicable. At minimum, include the make, model, serial number, manufacture date, size (engine brake horsepower), and EPA emission certification status of each engine. Maintain applicable records and log hours of operation and fuel use. Logs must include reasons for operation and delineate between emergency and non-emergency operation.

# 1.7.9.4 Refrigerants

Identify management practices to ensure that heating, ventilation, and air conditioning (HVAC) work involving refrigerants complies with 40 CFR 82 requirements. Technicians must be certified, maintain copies of certification on site, use certified equipment and log work that requires the addition or removal of refrigerant. Any refrigerant reclaimed is the property of the Government, coordinate with the Installation Environmental Office to determine the appropriate turn in location.

## 1.7.9.5 Air Pollution-engineering Processes

Identify planned air pollution-generating processes and management control measures (including, but not limited to, spray painting, abrasive blasting, demolition, material handling, fugitive dust, and fugitive emissions). Log hours of operations and track quantities of materials used.

# 1.7.9.6 NOT USED

### 1.7.9.7 Compliant Materials

Provide the Government a list of and SDSs for all hazardous materials proposed for use on site. Materials must be compliant with all Clean Air Act regulations for emissions including solvent and volatile organic compound contents, and applicable National Emission Standards for Hazardous Air Pollutants requirements. The Government may alter or limit use of specific materials as needed to meet installation permit requirements for emissions.

#### 1.8 LICENSES AND PERMITS

Obtain licenses and permits required for the construction of the project and in accordance with FAR 52.236-7 - Permits and Responsibilities. Notify the Government of all general use permitted equipment the Contractor plans to use on site. This paragraph supplements the Contractor's responsibility under FAR 52.236-7 - Permits and Responsibilities. Part 4 of this Section provides a list of typical preconstruction permits. The following paragraphs indicate which of those permits have been obtained by the Government or are in the process of being obtained by the Government.

#### 1.9 ENVIRONMENTAL RECORDS BINDER

Maintain on-site a separate three-ring Environmental Records Binder and submit at the completion of the project. Make separate parts within the binder that correspond to each submittal listed under paragraph CLOSEOUT SUBMITTALS in this section.

## 1.10 PESTICIDE DELIVERY, STORAGE, AND HANDLING

## 1.10.1 Delivery and Storage

Deliver pesticides to the site in the original, unopened containers bearing legible labels indicating the EPA registration number and the manufacturer's registered uses. Store pesticides according to manufacturer's instructions and under lock and key when unattended. All hazardous materials are tracked through the HAZMART and all containers must be processed through the HAZMART upon entering or leaving the installation. ALL Materials must be approved prior to being used at the facility. Contractors must provide accurate SDS for all materials. Primary containers must be labeled with a barcode by the HAZMART office, B203. ALL secondary containers shall be labeled identifying the material. When drums of unknown content are found, always contact the HAZMART at 586-282-5665. Contractors are responsible for ensuring that hazardous material is stored, labeled and dispensed and otherwise used in a safe manner.

## 1.10.2 Handling Requirements

Formulate, treat with, and dispose of pesticides and associated containers in accordance with label directions and use the clothing and personal protective equipment specified on the labeling for use during each phases of the application. Furnish SDSs for pesticide products.

# 1.11 SOLID WASTE MANAGEMENT PERMIT

Provide the Contracting Officer with written notification of the quantity of anticipated solid waste or debris that is anticipated or estimated to be generated by construction. Include in the report the locations where various types of waste will be disposed or recycled. Include letters of acceptance from the receiving location or as applicable; submit one copy of the receiving location state and local Solid Waste Management Permit or license showing such agency's approval of the disposal plan before transporting wastes off Government property.

#### 1.11.1 Solid Waste Management Report

Monthly, submit a solid waste disposal report to the Contracting Officer. For each waste, the report will state the classification (using the definitions provided in this section), amount, location, and name of the business receiving the solid waste.

#### 1.12 BORROW SOILS

It is the responsibility of the Contractor to have any off site fill material certified that the fill material is suitable and meets environmental fill requirements, if applicable. The fill material shall be deemed suitable via sampling by an environmental engineering firm acceptable to the Contracting Officer's Representative (COR). This confirmation shall include obtaining and testing representative samples from the proposed borrow source. The engineering firm will submit certification of environmentally suitable material signed by a licensed professional engineer. This certification along with all proposed borrow sources, borrow materials, sampling and analysis plans and reports shall be deemed acceptable to the COR prior to transportation of borrow material to the site.

#### 1.13 MANAGEMENT OF BORROW MATERIAL AND EXCESS SOIL

1. Under this contract, the intent is that all excavated soils are to be reused on-site to the greatest extent practicable and economically justified and the use of borrow from off-site sources shall be avoided to the greatest extent practicable and economically justified. (If available, the Government will identify on the contract drawings disposal areas and/or borrow areas outside the construction work limits on the Government installation where excess soils may be taken. Any compaction or grading requirements will be noted on the drawings or in the specifications.)

2. Excess soils shall become the property of the contractor and shall be properly disposed off-site in Government approved Class II landfills or a Government approved alternate destination. The Government will not approve the following sites: Residential and Agricultural sites, Schools, Playgrounds, or other Childcare sites, Sites with drinking water or irrigation wells. The Government will approve non-residential sites not listed above with naturally occurring arsenic levels equal to or greater

than DTA soils. In addition, written permission from the landowner is required. The written statement must include the site is not a wetland and is not the site of any known historical or archeological resources.

If reuse of all excavated soils is not practical or economical and 3. disposal on the Government installation is not available, the Contractor may place excess excavated soil material on a receiving property that has been approved by the Government. The action of placing excess soil on the receiving property shall have had the appropriate level of National Environmental Policy Act (NEPA) compliance activity performed and deemed acceptable. If the NEPA assessment has not evaluated placement of spoils off-site, then compliance with NEPA will need to be demonstrated through the preparation of a Record of Environmental Consideration (REC) or a Supplemental Environmental Assessment (EA). NEPA documents shall be prepared using an inter-disciplinary approach which will ensure the integrated use of the natural and social sciences and the environmental design arts (section 102(2)(A) of the Act). The disciplines of the preparers shall be appropriate to the scope and issues identified in the scoping process.

A written certification signed by the contractor shall be furnished to the Government indicating the soil was placed on the approved receiving site prior to payment for this effort. The certification shall identify dates and quantities of soils placed.

4. If borrow material is required and borrow is not available from the project site or the Government installation, the Contractor shall obtain borrow material from an off-site borrow source that has been approved by the Government. The action of acquiring borrow and transporting that material to the project shall have had the appropriate level of National Environmental Policy Act (NEPA) compliance activity performed and deemed acceptable. If the NEPA assessment has not evaluated the acquisition of borrow, then compliance with NEPA will need to be demonstrated through the preparation of a Record of Environmental Consideration (REC) or a Supplemental Environmental Assessment (EA). NEPA documents shall be prepared using an inter-disciplinary approach which will ensure the integrated use of the natural and social sciences and the environmental design arts (section 102(2)(A) of the Act). The disciplines of the preparers shall be appropriate to the scope and issues identified in the scoping process.

The Supplemental EA shall meet the requirements of ASTM E1527-13 and was performed no earlier than two months prior to award of the contract and by a qualified environmental professional as defined by X2.1 of ASTM E1527-13. The findings of the Supplemental EA shall state that no indications of contamination were found on or adjacent to the property and that no additional investigation is warranted. A copy of the ESA report shall be furnished by the Contractor to the Government.

# 1.14 FACILITY HAZARDOUS WASTE GENERATOR STATUS

Detroit Arsenal is designated as a Large Quantity Generator. Meet the regulatory requirements of this generator designation for any work conducted within the boundaries of this Installation. Comply with provisions of federal, state, and local regulatory requirements applicable to this generator status regarding training and storage, handling, and disposal of construction derived wastes. All RCRA designated hazardous waste generated onsite must be disposed of through the HAZMART office, B203.

#### 1.15 SUBCONTRACTORS

Ensure compliance with this section by subcontractors.

#### 1.16 PAYMENT

No separate payment will be made for work covered under this section. Payment of fees associated with environmental permits, application, and/or notices obtained by the Contractor, and payment of all fines/fees for violation or non-compliance with Federal, State, Regional and local laws and regulations are the Contractor's responsibility. All costs associated with this section must be included in the contract price.

## PART 2 PRODUCTS

Not Used

#### PART 3 EXECUTION

#### 3.1 PROTECTION OF NATURAL RESOURCES

Minimize interference with, disturbance to, and damage to fish, wildlife, and plants, including their habitats. Prior to the commencement of activities, consult with the Installation Environmental Office, regarding rare species or sensitive habitats that need to be protected. The protection of rare, threatened, and endangered animal and plant species identified, including their habitats, is the Contractor's responsibility.

Preserve the natural resources within the project boundaries and outside the limits of permanent work. Restore to an equivalent or improved condition upon completion of work that is consistent with the requirements of the Installation Environmental Office or as otherwise specified. Confine construction activities to within the limits of the work indicated or specified.

## 3.1.1 Flow Ways

Do not alter water flows or otherwise significantly disturb the native habitat adjacent to the project and critical to the survival of fish and wildlife, except as specified and permitted.

## 3.1.2 Vegetation

Except in areas to be cleared, do not remove, cut, deface, injure, or destroy trees or shrubs without the Contracting Officer's permission. Do not fasten or attach ropes, cables, or guys to existing nearby trees for anchorages unless authorized by the Contracting Officer. Where such use of attached ropes, cables, or guys is authorized, the Contractor is responsible for any resultant damage.

Protect existing trees that are to remain to ensure they are not injured, bruised, defaced, or otherwise damaged by construction operations. Remove displaced rocks from uncleared areas. Coordinate with the Contracting Officer and Installation Environmental Office to determine appropriate action for trees and other landscape features scarred or damaged by equipment operations.

# 3.1.3 Streams

Stream crossings must allow movement of materials or equipment without violating water pollution control standards of the federal, state, and local governments. Construction of stream crossing structures must be in compliance with any required permits including, but not limited to, Clean Water Act Section 404, and Section 401 Water Quality.

The Contracting Officer's approval and appropriate permits are required before any equipment will be permitted to ford live streams. In areas where frequent crossings are required, install temporary culverts or bridges. Obtain Contracting Officer's approval prior to installation. Remove temporary culverts or bridges upon completion of work, and repair the area to its original condition unless otherwise required by the Contracting Officer.

## 3.2 STORMWATER

A soil erosion and sedimentation control (SESC) permit has been obtain from the Soil and Erosion Control Division of the Macomb County Public Works Office and will be provided to the contractor. Do not discharge stormwater from construction sites to the sanitary sewer. If the water is noted or suspected of being contaminated, it may only be released to the storm drain system if the discharge is specifically permitted. Obtain authorization in advance from the Installation Environmental Office for any release of contaminated water.

# 3.2.1 Stormwater Pollution Prevention Plan (SWPPP)

In accordance with the National Pollutant Discharge Elimination System (NPDES) Permit, a Storm Water Pollution Prevention Plan (PPP) is required for this project. This plan shall be developed as part of the design process and updated by the construction contractor as a pre-construction activity and must meet the erosion and sediment control requirements for the State of Michigan. The Plan must identify the controls that will be used and include design, inspection, and maintenance information. A site plan with the existing and proposed grading shall be included, showing the controls being utilized. The permanent stabilization practices (permanent seeding, mulching, sodding, plants, erosion control blanket, riprap, etc.) shall be shown on the final grading plan, with temporary controls (temporary gravel construction entrance/exit, silt fences, straw bales, temporary diversions, sediment basins or traps, etc.) shown on the existing grading plan. Use of straw bales alone is not considered an effective method of sediment control. Prior to the start of construction, the Contractor shall submit the SWPPP to the Contracting Officer for review and acceptance. The SWPPP must address compliance with all State laws regarding historic preservation and endangered species with State Letters attached. Along with the SWPPP submittal, the Contractor shall inform the Soil and Erosion Control Division of the Macomb County Public Works Office of their intent to perform the construction activities. A copy of both the SWPPP and SESC Permit must be kept at the construction site. Any changes made to the plan must be documented and approved by the Contracting Officer. Note, the SWPPP is a part of the total Pollution Prevention Plan that the Contractor is responsible for preparing.

Contractor shall submit to the State and/or applicable agencies a Notice of Termination (NOT) when the construction activities for the project have been completed, and when the contractor no longer has any storm water discharges associated with the construction activity, or when the

contractor is no longer the operator of the facilities. Elimination of all storm water discharges associated with the construction activities occurs when disturbed soils at the construction site have been finally stabilized and temporary erosion and sediment control measures have been removed. Final stabilization means that all soil-disturbing activities at the site have been completed, and that, where applicable, a uniform perennial vegetative cover with a density of 70% of the cover for unpaved areas and areas not covered by permanent structures has been established, or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed. The 70% density of cover for unpaved areas shall be considered the minimum acceptable cover for the completed project area. Other States and/or applicable agencies may have a more restrictive percentage of cover required and if so, the Contractor shall be required to adhere to those requirements for release or acceptance of the permit(s) in those project locations. The NOT submittal and any subsequent approval or correspondences received from the State or applicable agencies shall be submitted by the Contractor to the Contracting Officer's Representative.

#### 3.2.2 Construction General Permit Requirements

## 3.2.2.1 General

Under the terms and conditions of the permit, install, inspect, maintain BMPs, prepare stormwater erosion and sediment control inspection reports, and submit SWPPP inspection reports. Maintain construction operations and management in compliance with the terms and conditions of the general permit for stormwater discharges from construction activities.

### 3.2.2.2 Inspection Reports

Submit "Inspection Reports" to the Contracting Officer in accordance with EPA and the State of MichiganConstruction General Permit.

## 3.2.2.3 Stormwater Pollution Prevention Plan Compliance Notebook

Create and maintain a three ring binder of documents that demonstrate compliance with the Construction General Permit. Include a copy of the permit Notice of Intent, proof of permit fee payment, SWPPP and SWPPP update amendments, inspection reports and related corrective action records, copies of correspondence with the EPA and the Michigan State Permitting Agency, and a copy of the permit Notice of Termination in the binder. At project completion, the notebook becomes property of the Government. Provide the compliance notebook to the Contracting Officer.

# 3.2.2.4 Stormwater Notice of Termination for Construction Activities

Submit a Notice of Termination to the Contracting Officer for approval once construction is complete and final stabilization has been achieved on all portions of the site for which the permittee is responsible. Once approved, submit the Notice of Termination to the appropriate state or federal agency. Prepare as-built topographic survey information required by the permitting agency for certification of the stormwater management system, and provide to the Contracting Officer.

# 3.2.3 Erosion and Sediment Control Measures

Provide erosion and sediment control measures in accordance with state and local laws and regulations. Preserve vegetation to the maximum extent
practicable.

Erosion control inspection reports may be compiled as part of a stormwater pollution prevention plan inspection reports.

# 3.2.3.1 Erosion Control

Prevent erosion by mulching, Compost Blankets, Geotextiles and/or temporary slope drains. Stabilize slopes by chemical stabilization, seeding, erosion control blankets or such combination of these methods necessary for effective erosion control. Use of hay bales is prohibited.

Provide seeding in accordance with UFGS Section 32 92 19 SEEDING.

#### 3.2.3.2 Sediment Control Practices

Implement sediment control practices to divert flows from exposed soils, temporarily store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Implement sediment control practices prior to soil disturbance and prior to creating areas with concentrated flow, during the construction process to minimize erosion and sediment laden runoff. Include the following devices: silt fence, temporary diversion dikes and/or storm drain inlet protection.

### 3.2.4 Work Area Limits

Mark the areas that need not be disturbed under this Contract prior to commencing construction activities. Mark or fence isolated areas within the general work area that are not to be disturbed. Protect monuments and markers before construction operations commence. Where construction operations are to be conducted during darkness, any markers must be visible in the dark. Personnel must be knowledgeable of the purpose for marking and protecting particular objects.

## 3.2.5 Contractor Facilities and Work Areas

Place field offices, staging areas, stockpile storage, and temporary buildings in areas designated on the drawings or as directed by the Contracting Officer. Move or relocate the Contractor facilities only when approved by the Government. Provide erosion and sediment controls for onsite borrow and spoil areas to prevent sediment from entering nearby waters. Control temporary excavation and embankments for plant or work areas to protect adjacent areas.

#### 3.2.6 Municipal Separate Storm Sewer System (MS4) Management

Comply with the Installation's MS4 permit requirements.

### 3.3 SURFACE AND GROUNDWATER

## 3.3.1 Cofferdams, Diversions, and Dewatering

Construction operations for dewatering, removal of cofferdams, tailrace excavation, and tunnel closure must be constantly controlled to maintain compliance with existing state water quality standards and designated uses of the surface water body. Comply with the State of Michigan water quality standards and anti-degradation provisions and the Clean Water Act Section 404. Do not discharge excavation ground water to the sanitary sewer, storm drains, or to surface waters without prior specific

authorization in writing from the Installation Environmental Office. Discharge of hazardous substances will not be permitted under any circumstances. Use sediment control BMPs to prevent construction site runoff from directly entering any storm drain or surface waters.

If the construction dewatering is noted or suspected of being contaminated, it may only be released to the storm drain system if the discharge is specifically permitted. Obtain authorization for any contaminated groundwater release in advance from the Installation Environmental Officer and the federal or state authority, as applicable. Discharge of hazardous substances will not be permitted under any circumstances.

3.3.2 Waters of the United States

Do not enter, disturb, destroy, or allow discharge of contaminants into waters of the United States.

- 3.4 NOT USED
- 3.4.1 NOT USED

Existing historical resources within the work area are shown on the drawings. Protect these resources and be responsible for their preservation during the life of the Contract.

3.5 AIR RESOURCES

Equipment operation, activities, or processes will be in accordance with 40 CFR 64 and state air emission and performance laws and standards.

3.5.1 Preconstruction Air Permits

Notify the Air Program Manager, through the Contracting Officer, at least 6 months prior to bringing equipment, assembled or unassembled, onto the Installation, so that air permits can be secured. Necessary permitting time must be considered in regard to construction activities. Clean Air Act (CAA) permits must be obtained prior to bringing equipment, assembled or unassembled, onto the Installation.

Provide DTA-DPW Air manager monthly construction equipment use report.

3.5.2 Oil or Dual-fuel Boilers and Furnaces

Provide product data and details for new, replacement, or relocated fuel fired boilers, heaters, or furnaces to the Installation Environmental Office (Air Program Manager) through the Contracting Officer. Data to be reported include: equipment purpose (water heater, building heat, process), manufacturer, model number, serial number, fuel type (oil type, gas type) size (MMBTU heat input). Provide in accordance with paragraph PRECONSTRUCTION AIR PERMITS.

3.5.3 Burning

Burning is prohibited on the Government premises.

3.5.4 Class I ODS Prohibition

Class I ODS are Government property and must be returned to the Government

for appropriate management. Coordinate with the Installation Environmental Office to determine the appropriate location for turn in of all reclaimed refrigerant.

#### 3.5.5 Accidental Venting of Refrigerant

Accidental venting of a refrigerant is a release and must be reported immediately to the Contracting Officer.

# 3.5.6 EPA Certification Requirements

Heating and air conditioning technicians must be certified through an EPA-approved program. Maintain copies of certifications at the employees' places of business; technicians must carry certification wallet cards, as provided by environmental law.

### 3.5.7 Dust Control

Keep dust down at all times, including during nonworking periods. Sprinkle or treat, with dust suppressants, the soil at the site, haul roads, and other areas disturbed by operations. Dry power brooming will not be permitted. Instead, use vacuuming, wet mopping, wet sweeping, or wet power brooming. Air blowing will be permitted only for cleaning nonparticulate debris such as steel reinforcing bars. Only wet cutting will be permitted for cutting concrete blocks, concrete, and bituminous concrete. Do not unnecessarily shake bags of cement, concrete mortar, or plaster.

#### 3.5.7.1 Particulates

Dust particles, aerosols and gaseous by-products from construction activities, and processing and preparation of materials (such as from asphaltic batch plants) must be controlled at all times, including weekends, holidays, and hours when work is not in progress. Maintain excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and other work areas within or outside the project boundaries free from particulates that would exceed 40 CFR 50, state, and local air pollution standards or that would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, baghouse, scrubbers, electrostatic precipitators, or other methods will be permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated to keep the disturbed area damp. Provide sufficient, competent equipment available to accomplish these tasks. Perform particulate control as the work proceeds and whenever a particulate nuisance or hazard occurs. Comply with state and local visibility regulations.

### 3.5.7.2 Abrasive Blasting

Blasting operations cannot be performed without prior approval of the Installation Air Program Manager. The use of silica sand is prohibited in sandblasting.

Provide tarpaulin drop cloths and windscreens to enclose abrasive blasting operations to confine and collect dust, abrasive agent, paint chips, and other debris.

# 3.5.8 Odors

Control odors from construction activities. The odors must be in compliance with state regulations and local ordinances and may not constitute a health hazard.

# 3.6 WASTE MINIMIZATION

Minimize the use of hazardous materials and the generation of waste. Include procedures for pollution prevention/ hazardous waste minimization in the Hazardous Waste Management Section of the EPP. Obtain a copy of the installation's Pollution Prevention/Hazardous Waste Minimization Plan for reference material when preparing this part of the EPP. If no written plan exists, obtain information by contacting the Contracting Officer. Describe the anticipated types of the hazardous materials to be used in the construction when requesting information.

# 3.6.1 Salvage, Reuse and Recycle

Identify anticipated materials and waste for salvage, reuse, and recycling. Describe actions to promote material reuse, resale or recycling. To the extent practicable, all scrap metal must be sent for reuse or recycling and will not be disposed of in a landfill.

Include the name, physical address, and telephone number of the hauler, if transported by a franchised solid waste hauler. Include the destination and, unless exempted, provide a copy of the state or local permit (cover) or license for recycling.

# 3.6.2 Nonhazardous Solid Waste Diversion Report

Maintain an inventory of nonhazardous solid waste diversion and disposal of construction and demolition debris. Submit a report to the Contracting Officer on the first working day after each fiscal year quarter, starting the first quarter that nonhazardous solid waste has been generated. Include the following in the report:

Construction and Demolition (C&D) Debris Disposed	cubic yards or tons as appropriate
C&D Debris Recycled	cubic yards or tons as appropriate
Total C&D Debris Generated	cubic yards or tons as appropriate
Waste Sent to Waste-To-Energy Incineration Plant (This amount should not be included in the recycled amount)	cubic yards or tons as appropriate

# 3.7 WASTE MANAGEMENT AND DISPOSAL

# 3.7.1 Waste Determination Documentation

Complete a Waste Determination form (provided at the pre-construction conference) for Contractor-derived wastes to be generated. All potentially hazardous solid waste streams that are not subject to a specific exclusion or exemption from the hazardous waste regulations (e.g. scrap metal, domestic sewage) or subject to special rules, (lead-acid batteries and precious metals) must be characterized in accordance with the requirements of 40 CFR 261 or corresponding applicable state or local regulations. Base waste determination on user knowledge of the processes and materials used, and analytical data when necessary. Consult with the Installation environmental staff for guidance on specific requirements. Attach support documentation to the Waste Determination form. As a minimum, provide a Waste Determination form for the following waste (this listing is not inclusive): oil- and latex -based painting and caulking products, solvents, adhesives, aerosols, petroleum products, and containers of the original materials.

3.7.2 Solid Waste Management

## 3.7.2.1 Solid Waste Management Report

Provide copies of the waste handling facilities' weight tickets, receipts, bills of sale, and other sales documentation. In lieu of sales documentation, a statement indicating the disposal location for the solid waste that is signed by an employee authorized to legally obligate or bind the firm may be submitted. The sales documentation Contractor certification must include the receiver's tax identification number and business, EPA or state registration number, along with the receiver's delivery and business addresses and telephone numbers. For each solid waste retained for the Contractor's own use, submit the information previously described in this paragraph on the solid waste disposal report. Prices paid or received do not have to be reported to the Contracting Officer unless required by other provisions or specifications of this Contract or public law.

# 3.7.2.2 Control and Management of Solid Wastes

Pick up solid wastes, and place in covered containers that are regularly emptied. Do not prepare or cook food on the project site. Prevent contamination of the site or other areas when handling and disposing of wastes. At project completion, leave the areas clean. Employ segregation measures so that no hazardous or toxic waste will become co-mingled with non-hazardous solid waste. Transport solid waste off Government property and dispose of it in compliance with 40 CFR 260, state, and local requirements for solid waste disposal. A Subtitle D RCRA permitted landfill is the minimum acceptable offsite solid waste disposal option. Verify that the selected transporters and disposal facilities have the necessary permits and licenses to operate. Comply with site procedures. Segregate and separate treated wood components disposed at a lined landfill approved to accept this waste in accordance with local and state regulations. Solid waste disposal offsite must comply with most stringent local, state, and federal requirements, including 40 CFR 241, 40 CFR 243, and 40 CFR 258.

Manage hazardous material used in construction, including but not limited to, aerosol cans, waste paint, cleaning solvents, contaminated brushes,

and used rags, in accordance with 49 CFR 173.

3.7.3 Chemicals and Chemical Wastes

Dispense chemicals ensuring no spillage to the ground or water. Perform and document periodic inspections of dispensing areas to identify leakage and initiate corrective action. This documentation will be periodically reviewed by the Government. Collect chemical waste in corrosion resistant, compatible containers. Collection drums must be monitored and removed to a staging or storage area when contents are within 150 mm( 6 inches) of the top. Wastes will be classified, managed, stored, and disposed of in accordance with Federal, State, and local laws and regulations.

3.7.4 Control and Management of Hazardous Waste

Do not dispose of hazardous waste on Government property. Do not discharge any waste to a sanitary sewer, storm drain, or to surface waters or conduct waste treatment or disposal on Government property without written approval of the Contracting Officer.

3.7.4.1 Hazardous Waste/Debris Management

Identify construction activities that will generate hazardous waste or debris. Provide a documented waste determination for resultant waste streams. Identify, label, handle, store, and dispose of hazardous waste or debris in accordance with federal, state, and local regulations, including 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, 40 CFR 266, and 40 CFR 268.

Manage hazardous waste in accordance with the approved Hazardous Waste Management Section of the EPP. Store hazardous wastes in approved containers in accordance with 49 CFR 173 and 49 CFR 178. Hazardous waste generated within the confines of Government facilities is identified as being generated by the Government. Prior to removal of any hazardous waste from Government property, hazardous waste manifests must be signed by personnel from the Installation Environmental Office. Do not bring hazardous waste onto Government property. Provide the Contracting Officer with a copy of waste determination documentation for any solid waste streams that have any potential to be hazardous waste or contain any chemical constituents listed in 40 CFR 372-SUBPART D.

3.7.4.2 Waste Storage/Satellite Accumulation/90 Day Storage Areas

Accumulate hazardous waste at satellite accumulation points and in compliance with 40 CFR 262.34 and applicable state or local regulations. Individual waste streams will be limited to 55 gallons of accumulation (or 1 quart for acutely hazardous wastes). If the Contractor expects to generate hazardous waste at a rate and quantity that makes satellite accumulation impractical, the Contractor may request a temporary 90 day accumulation point be established. Submit a request in writing to the Contracting Officer and provide the following information (Attach Site Plan to the Request):

Contract Number	
Contractor	
Haz/Waste or Regulated Waste POC	

Contract Number	
Phone Number	
Type of Waste	
Source of Waste	
Emergency POC	
Phone Number	
Location of the Site	

Attach a Waste Determination form for the expected waste streams. Allow ten (10) working days for processing this request. Additional compliance requirements (e.g. training and contingency planning) that may be required are the responsibility of the Contractor. Barricade the designated area where waste is being stored and post a sign identifying as follows:

"DANGER - UNAUTHORIZED PERSONNEL KEEP OUT"

#### 3.7.4.3 Hazardous Waste Disposal

3.7.4.3.1 Responsibilities for Contractor's Disposal

Provide hazardous waste manifest to the Installations Environmental Office for review, approval, and signature prior to shipping waste off Government property. All RCRA designated hazardous waste generated on site must be disposed of through the HAZMART office, B203.

#### 3.7.4.3.1.1 Services

Provide service necessary for the final treatment or disposal of the hazardous material or waste in accordance with 40 CFR 260, local, and state, laws and regulations, and the terms and conditions of the Contract within sixty (60) days after the materials have been generated. These services include necessary personnel, labor, transportation, packaging, detailed analysis (if required for disposal or transportation, include manifesting or complete waste profile sheets, equipment, and compile documentation).

#### 3.7.4.3.1.2 Samples

Obtain a representative sample of the material generated for each job done to provide waste stream determination.

# 3.7.4.3.1.3 Analysis

Analyze each sample taken and provide analytical results to the Contracting Officer. See paragraph WASTE DETERMINATION DOCUMENTATION.

#### 3.7.4.3.1.4 Labeling

Determine the Department of Transportation's (DOT's) proper shipping names for waste (each container requiring disposal) and demonstrate to the Contracting Officer how this determination is developed and supported by the sampling and analysis requirements contained herein. Label all containers of hazardous waste with the words "Hazardous Waste" or other words to describe the contents of the container in accordance with 40 CFR 262.31 and applicable state or local regulations.

3.7.4.3.2 Contractor Disposal Turn-In Requirements

Hazardous waste generated must be disposed of in accordance with the following conditions to meet installation requirements:

a. Drums must be compatible with waste contents and drums must meet DOT requirements for 49 CFR 173 for transportation of materials.

b. Band drums to wooden pallets.

c. No more than three 55 gallon drums or two 85 gallon over packs are to be banded to a pallet.

- d. Band using 1-1/4 inch minimum band on upper third of drum.
- e. Provide label in accordance with 49 CFR 172.101.
- f. Leave 3 to 5 inches of empty space above volume of material.

3.7.4.4 Universal Waste Management

Manage the following categories of universal waste in accordance with federal, state, and local requirements and installation instructions:

- a. Batteries as described in 40 CFR 273.2
- b. Lamps as described in 40 CFR 273.5
- c. Mercury-containing equipment as described in 40 CFR 273.4
- d. Pesticides as described in 40 CFR 273.3

Mercury is prohibited in the construction of this facility, unless specified otherwise, and with the exception of mercury vapor lamps and fluorescent lamps. Dumping of mercury-containing materials and devices such as mercury vapor lamps, fluorescent lamps, and mercury switches, in rubbish containers is prohibited. Remove without breaking, pack to prevent breakage, and transport out of the activity in an unbroken condition for disposal as directed.

3.7.4.5 Electronics End-of-Life Management

Recycle or dispose of electronics waste, including, but not limited to, used electronic devices such computers, monitors, hard-copy devices, televisions, mobile devices, in accordance with 40 CFR 260-262, state, and local requirements, and installation instructions.

3.7.4.6 Disposal Documentation for Hazardous and Regulated Waste

Contact the Contracting Officer for the facility RCRA identification number that is to be used on each manifest.

3.7.5 Releases/Spills of Oil and Hazardous Substances

3.7.5.1 Response and Notifications

Exercise due diligence to prevent, contain, and respond to spills of hazardous material, hazardous substances, hazardous waste, sewage, regulated gas, petroleum, lubrication oil, and other substances regulated

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in accordance with 40 CFR 300. Maintain spill cleanup equipment and materials at the work site. In the event of a spill, take prompt, effective action to stop, contain, curtail, or otherwise limit the amount, duration, and severity of the spill/release. In the event of any releases of oil and hazardous substances, chemicals, or gases; immediately (within 15 minutes) notify the Installation Fire Department, the Installation Command Duty Officer, the Installation Environmental Office, the Contracting Officer. Provide DTA DPW Air manager monthly construction equipment use report.

Submit verbal and written notifications as required by the federal ( 40 CFR 300.125 and 40 CFR 355), state, local regulations and instructions. Provide copies of the written notification and documentation that a verbal notification was made within tewnty (20) days. Spill response must be in accordance with 40 CFR 300 and applicable state and local regulations. Contain and clean up these spills without cost to the Government.

# 3.7.5.2 Clean Up

Clean up hazardous and non-hazardous waste spills. Reimburse the Government for costs incurred including sample analysis materials, clothing, equipment, and labor if the Government will initiate its own spill cleanup procedures, for Contractor- responsible spills, when: Spill cleanup procedures have not begun within one hour of spill discovery/occurrence; or, in the Government's judgment, spill cleanup is inadequate and the spill remains a threat to human health or the environment.

# 3.7.6 Mercury Materials

Immediately report to the Environmental Office and the Contracting Officer instances of breakage or mercury spillage. Clean mercury spill area to the satisfaction of the Contracting Officer.

Do not recycle a mercury spill cleanup; manage it as a hazardous waste for disposal.

# 3.7.7 Wastewater

3.7.7.1 Disposal of wastewater must be as specified below.

# 3.7.7.1.1 Treatment

Do not allow wastewater from construction activities, such as onsite material processing, concrete curing, foundation and concrete clean-up, water used in concrete trucks, and forms to enter water ways or to be discharged prior to being treated to remove pollutants. Dispose of the construction- related waste water off-Government property in accordance with 40 CFR 403, state, regional, and local laws and regulations.

# 3.7.7.1.2 Surface Discharge

For discharge of ground water, obtain a state or federal permit specific for pumping and discharging ground water prior to surface discharging. Surface discharge in accordance with the requirements of the NPDES or state STORMWATER DISCHARGES FROM CONSTRUCTION SITES permit.

### 3.7.7.1.3 Land Application

Water generated from the flushing of lines after disinfection or disinfection in conjunction with hydrostatic testing must be discharged into the sanitary sewer with prior approval and notification to the Wastewater Treatment Plant's Operator.

#### 3.8 HAZARDOUS MATERIAL MANAGEMENT

Include hazardous material control procedures in the Safety Plan, in accordance with LRL Section 01 35 26.00 06 GOVERNMENTAL SAFETY REQUIREMENTS. Address procedures and proper handling of hazardous materials, including the appropriate transportation requirements. Do not bring hazardous material onto Government property that does not directly relate to requirements for the performance of this contract. Submit an SDS and estimated quantities to be used for each hazardous material to the Contracting Officer prior to bringing the material on the installation. Typical materials requiring SDS and quantity reporting include, but are not limited to, oil and latex based painting and caulking products, solvents, adhesives, aerosol, and petroleum products. Use hazardous materials in a manner that minimizes the amount of hazardous waste generated. Containers of hazardous materials must have National Fire Protection Association labels or their equivalent. Certify that hazardous materials removed from the site are hazardous materials and do not meet the definition of hazardous waste, in accordance with 40 CFR 261.

## 3.9 PREVIOUSLY USED EQUIPMENT

Clean previously used construction equipment prior to bringing it onto the project site. Equipment must be free from soil residuals, egg deposits from plant pests, noxious weeds, and plant seeds. Consult with the U.S. Department of Agriculture jurisdictional office for additional cleaning requirements.

#### 3.10 MILITARY MUNITIONS

In the event military munitions, as defined in 40 CFR 260, are discovered or uncovered, immediately stop work in that area and immediately inform the Contracting Officer.

- A. Recognize- recognize the hazard and do not touch, disturb, or move the item as it could detonate with movement of ground vibrations.
- B. Retreat stop work, mark the general location, and have everyone retreat from the area.
- C. Report report the situation immediately to the appropriate local emergency authority) i.e. call 911 or the equivalent on DOD Installations), providing as much information as possible about the items encountered. USACE Safety Office. And installation staff as appropriate.

#### 3.11 PETROLEUM, OIL, LUBRICANT (POL) STORAGE AND FUELING

POL products include flammable or combustible liquids, such as gasoline, diesel, lubricating oil, used engine oil, hydraulic oil, mineral oil, and cooking oil. Store POL products and fuel equipment and motor vehicles in a manner that affords the maximum protection against spills into the environment. Manage and store POL products in accordance with EPA

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40 CFR 112, and other federal, state, regional, and local laws and regulations. Use secondary containments, dikes, curbs, and other barriers, to prevent POL products from spilling and entering the ground, storm or sewer drains, stormwater ditches or canals, or navigable waters of the United States. Describe in the EPP (see paragraph ENVIRONMENTAL PROTECTION PLAN) how POL tanks and containers must be stored, managed, and inspected and what protections must be provided. Storage of oil, including fuel, on the project site is not allowed. Fuel must be brought to the project site each day that work is performed. Contractor shall submit fueling plan for this project for review and approval.

#### 3.11.1 Used Oil Management

Manage used oil generated on site in accordance with 40 CFR 279. Determine if any used oil generated while onsite exhibits a characteristic of hazardous waste. Used oil containing 1,000 parts per million of solvents is considered a hazardous waste and disposed of at the Contractor's expense. Used oil mixed with a hazardous waste is also considered a hazardous waste. Dispose in accordance with paragraph HAZARDOUS WASTE DISPOSAL.

#### 3.11.2 Oil Storage Including Fuel Tanks

Provide secondary containment and overfill protection for oil storage tanks. A berm used to provide secondary containment must be of sufficient size and strength to contain the contents of the tanks plus 5 inches freeboard for precipitation. Construct the berm to be impervious to oil for 72 hours that no discharge will permeate, drain, infiltrate, or otherwise escape before cleanup occurs. Use drip pans during oil transfer operations; adequate absorbent material must be onsite to clean up any spills and prevent releases to the environment. Cover tanks and drip pans during inclement weather. Provide procedures and equipment to prevent overfilling of tanks. If tanks and containers with an aggregate aboveground capacity greater than 1320 gallons will be used onsite (only containers with a capacity of 55 gallons or greater are counted), provide and implement a SPCC plan meeting the requirements of 40 CFR 112. Do not bring underground storage tanks to the installation for Contractor use during a project. Submit the SPCC plan to the Contracting Officer for approval.

Monitor and remove any rainwater that accumulates in open containment dikes or berms. Inspect the accumulated rainwater prior to draining from a containment dike to the environment, to determine there is no oil sheen present.

# 3.12 INADVERTENT DISCOVERY OF PETROLEUM-CONTAMINATED SOIL OR HAZARDOUS WASTES

If petroleum-contaminated soil, or suspected hazardous waste is found during construction that was not identified in the Contract documents, immediately notify the Contracting Officer. Do not disturb this material until authorized by the Contracting Officer.

# 3.13 PEST MANAGEMENT

In order to minimize impacts to existing fauna and flora, coordinate with the Installation Pest Management Coordinator (IPMC) or Project Pesticide Coordinator (PPC), through the Contracting Officer, at the earliest possible time prior to pesticide application. Discuss integrated pest

management strategies with the IPMC or PPC and receive concurrence from the IPMC or PPC through the Contracting Officer prior to the application of any pesticide associated with these specifications. Provide Installation Project Office Pest Management personnel the opportunity to be present at meetings concerning treatment measures for pest or disease control and during application of the pesticide. The use and management of pesticides are regulated under 40 CFR 152 - 186. The Contractor shall submit, in writing, to the Contracting Officer, a Notice of Soil Treatment, seven (7) days before the required soil treatment agents are applied, to assure that DOD Certified Pest Control Personnel are present during soil treatment applications. All soil treatment applications must be in the presence of DOD Certified Pest Control personnel.

#### 3.13.1 Pesticide Delivery and Storage

Deliver pesticides to the site in the original, unopened containers bearing legible labels indicating the EPA registration number and the manufacturer's registered uses. Store pesticides according to manufacturer's instructions and under lock and key when unattended.

# 3.13.2 Pesticide Handling Requirements

Formulate, treat with, and dispose of pesticides and associated containers in accordance with label directions and use the clothing and personal protective equipment specified on the labeling for use during all phases of the application. Furnish Material Safety Data Sheets (MSDS) for all pesticide products.

#### 3.13.3 Qualifications

For the application of pesticides, use the services of a subcontractor whose principal business is pest control. The subcontractor must be licensed and certified in the state where the work is to be performed.

#### 3.13.4 Application

Apply pesticides using a state-certified pesticide applicator in accordance with EPA label restrictions and recommendation. The certified applicator must wear clothing and personal protective equipment as specified on the pesticide label. The Contracting Officer will designate locations for water used in formulating. Do not allow the equipment to overflow. Inspect equipment for leaks, clogging, wear, or damage and repair prior to application of pesticide.

# 3.13.5 Pesticide Treatment Plan

Include and update a pesticide treatment plan, as information becomes available. Include in the plan the sequence of treatment, dates, times, locations, pesticide trade name, EPA registration numbers, authorized uses, chemical composition, formulation, original and applied concentration, application rates of active ingredient (that is, pounds of active ingredient applied), equipment used for application and calibration of equipment. Comply with 40 CFR 152-189, state, regional, and local pest management record-keeping and reporting requirements as well as any additional Installation Project Office specific requirements in conformance with DA AR 200-1 Chapter 5, Pest Management, Section 5-4 "Program requirements" for data required to be reported to the Installation.

## 3.14 CHLORDANE

Evaluate excess soils and concrete foundation debris generated during the demolition of housing units or other wooden structures for the presence of chlordane or other pesticides prior to reuse or final disposal.

### 3.15 SOUND INTRUSION

Make the maximum use of low-noise emission products, as certified by the EPA. Blasting or use of explosives are not permitted without written permission from the Contracting Officer, and then only during the designated times. Confine pile-driving operations to the period between 8 a.m. and 4 p.m., Monday through Friday, exclusive of holidays, unless otherwise specified.

Keep construction activities under surveillance and control to minimize environment damage by noise.

#### 3.16 NOT USED

#### 3.17 POST CONSTRUCTION CLEANUP

Clean up areas used for construction in accordance with FAR 52.236-12 -Cleaning Up. Unless otherwise instructed in writing by the Contracting Officer, remove traces of temporary construction facilities such as haul roads, work area, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction prior to final acceptance of the work. Grade parking area and similar temporarily used areas to conform with surrounding contours.

### PART 4 ENVIRONMENTAL PERMITS AND COMMITMENTS

#### 4.1 LIST OF PRECONSTRUCTION PERMITS

Obtaining and complying with all environmental permits and commitments required by Federal, State, regional, local, and Installation/Facility environmental laws and regulations are the Contractor's responsibility. Prior to beginning of construction, the Contractor shall, upon review of the project and this specification section, make a list of all permits and construction-related commitments/and requirements required for the duration of the construction phase to be attached to the Environmental Protection Plan, or other similar documentation if an Environmental Protection Plan is not required. The Contractor, in conjunction with the Designer of Record (DOR), shall prepare a List of Preconstruction Permits (LOPP) with construction-related commitments/and requirements. The LOPP shall include, but is not be limited to the following: permit name, the address of the permitting agency, cost of submittal/Permit fee, and the name of the permitee. The LOPP should also include specifics of each permit such as the purpose/reason permit is needed, regulatory requirements, applicability to the project, schedule for obtaining permit, and other information such as authorized or permit restrictions. The LOPP should also list specific commitments (i.e., dust control measures, tree cutting restrictions, erosion control measures) that are not inherent to a specific permit or may apply to multiple permits, or are required for proper construction and compliance.

4.2 ENVIRONMENTAL REGULATIONS AND OTHER DOCUMENTS THAT MAY CONTAIN INFORMATION TO IDENTIFY PRECONSTRUCTION PERMITS AND CONSTRUCTION-RELATED COMMITMENTS

#### 4.2.1 National Environmental Policy Act (NEPA)

The National Environmental Policy Act establishes policies and goals for the protection of the environment. The NEPA process includes systematic examination of possible and probable environmental consequences of implementing a Proposed Action. USACE projects should be in compliance with AR 200-2, Chapter 2 - National Environmental Policy Act and the Decision Process. ER 200-2-2 provides additional guidance on NEPA documentation. It is the responsibility of the Contractor to obtain and review copies of NEPA documentation related to the project prior to beginning of construction. This may include but is not limited to the Record of Environmental Consideration (REC), an Environmental Assessment (EA), a Finding of No Significant Impact (FONSI), an Environmental Impact Statement (EIS), a Life Cycle Environmental Document (LCED), a Record of Decision (ROD), and a Categorical Exclusion (CX). These documents may also contain commitments, such Environmental Impacts and Minimization/Avoidance Measures for the Proposed Action that must be followed and incorporated into the Environmental Protection Plan or other appropriate documentation, and included in the LOPP.

# 4.2.2 Endangered Species Act

Construction should be completed in compliance with the Endangered Species act of 1973 and Army Regulation AR 200-3, Chapter 11 – Endangered/Threatened Species Guidance. The Endangered Species Act provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they reside. In the case that a proposed construction action could be harmful to a threatened or endangered species or its habitat, the Contractor will be required to review and follow federal, state, regional, and local regulations pertaining to threatened and endangered species. For work taking place on a military installation, the Contractor will be required to obtain and review a copy of any Endangered Species Management Plans (ESMP) or other related commitments from the appropriate base personnel, or State Fish and Wildlife personnel relative to the Installation.

Projects that may affect threatened or endangered species will likely have had a Biological Evaluation and may also have a Biological Assessment completed for the action. The Biological Evaluation and Biological Assessment provides site-specific information regarding potential impacts to federally threatened or endangered species in compliance with Section 7 (a)(2) of the Endangered Species Act. If a Biological Evaluation or a Biological Assessment has been completed for the proposed action, the Contractor should obtain and review it and use it to help develop species specific protection measures to be included in the Environmental Protection Plan.

If a threatened or endangered species is encountered during construction, the Contractor should immediately stop construction in the area and contact the appropriate authorities. Even if endangered species are not located at a construction site, the facility ESMP may have avoidance measures required of any construction at the facility. The Contractor should thoroughly review and follow requirements of the ESMP.

# 4.2.3 National Historic Preservation Act

The National Historic Preservation Act is intended to protect the nations historic and cultural resources. Section 106 of the National Historic Preservation Act requires any government agency with jurisdiction over an undertaking to take into account its effects on any district, site, building, structure, or object included on or eligible for inclusion on the National Register. Construction should be completed in compliance with the National Historic Preservation Act. It is the responsibility of the Contractor to obtain and review a copy of any pertinent Integrated Cultural Resources Management Plan from the appropriate authorities. If at any time during construction cultural resources are discovered, the Contractor will immediately stop any construction that may damage the newly discovered resource. It is the responsibility of the Contractor to review any additional State, regional, or local regulations and obtain necessary permits.

#### 4.2.4 Clean Water Act

The Clean Water Act is the primary federal law of the United States governing water pollution. The purpose of the Clean Water Act is to eliminate release of high amounts of pollution into waters of the United States.

4.2.4.1 National Pollutant Discharge Elimination System (NPDES) Section 402 of the Clean Water Act authorizes the National Pollutant Discharge Elimination System (NPDES) permit program. Compliance with NPDES will be required on any construction project with at least one acre of land disturbance. The Contractor shall apply for and obtain a NPDES permit from Macomb County and provide a copy to DPW. It is the responsibility of the Contractor to determine if a general permit has been issued covering construction activities. Additionally, the Contractor is to follow the NPDES and Notice of Intent (NOI) requirements throughout the construction duration. In compliance with NPDES, a Storm Water Pollution Prevention Plan (SWPPP) or a Soil Erosion and Sediment Control Plan must be in place and followed for the duration of construction. The project specific SWPPP is attached at this section. A Storm Water Best Management Practices (SWBMP) Plan should also be included as part of the Environmental Protection Plan. After construction is finished, a Notice of Termination must be submitted within thirty (30) days after all land disturbing activity is complete.

## 4.2.4.2 Section 404 Permit for Dredge/Fill Operations

Construction resulting in the discharge of fill or dredge material into wetlands or waters of the United States must be authorized by a permit pursuant to section 404 of the Clean Water Act. It is the responsibility of the Contractor to obtain and review the Federal, State, or Regional general permits pertaining to construction, or to obtain an individual permit if construction activity is not covered by a general permit.

# 4.2.4.3 Waste Water Discharge Permits

NPDES authorizes permitting requirements for waste water discharge. Any non-exempt facilities that will discharge waste water to the local sanitary sewer system (ex. on-site concrete plant, on-site sewage treatment plant, water treatment plant, equipment wash rack) will require permits in accordance with any Federal, State, regional, and local regulations.

4.2.4.4 Aquatic Resources Alteration Permit (NOT APPLICABLE - Tennessee Permit)

State, Regional, or Local regulations may also require an Aquatic Resources Alteration Permit for any construction that alters a stream, lake, river, or wetland. It is the responsibility of the Contractor to review the regulations of jurisdictions covering the construction site and to obtain any necessary permits in compliance with these jurisdictions.

#### 4.2.5 Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) is the principal Federal law of the United States covering the disposal of solid and hazardous waste. The RCRA also provides regulation on underground storage tanks (USTs). The objectives of the RCRA are to protect human health and the environment from potential hazards of waste disposal, to conserve energy and natural resources, to reduce waste generation, and to ensure wastes are managed in an environmentally sound way. Construction should be completed in compliance with RCRA Part C (hazardous waste) and RCRA Part D non-hazardous solid wastes).

#### 4.2.5.1 Solid Waste Disposal

The Contractor is responsible for including a Solid Waste Minimization Plan and a Contaminant Prevention Plan as part of the Environmental Protection Plan. These plans are to ensure the proper handling of solid waste generated during construction. In general, the Contractor is required to divert a minimum of 60 percent of solid waste generated during construction from landfills, but this amount may vary between Installations. Refer to the UFGS SECTION 01 74 19 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT for more information regarding solid waste disposal and requirements. It is the responsibility of the Contractor to obtain a Solid Waste Permit or a Beneficial Reuse Permit from the State and local authorities.

# 4.2.5.2 Hazardous Waste Disposal

Hazardous wastes are as defined in 40 CFR 261. The Contractor is responsible for developing a Spill Control Plan to be included in the Environmental Protection Plan. The Contractor may be required to obtain a Hazardous Waste Generator ID# from the EPA, and additional permitting requirements may have to be met in accordance with State, regional, and local regulations. If during construction any asbestos, lead based paint, Polychlorinated biphenyl, or any other material or substance hazardous to human health is encountered, that portion of work should be stopped immediately, the contracting officer should be contacted, and all necessary precautions to avoid human harm should be taken.

#### 4.2.5.3 Underground Storage Tank Systems

An underground storage tank (UST) system is a tank and any underground piping that has at least 10 percent of its total volume underground. Any construction dealing with the installation, modification, or removal of an UST must be in compliance with the RCRA, and AR 200-1, Chapter 11 - Storage Tank Systems/Oil and Hazardous Substances Spills, and the UFGS SECTION 02 65 00 UNDERGROUND STORAGE TANK REMOVAL. Additional State, regional, and local permitting may be required for construction dealing with USTS. It is the responsibility of the Contractor to obtain any of

these permits. If a UST is encountered that was not included in the design, work around the vicinity of the tank and potential contaminated areas will stop and the contractor will notify the contracting officer.

#### 4.2.6 Safe Drinking Water Act (SDWA)

The purpose of the Safe Drinking Water Act (SDWA) is to protect public drinking water and its sources: rivers, lakes, reservoirs, springs, and ground water wells. Construction should be completed in compliance with requirements of the Safe Drinking Water Act, as stated by Army Regulation AR 200-1, Chapter 4 - Environmental Asset Management.

# 4.2.6.1 Water Distribution

Any construction involving the installation of a water treatment system, installation of water distribution lines, or the installation of a drinking water well will require permitting, usually issued by the State government and as coordinated with local and State regulatory authorities.

#### 4.2.6.2 Groundwater Protection

The Contractor will be required to develop and adhere to a groundwater protection plan for any construction that could result in groundwater contamination. The groundwater protection plan should be included as part of the Environmental Protection Plan. The Contractor should review Federal, State, regional, and local regulations concerning groundwater protection and obtain permits required by regulations. If the Contractor is required to use underground injection to dispose of fluids in the ground, and underground injection control permit will be required, which will likely be issued by the State. The Contractor should coordinate with State authorities to insure that proper permitting is obtained and applicable regulations are followed.

# 4.2.7 Occupational Safety and Health Act

The Occupational Safety and Health Act is the primary federal law governing occupational health and safety in the workplace. Its main goal is to ensure that employers provide employees with an environment free from recognized hazards, such as exposure to toxic chemicals, excessive noise levels, mechanical dangers, heat or cold stress, or unsanitary conditions.

Many states have their own Occupational Safety and Health requirements which are at least as strict as the Federal requirements. The Contractor should adhere to 29 CFR 1926 which regulates construction activities as well as follow safety and health requirements specified in EM 385-1-1.

### 4.2.7.1 Employee Right to Know

Employee Right to Know is an Occupational Safety and Health Administration (OSHA) regulation giving employees the right to know information about the hazards they may be exposed to in the workplace, or on a construction site. The Contractor should be in compliance with OSHA standards during the duration of construction. The Contractor should make available material safety data sheets (MSDS) on any hazardous material or product that may be present on the construction site. These sheets should include such information such as the specific product, hazards and safety risks related to the product, storage and disposal requirements, protective equipment requirements, and emergency response procedures.

# 4.2.7.2 Occupational Exposure Limits (OELs)

The United States Army Corps of Engineers (USACE) uses enforceable occupational exposure limits (OELs) to protect employees against potential health effects of exposure to hazardous substances. The OELs are regulatory limits on the amount (concentration) of a substance in the air, or on the skin. It is the responsibility of the Contractor to ensure that the construction site remains within the OELs set by USACE. EM 385-1-1 defines the OELs as the most stringent standard published between the most recently published American Conference of Governmental Industrial Hygienists (ACGIH) guideline "Threshold Limit Values and Biological Exposure Indices," and the Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PELs) as defined by 29 CFR 1910, 29 CFR 1915, and 29 CFR 1926.

## 4.2.7.3 Confined Spaces

A confined space has limited or restricted means for entry or exit, and is not designed for continuous employee occupancy. This includes areas such as underground vaults, tanks, storage bins, manholes, pits, silos, process vessels, and pipelines. A confined space may require a special permit for work to take place. A permit-required confined space as described by OSHA is a confined space with any of the following characteristics: contains or has the potential to contain a hazardous atmosphere; contains a material that has the potential to engulf an entrant; has walls that converge inward or floors that slope downward and taper into a smaller area which could trap or asphyxiate an entrant; or contains any other recognized safety or health hazard, such as unguarded machinery, exposed live wires, or heat stressors. The Contractor should follow Federal, State, regional and local regulations and obtain necessary permits in regards to work in confined spaces.

# 4.2.8 Coastal Zone Management Act

The Coastal Zone Management Act of 1972 establishes a voluntary national program to encourage coastal states to implement coastal zone management plans. The Contractor should be aware that the mentioned coastal zone management plans may exist in any coastal state, including the Great Lakes. It is the responsibility of the Contractor to obtain the coastal zone management plan from the State government where the project is located, and to follow all regulations set forth by the plan.

#### 4.2.9 Burning not allowed

Burning is prohibited at Detroit Arsenal.

4.2.10 Floodplain Construction Permits (applicable to both 401 and 404 permits)

In accordance with CFR 44, Part 60.3 - Flood Plain Management Criteria for Flood-prone Areas, communities are required to issue permits for proposed construction and development activities within the community. This is to ensure the proper management of flood prone areas. It is the responsibility of the Contractor to obtain necessary Federal, State, regional, and local permits related to floodplain construction and to follow all related regulations.

# 4.2.11 Air Quality Permits

The Contractor is responsible for developing a dirt and dust control plan prior to construction. It is the responsibility of the Contractor to obtain any State, Regional, and Local permits relating to air quality during construction. A permit may be required if there is any issue with emissions release during construction, detectable levels of radon, or dirt and dust control issues. Also, the Contractor may be required to obtain a permit for the use of any equipment with combustible sources. Appropriate radon mitigation measures should be used during construction in accordance with 29 CFR 1910.

# 4.2.12 Excavation Permit

In addition to the Notice of Intent (NOI), an excavation permit from State, regional, local governments, and/or the facility/Installation may be required before excavation can commence on the project site. It is the responsibility of the Contractor to review State, regional, and local regulations pertaining to excavation and to obtain any necessary permits prior to initiation of construction.

#### 4.2.13 Vegetation and Revegetation Permit

Any construction activity that involves vegetation removal or re-vegetation may require a vegetation permit from State, regional, and local authorities. It is the responsibility to review State, regional, and local regulations pertaining to vegetation prior to construction and to follow through with responsibilities stated in the regulations. Vegetation removal or vegetation plans may be restricted or limited by the presence of threatened or endangered species or by a pest management requirements. If the project could affect threatened and endangered species or is covered by a pest management plan, the Contractor may have special vegetation requirements to follow. These requirements would be included in the appropriate facility management plans or by Fish and Wildlife Service regulations.

# 4.2.14 Water Withdrawal Permits

Withdrawal of water from any surface, spring, or groundwater source may require a Water Withdrawal Permit. It is the responsibility of the Contractor to review any relevant State, regional, and local regulations and to obtain any necessary permits for water withdrawal activities prior to initiation of construction.

# 4.2.15 Zoning Permits

It is the responsibility of the Contractor to review any State, regional, and local regulations pertaining to zoning and to obtain necessary permits prior to initiation of construction.

# 4.2.16 Noise Permits

Some local and state jurisdictions may enforce noise ordinances. Construction activity may be in violation of these ordinances and could require permit to exceed the ordinance levels. It is the responsibility of the Contractor to review local regulations regarding noise pollution and to obtain necessary permits prior to the initiation of construction.

## 4.2.17 Pesticide Permits

Some construction projects may require the use of pesticides for pest control. If a pesticide is to be used on a construction site, the Contractor is responsible for following procedures in the area Integrated Pest management plan (IMPM). Pest control measures must be in compliance with AR200-1, Chapter 5 - Pest Management. Obtainment of Federal, State, regional, or local permits required for the use of a pesticide is the responsibility of the Contractor.

4.2.18 Munitions and Explosives of Concern (MEC)/Unexploded Ordnance (UXO)

In the event military munitions, as defined in 40 CFR 260, are discovered or uncovered, the Contractor will immediately stop work in that area and immediately inform the Contracting Officer. Any construction on a site that has the possibility of the existence of MEC or UXO must be coordinated through the Center of Expertise.

#### 4.2.19 Driveway / Curb Cut Permit

The construction of a driveway connecting to a public road may require permitting. The contractor should review all State, regional, and local regulations pertaining to driveway construction and curb cutting and obtain any necessary permits. In addition to driveway and curb cut Permits, a right-of-way Permit to be obtained by the Contractor may also be required if a sidewalk will be temporarily obstructed during the construction of a driveway entrance.

4.2.20 Demolition/Renovation Permit

Construction projects that require the demolition or renovation of structures may require the Contractor to obtain permitting. The National Emission Standards for Hazardous Air Pollutants (NESHAP) are stationary source standards for hazardous air pollutants. Hazardous air pollutants (HAPs) are those pollutants that are known or suspected to cause cancer or other serious health effects. Building demolition could release HAPs such as asbestos into the air if proper regulations aren't followed. The presence of HAPs on a construction site will require the Contractor to develop appropriate plans for the removal of such pollutants prior to demolition, and may require additional permitting from State, regional, and local authorities.

Other considerations such as proper utility disconnection and safe building demolition are also considered and may require permits. If any demolition activity interferes with the public right-of-way, an obstruction permit will also need to be obtained from the appropriate authorities. It is the responsibility of the Contractor to follow all Federal, State, regional, and local regulations and obtain the appropriate permits dealing with building demolition and right-of-way obstruction.

#### 4.2.21 Utility Permits

Any project that requires utility construction or connection will likely require a permit from local authorities. It is the responsibility of the contractor to review all local regulations and obtain all permits and fees relating to utility construction and connections. Utility installations that will likely require permitting are electric, gas, drinking water, communication, and sanitary sewer utility installations. The Contractor is responsible for contacting the provider for each of the utilities and P2#: 506474 - Manned/Unmanned Tactical Vehicle Lab (MUMT) Detroit Arsenal, MI coordinate permitting and installation with the utility providers. Construction Impact Notification: Submit FORM CIN, Rev 30-January-2014 Coordinate with DPW and Environmental Digging / Excavation Permits: Submit FORM PWF-103, Rev 09-October-2014 Coordinate with DPW and Environmental Stormwater / Soil Erosion Sediment Control (SESC): Permits obtained during the design process from Macomb County Public Works Office Macomb County Coordinate with Macomb County Public Works Office, DPW and Environmental Sewer: No permit required. Coordinate with DPW and Environmental Water: No permit required. Coordinate with DPW and Environmental Electrical: No Permit required. Notification of power outages required as part of Construction Impact Notification. Coordinate with DPW and Environmental Hot Work (Open Flame) Permit: Permit Required. Submit DA FORM 5383-RB FEB 95 Coordinate with DPW and Fire Dept Airspace/Crane Operations: Permit required. Submit Lift and Rigging Plan Coordinate with DPW

4.2.22 Aquatic Resource Alteration Permits (Not Applicable - Tennessee Permit)

Construction involving the temporary or permanent alteration of aquatic resources will require State, regional, or local permitting. The Contractor is responsible for reviewing State, regional and local laws as well as regulations and coordinating with appropriate authorities to determine if an aquatic resource alteration permit is necessary. Actions such as the temporary or permanent diversion of a stream, depositing of fill material into a stream, pond, lake, or wetland, and other similar activities will likely trigger the need for a permit.

## 4.2.23 Construction Permit

New construction may require a construction or building permit from State, regional, or local authorities prior to the beginning of construction. It is the responsibility of the Contractor to review State, regional and local laws and regulations and to obtain a construction permit if required.

# 4.2.24 Permit Variances

State, regional, and local authorities may allow modifications to be made in areas covered by existing permits. The permitting agency may be able to issue a permit variance for either a temporary or one-time exceedance of conditions specified in the existing permit. The Contractor should coordinate with permitting authorities if a variance will be necessary for the completion of the project.

-- End of Section --

## SECTION 01 74 19

# CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL 02/19, CHG 3: 11/21

#### PART 1 GENERAL

#### 1.1 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.

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40	CFR 273	Standards	s for	Universal	Waste	Management
			·			

- 49 CFR 173 Shippers General Requirements for Shipments and Packagings
- 49 CFR 178 Specifications for Packagings

#### 1.2 DEFINITIONS

1.2.1 Co-mingle

The practice of placing unrelated materials together in a single container, usually for benefits of convenience and speed.

#### 1.2.2 Construction Waste

Waste generated by construction activities, such as scrap materials, damaged or spoiled materials, temporary and expendable construction materials, and other waste generated by the workforce during construction activities.

### 1.2.3 Demolition Debris/Waste

Waste generated from demolition activities, including minor incidental demolition waste materials generated as a result of Intentional dismantling of all or portions of a building, to include clearing of building contents that have been destroyed or damaged.

1.2.4 Disposal

Depositing waste in a solid waste disposal facility, usually a managed landfill or incinerator, regulated in the US under the Resource Conservation and Recovery Act (RCRA).

# 1.2.5 Diversion

The practice of diverting waste from disposal in a landfill or incinerator, by means of eliminating or minimizing waste, or reuse of materials.

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#### 1.2.6 Final Construction Waste Diversion Report

A written assertion by a material recovery facility operator identifying constituent materials diverted from disposal, usually including summary tabulations of materials, weight in short-ton.

# 1.2.7 Recycling

The series of activities, including collection, separation, and processing, by which products or other materials are diverted from the solid waste stream for use in the form of raw materials in the manufacture of new products sold or distributed in commerce, or the reuse of such materials as substitutes for goods made of virgin materials, other than fuel.

# 1.2.8 Reuse

The use of a product or materials again for the same purpose, in its original form or with little enhancement or change.

1.2.9 Salvage

Usable, salable items derived from buildings undergoing demolition or deconstruction, parts from vehicles, machinery, other equipment, or other components.

# 1.2.10 Source Separation

The practice of administering and implementing a management strategy to identify and segregate unrelated waste at the first opportunity.

#### 1.3 CONSTRUCTION WASTE (INCLUDES DEMOLITION DEBRIS/WASTE)

Divert a minimum of 75 percent by weight of the project construction waste and demolition debris/waste from the landfill or incinerator. Follow applicable industry standards in the management of waste. Apply sound environmental principles in the management of waste. (1) Practice efficient waste management when sizing, cutting, and installing products and materials and (2) use all reasonable means to divert construction waste and demolition debris/waste from landfills and incinerators and to facilitate the recycling or reuse of excess construction materials.

#### 1.4 CONSTRUCTION WASTE MANAGEMENT

Implement a Construction Waste Management Program for the project. Take a pro-active, responsible role in the management of construction construction waste, recycling process, disposal of demolition debris/waste, and require all subcontractors, vendors, and suppliers to participate in the Construction Waste Management Program. Establish a process for clear tracking, and documentation of construction waste and demolition debris/waste.

1.4.1 Implementation of Construction Waste Management Program

Develop and document how the Construction Waste Management Program will be implemented in a Construction Waste Management Plan. Submit a Construction Waste Management Plan to the Contracting Officer for approval. Construction waste and demolition debris/waste materials include un-used construction materials not incorporated in the final work,

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as well as demolition debris/waste materials from demolition activities or deconstruction activities. In the management of waste, consider the availability of viable markets, the condition of materials, the ability to provide material in suitable condition and in a quantity acceptable to available markets, and time constraints imposed by internal project completion mandates.

### 1.4.2 Oversight

The Quality Control Manager, as specified in Section 01 45 00.15 06 CONTRACTOR QUALITY CONTROL, is responsible for overseeing and documenting results from executing the Construction Waste Management Plan for the project.

# 1.4.3 Special Programs

Implement special programs involving rebates or similar incentives related to recycling of construction waste and demolition debris/waste materials. Retain revenue or savings from salvaged or recycling, unless otherwise directed. Ensure firms and facilities used for recycling, reuse, and disposal are permitted for the intended use to the extent required by federal, state, and local regulations.

#### 1.4.4 Special Instructions

Provide on-site instruction of appropriate separation, handling, recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the projects. Designation of single source separating or commingling will be clearly marked on the containers.

# 1.4.5 Waste Streams

Delineate waste streams and characterization, including estimated material types and quantities of waste, in the Construction Waste Management Plan. Manage all waste streams associated with the project. Typical waste streams are listed below. Include additional waste steams not listed:

- a. Land Clearing Debris
- b. Asphalt
- c. Masonry and CMU
- d. Concrete
- e. Metals (Includes, but is not limited to, banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized, stainless steel, aluminum, copper, zinc, bronze.)
- f. Wood (nails and staples allowed)
- g. Glass
- h. Paper
- i. Plastics (PET, HDPE, PVC, LDPE, PP, PS, Other)
- j. Gypsum

- k. Non-hazardous paint and paint cans
- 1. Carpet
- m. Ceiling Tiles
- n. Insulation
- o. Beverage Containers

#### 1.5 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Construction Waste Management Plan; G, AE

SD-06 Test Reports

Quarterly Reports

Annual Report

SD-11 Closeout Submittals

Final Construction Waste Diversion Report; S

#### 1.6 MEETINGS

Conduct Construction Waste Management meetings. After award of the Contract and prior to commencement of work, schedule and conduct a meeting with the Contracting Officer to discuss the proposed Construction Waste Management Plan and to develop a mutual understanding relative to the management of the Construction Waste Management Program and how waste diversion requirements will be met.

The requirements of this meeting may be fulfilled during the coordination and mutual Understanding meeting outlined in Section 01 45 04.10 06 QUALITY CONTROL. At a minimum, discuss and document waste management goals at following meetings:

- a. Preconstruction meeting.
- b. Regular site meetings.
- c. Work safety meeting (if applicable).

#### 1.7 CONSTRUCTION WASTE MANAGEMENT PLAN

Submit Construction Waste Management Plan within 45 calendar days after contract award. Revise and resubmit Construction Waste Management Plan as necessary, in order for construction to begin.. Execute demolition or deconstruction activities in accordance with Section 02 41 00 DEMOLITION . Manage demolition debris/waste materials in accordance with the approved

> SECTION 01 74 19 Page 4 Certified Final Submittal

construction waste management plan.

An approved Construction Waste Management Plan will not relieve the Contractor of responsibility for compliance with applicable environmental regulations or meeting project cumulative waste diversion requirement. Ensure all subcontractors receive a copy of the approved Construction Waste Management Plan. The plan demonstrates how to meet the project waste diversion requirement. Also, include the following in the plan:

- a. Identify the names of individuals responsible for waste management and waste management tracking, along with roles and responsibilities on the project.
- b. Actions that will be taken to reduce solid waste generation, including coordination with subcontractors to ensure awareness and participation.
- c. Description of the regular meetings to be held to address waste management.
- d. Description of the specific approaches to be used in recycling/reuse of the various materials generated, including the areas on site and equipment to be used for processing, sorting, and temporary storage of materials.
- e. Name of landfill and incinerator to be used.
- f. Identification of local and regional re-use programs, including non-profit organizations such as schools, local housing agencies, and organization that accept used materials such as material exchange networks and resale stores. Include the name, location, phone number for each re-use facility identified, and provide a copy of the permit or license for each facility.
- g. List of specific materials, by type and quantity, that will be salvaged for resale, salvaged and reused on the current project, salvaged and stored for reuse on a future project, or recycled. Identify the recycling facilities by name, address, and phone number.
- h. Identification of materials that cannot be recycled or reused with an explanation or justification, to be approved by the Contracting Officer.
- i. Description of the means by which materials identified in item (g) above will be protected from contamination.
- j. Description of the means of transportation of the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site).
- k. Copy of training plan for subcontractors and other services to prevent contamination by co-mingling materials identified for diversion and waste materials.
- 1. Identification of at least 5 construction or demolition material streams for diversion.
- n. Facilities or subcontractors offering construction waste transport

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> on-site or off-site must ensure that proper shipping orders, bill of lading, manifests, or other shipping documents containing waste diversion information meet requirements of 40 CFR 273 Universal Waste Management, 49 CFR 173 Shippers - General Requirements for Shipments and Packagings, and 49 CFR 178 Specifications for Packaging. Individuals signing manifests or other shipping documents should meet the minimum training requirements.

o. List each supplier who deliver construction materials, in bulk, or package products in returnable containers or returnable packaging, or have take-back programs. List each program and the applicable material to actively monitor and track to assist in meeting waste diversion requirements on the project.

Distribute copies of the waste management plan to each subcontractor, and the Contracting Officer.

1.8 RECORDS (DOCUMENTATION)

#### 1.8.1 General

Maintain records to document the types and quantities of waste generated and diverted though re-use, recycling and sale to third parties; through disposal to a landfill or incinerator facility. Provide explanations for materials not recycled, reused or sold. Collect and retain manifests, weight tickets, sales receipts, and invoices specifically identifying diverted project waste materials or disposed materials.

# 1.8.2 Accumulated

Maintain a running record of materials generated and diverted from landfill disposal, including accumulated diversion rates for the project. Make records available to the Contracting Officer during construction or incidental demolition activities. Provide a copy of the diversion records to the Contracting Officer upon completion of the construction, incidental demolitions or minor deconstruction activities.

#### 1.9 REPORTS

### 1.9.1 General

Maintain current construction waste diversion information on site for periodic inspection by the Contracting Officer. Include in the quarterly reports, annual reports and final reports: the project name, contract information, information for waste generated, diverted and disposed of for the current reporting period and show cumulative totals for the project. Reports must identify quantifies of waste by type and disposal method. Also include in each report, supporting documentation to include manifests, weigh tickets, receipts, and invoices specifically identifying the project and waste material type and weighted sum.

#### 1.9.2 Quarterly Reporting

Provide cumulative reports at the end of each quarter (December, March, June, and September, corresponding with the federal fiscal year for reporting purposes). Submit quarterly reports not later than 15 calendar days after the preceding quarter has ended. Submit Quarterly Reports to the Department of Public Works (DPW) Solid Waste Manger.

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### 1.9.3 Annual Reporting

Provide a cumulative construction waste diversion report annually. Submit annual report not later than 30 calendar days after the preceding fourth quarter has ended. Provide copy of annual construction waste diversion report to the Department of Public Works (DPW) Solid Waste Manger.

## 1.10 FINAL CONSTRUCTION WASTE DIVERSION REPORT

A Final Construction Waste Diversion Report is required at the end of the project. Provide Final Construction Waste Diversion Report 60 days prior to the Contract Completion Date. The final Construction Waste Diversion Report must be included in the Sustainability eNotebook in accordance with Section 01 33 29.00 06 SUSTAINABILITY REPORTING.

# 1.11 COLLECTION

Collect, store, protect, and handle reusable and recyclable materials at the site in a manner which prevents contamination, and provides protection from the elements to preserve their usefulness and monetary value. Provide receptacles and storage areas designated specifically for recyclable and reusable materials and label them clearly and appropriately to prevent contamination from other waste materials. Keep receptacles or storage areas neat and clean.

Train subcontractors and other service providers to either separate waste streams or use the co-mingling method as described in the Construction Waste Management Plan. Handle hazardous waste and hazardous materials in accordance with applicable regulations and coordinate with Section 01 57 19.00 06 TEMPORARY ENVIRONMENTAL CONTROLS AND PERMITS. Separate materials by one of the following methods described herein:

## 1.11.1 Source Separation Method

Separate waste products and materials that are recyclable from trash and sort as described below into appropriately marked separate containers and then transport to the respective recycling facility for further processing. Deliver materials in accordance with recycling or reuse facility requirements (e.g., free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process). Separate materials into the category types as defined in the Construction Waste Management Plan.

#### 1.11.2 Other Methods

Other methods proposed by the Contractor may be used when approved by the Contracting Officer.

#### 1.12 DISPOSAL

Control accumulation of waste materials and trash. Recycle or dispose of collected materials off-site at intervals approved by the Contracting Officer and in compliance with waste management procedures as described in the waste management plan. Except as otherwise specified in other sections of the specifications, dispose of in accordance with the following:

1.12.1 Reuse

Give first consideration to reusing construction and demolition materials as a disposition strategy. Recover for reuse materials, products, and components as described in the approved Construction Waste Management Plan. Coordinate with the Contracting Officer to identify onsite reuse opportunities or material sales or donation available through Government resale or donation programs. Consider the use of surplus industrial supply broker services, who match entities with reusable or repurpose industrial materials with entities with need of such materials.

1.12.2 Recycle

Recycle non-hazardous construction and demolition/debris materials that are not suitable for reuse. Track rejection of contaminated recyclable materials by the recycling facility. Rejected recyclables materials will not be counted as a percentage of diversion calculation.

1.12.3 NOT USED

1.12.4 Waste

Dispose by landfill or incineration only those waste materials with no practical use, economic benefit, or recycling opportunity.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used. -- End of Section --

# SECTION 01 78 23

# OPERATION AND MAINTENANCE DATA 08/15, CHG 2: 08/21

#### PART 1 GENERAL

#### 1.1 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-10 Operation and Maintenance Data

O&M Database; G

Training Plan; G

Training Outline; G

Training Content; G

SD-11 Closeout Submittals

Training Video Recording; G

Validation of Training Completion; G

## 1.2 OPERATION AND MAINTENANCE DATA

Submit Operation and Maintenance (O&M) Data for the provided equipment, product, or system, defining the importance of system interactions, troubleshooting, and long-term preventive operation and maintenance. Compile, prepare, and aggregate O&M data to include clarifying and updating the original sequences of operation to as-built conditions. Organize and present information in sufficient detail to clearly explain O&M requirements at the system, equipment, component, and subassembly level. Include an index preceding each submittal. Submit in accordance with this section and Section 01 33 00 SUBMITTAL PROCEDURES.

#### 1.2.1 Package Quality

Documents must be fully legible. Operation and Maintenance data must be consistent with the manufacturer's standard brochures, schematics, printed instructions, general operating procedures, and safety precautions.

# 1.2.2 Package Content

Provide data package content in accordance with paragraph SCHEDULE OF OPERATION AND MAINTENANCE DATA PACKAGES. Comply with the data package requirements specified in the individual technical sections, including the content of the packages and addressing each product, component, and system designated for data package submission, except as follows. Use Data Package 4 for commissioned items without a specified data package

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requirement in the individual technical sections. Provide a Data Package 3 instead of Data Package 1 or 2, as specified in the individual technical section, for items that are commissioned.

1.2.3 Changes to Submittals

Provide manufacturer-originated changes or revisions to submitted data if a component of an item is so affected subsequent to acceptance of the O&M Data. Submit changes, additions, or revisions required by the Contracting Officer for final acceptance of submitted data within 30 calendar days of the notification of this change requirement.

#### 1.2.4 Commissioning Authority Review and Approval

Submit the commissioned systems and equipment submittals to the Commissioning Authority (CxA) to review for completeness and applicability. Obtain validation from the CxA that the systems and equipment provided meet the requirements of the Contract documents and design intent, particularly as they relate to functionality, energy performance, water performance, maintainability, sustainability, system cost, indoor environmental quality, and local environmental impacts. The CxA communicates deficiencies to the Contracting Officer. Submit the O&M manuals to the Contracting Officer upon a successful review of the corrections, and with the CxA recommendation for approval and acceptance of these O&M manuals. This work is in addition to the normal review procedures for O&M data.

#### 1.3 O&M DATABASE

Develop an editable, electronic spreadsheet based on the equipment in the Operation and Maintenance Manuals that contains the information required to start a preventive maintenance program. As a minimum, provide list of system equipment, location installed, warranty expiration date, manufacturer, model, and serial number.

#### 1.4 OPERATION AND MAINTENANCE MANUAL FILE FORMAT

Assemble data packages into electronic Operation and Maintenance Manuals. Assemble each manual into a composite electronically indexed file using the most current version of Adobe Acrobat or similar software capable of producing PDF file format. Provide compact disks (CD) or data digital versatile disk (DVD) as appropriate, so that each one contains operation, maintenance and record files, project record documents, and training videos. Include a complete electronically linked operation and maintenance directory.

#### 1.4.1 Organization

Bookmark Product and Drawing Information documents using the current version of CSI MasterFormat numbering system, and arrange submittals using the specification sections as a structure. Use CSI MasterFormat and UFGS numbers along with descriptive bookmarked titles that explain the content of the information that is being bookmarked.

# 1.4.2 CD or DVD Label and Disk Holder or Case

Provide the following information on the disk label and disk holder or case:

- a. Building Number
- b. Project Title
- c. Activity and Location
- d. Construction Contract Number
- e. Prepared For: (Contracting Agency)
- f. Prepared By: (Name, title, phone number and email address)
- g. Include the disk content on the disk label
- h. Date
- i. Virus scanning program used
- 1.5 TYPES OF INFORMATION REQUIRED IN O&M DATA PACKAGES

The following are a detailed description of the data package items listed in paragraph SCHEDULE OF OPERATION AND MAINTENANCE DATA PACKAGES.

1.5.1 Operating Instructions

Provide specific instructions, procedures, and illustrations for the following phases of operation for the installed model and features of each system:

1.5.1.1 Safety Precautions and Hazards

List personnel hazards and equipment or product safety precautions for operating conditions. List all residual hazards identified in the Activity Hazard Analysis provided under Section 01 35 26.00 06 GOVERNMENT SAFETY REQUIREMENTS. Provide recommended safeguards for each identified hazard.

1.5.1.2 Operator Prestart

Provide procedures required to install, set up, and prepare each system for use.

1.5.1.3 Startup, Shutdown, and Post-Shutdown Procedures

Provide narrative description for Startup, Shutdown and Post-shutdown operating procedures including the control sequence for each procedure.

1.5.1.4 Normal Operations

Provide Control Diagrams with data to explain operation and control of systems and specific equipment. Provide narrative description of Normal Operating Procedures.

#### 1.5.1.5 Emergency Operations

Provide Emergency Procedures for equipment malfunctions to permit a short period of continued operation or to shut down the equipment to prevent further damage to systems and equipment. Provide Emergency Shutdown Instructions for fire, explosion, spills, or other foreseeable

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contingencies. Provide guidance and procedures for emergency operation of utility systems including required valve positions, valve locations and zones or portions of systems controlled.

1.5.1.6 Operator Service Requirements

Provide instructions for services to be performed by the operator such as lubrication, adjustment, inspection, and recording gauge readings.

1.5.1.7 Environmental Conditions

Provide a list of Environmental Conditions (temperature, humidity, and other relevant data) that are best suited for the operation of each product, component or system. Describe conditions under which the item equipment should not be allowed to run.

1.5.1.8 Operating Log

Provide forms, sample logs, and instructions for maintaining necessary operating records.

1.5.1.9 Additional Requirements for HVAC Control Systems

Provide Data Package 5 and the following for control systems:

- a. Narrative description on how to perform and apply functions, features, modes, and other operations, including unoccupied operation, seasonal changeover, manual operation, and alarms. Include detailed technical manual for programming and customizing control loops and algorithms.
- b. Full as-built sequence of operations.
- c. Copies of checkout tests and calibrations performed by the Contractor (not Cx tests).
- d. Full points list. Provide a listing of rooms with the following information for each room:
  - (1) Room number
  - (2) Room name
  - (3) Air handler unit ID
  - (4) Reference drawing number
  - (5) Air terminal unit tag ID
  - (6) Heating or cooling valve tag ID
  - (7) Minimum cfm
  - (8) Maximum cfm
- e. Full print out of all schedules and set points after testing and acceptance of the system.
- f. Full as-built print out of software program.

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- g. Marking of system sensors and thermostats on the as-built floor plan and mechanical drawings with their control system designations.
- 1.5.2 Preventive Maintenance

Provide the following information for preventive and scheduled maintenance to minimize repairs for the installed model and features of each system. Include potential environmental and indoor air quality impacts of recommended maintenance procedures and materials.

#### 1.5.2.1 Lubrication Data

Include the following preventive maintenance lubrication data, in addition to instructions for lubrication required under paragraph OPERATOR SERVICE REQUIREMENTS:

- a. A table showing recommended lubricants for specific temperature ranges and applications.
- b. Charts with a schematic diagram of the equipment showing lubrication points, recommended types and grades of lubricants, and capacities.
- c. A Lubrication Schedule showing service interval frequency.
- 1.5.2.2 Preventive Maintenance Plan, Schedule, and Procedures

Provide manufacturer's schedule for routine preventive maintenance, inspections, condition monitoring (predictive tests) and adjustments required to ensure proper and economical operation and to minimize repairs. Provide instructions stating when the systems should be retested. Provide manufacturer's projection of preventive maintenance work-hours on a daily, weekly, monthly, and annual basis including craft requirements by type of craft. For periodic calibrations, provide manufacturer's specified frequency and procedures for each separate operation.

- a. Define the anticipated time required to perform each of each test (work-hours), test apparatus, number of personnel identified by responsibility, and a testing validation procedure permitting the record operation capability requirements within the schedule. Provide a remarks column for the testing validation procedure referencing operating limits of time, pressure, temperature, volume, voltage, current, acceleration, velocity, alignment, calibration, adjustments, cleaning, or special system notes. Delineate procedures for preventive maintenance, inspection, adjustment, lubrication and cleaning necessary to minimize repairs.
- b. Repair requirements must inform operators how to check out, troubleshoot, repair, and replace components of the system. Include electrical and mechanical schematics and diagrams and diagnostic techniques necessary to enable operation and troubleshooting of the system after acceptance.

# 1.5.3 Repair

Provide manufacturer's recommended procedures and instructions for correcting problems and making repairs for the installed model and features of each system. Include potential environmental and indoor air

quality impacts of recommended maintenance procedures and materials.

1.5.3.1 Troubleshooting Guides and Diagnostic Techniques

Provide step-by-step procedures to promptly isolate the cause of typical malfunctions. Describe clearly why the checkout is performed and what conditions are to be sought. Identify tests or inspections and test equipment required to determine whether parts and equipment may be reused or require replacement.

1.5.3.2 Wiring Diagrams and Control Diagrams

Provide point-to-point drawings of wiring and control circuits including factory-field interfaces. Provide a complete and accurate depiction of the actual job specific wiring and control work. On diagrams, number electrical and electronic wiring and pneumatic control tubing and the terminals for each type, identically to actual installation configuration and numbering.

1.5.3.3 Repair Procedures

Provide instructions and a list of tools required to repair or restore the product or equipment to proper condition or operating standards.

1.5.3.4 Removal and Replacement Instructions

Provide step-by-step procedures and a list of required tools and supplies for removal, replacement, disassembly, and assembly of components, assemblies, subassemblies, accessories, and attachments. Provide tolerances, dimensions, settings and adjustments required. Use a combination of text and illustrations.

1.5.3.5 Spare Parts and Supply Lists

Provide lists of spare parts and supplies required for repair to ensure continued service or operation without unreasonable delays. Special consideration is required for facilities at remote locations. List spare parts and supplies that have a long lead-time to obtain.

#### 1.5.3.6 Repair Work-Hours

Provide manufacturer's projection of repair work-hours including requirements by type of craft. Identify, and tabulate separately, repair that requires the equipment manufacturer to complete or to participate.

1.5.4 Real Property Equipment

Provide a list of installed equipment furnished under this contract. Include all information usually listed on manufacturer's name plate. In the "EQUIPMENT-IN-PLACE LIST" include, as applicable, the following for each piece of equipment installed: description of item, location (by room number), model number, serial number, capacity, name and address of manufacturer, name and address of equipment supplier, condition, spare parts list, manufacturer's catalog, and warranty. Submit the final list 30 days after transfer of the completed facility.

Key the designations to the related area depicted on the contract drawings. List the following data:

RECORD OF DESIGNATED EQUIPMENT AND MATERIALS DATA					
Description	Specification Section	Manufacturer and Catalog, Model, and Serial Number	Composition and Size	Where Used	

#### 1.5.5 Appendices

Provide information required below and information not specified in the preceding paragraphs but pertinent to the maintenance or operation of the product or equipment. Include the following:

1.5.5.1 Product Submittal Data

Provide a copy of SD-03 Product Data submittals documented with the required approval.

1.5.5.2 Certificates

Provide a copy of SD-07 Certificates submittals documented with the required approval.

1.5.5.3 Manufacturer's Instructions

Provide a copy of SD-08 Manufacturer's Instructions submittals documented with the required approval.

1.5.5.4 O&M Submittal Data

Provide a copy of SD-10 Operation and Maintenance Data submittals documented with the required approval.

1.5.5.5 Parts Identification

Provide identification and coverage for the parts of each component, assembly, subassembly, and accessory of the end items subject to replacement. Include special hardware requirements, such as requirement to use high-strength bolts and nuts. Identify parts by make, model, serial number, and source of supply to allow reordering without further identification. Provide clear and legible illustrations, drawings, and exploded views to enable easy identification of the items. When illustrations omit the part numbers and description, both the illustrations and separate listing must show the index, reference, or key number that will cross-reference the illustrated part to the listed part. Group the parts shown in the listings by components, assemblies, and subassemblies in accordance with the manufacturer's standard practice. Parts data may cover more than one model or series of equipment, components, assemblies, subassemblies, attachments, or accessories, such as typically shown in a master parts catalog.

# 1.5.5.6 Warranty Information

List and explain the various warranties and clearly identify the servicing and technical precautions prescribed by the manufacturers or contract documents in order to keep warranties in force. Include warranty

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information for primary components of the system. Provide copies of warranties required by Section 00 80 00.00 06 SPECIAL PROVISIONS.

1.5.5.7 Extended Warranty Information

List all warranties for products, equipment, components, and sub-components whose duration exceeds one year. For each warranty listed, indicate the applicable specification section, duration, start date, end date, and the point of contact for warranty fulfillment. Also, list or reference the specific operation and maintenance procedures that must be performed to keep the warranty valid. Provide copies of warranties required by Section 00 80 00.00 06 SPECIAL PROVISIONS.

1.5.5.8 Personnel Training Requirements

Provide information available from the manufacturers that is needed for use in training designated personnel to properly operate and maintain the equipment and systems.

1.5.5.9 Testing Equipment and Special Tool Information

Include information on test equipment required to perform specified tests and on special tools needed for the operation, maintenance, and repair of components. Provide final set points.

1.5.5.10 Testing and Performance Data

Include completed prefunctional checklists, functional performance test forms, and monitoring reports. Include recommended schedule for retesting and blank test forms. Provide final set points.

1.5.5.11 Field Test Reports and Manufacturer's Field Reports

Provide a copy of Field Test Reports (SD-06) and Manufacturer's Field Reports (SD-09) submittals documented with the required approval.

1.5.5.12 Contractor Information

Provide a list that includes the name, address, and telephone number of the General Contractor and each Subcontractor who installed the product or equipment, or system. For each item, also provide the name address and telephone number of the manufacturer's representative and service organization that can provide replacements most convenient to the project site. Provide the name, address, and telephone number of the product, equipment, and system manufacturers.

1.6 SCHEDULE OF OPERATION AND MAINTENANCE DATA PACKAGES

Provide the O&M data packages specified in individual technical sections. The information required in each type of data package follows:

- 1.6.1 Data Package 1
  - a. Safety precautions and hazards
  - b. Cleaning recommendations
  - c. Maintenance and repair procedures

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- d. Warranty information
- e. Extended warranty information
- f. Contractor information
- g. Spare parts and supply list
- 1.6.2 Data Package 2
  - a. Safety precautions and hazards
  - b. Normal operations
  - c. Environmental conditions
  - d. Lubrication data
  - e. Preventive maintenance plan, schedule, and procedures
  - f. Cleaning recommendations
  - g. Maintenance and repair procedures
  - h. Removal and replacement instructions
  - i. Spare parts and supply list
  - j. Parts identification
  - k. Warranty information
  - 1. Extended warranty information
  - m. Contractor information
- 1.6.3 Data Package 3
  - a. Safety precautions and hazards
  - b. Operator prestart
  - c. Startup, shutdown, and post-shutdown procedures
  - d. Normal operations
  - e. Emergency operations
  - f. Environmental conditions
  - g. Operating log
  - h. Lubrication data
  - i. Preventive maintenance plan, schedule, and procedures
  - j. Cleaning recommendations
  - k. Troubleshooting guides and diagnostic techniques

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- 1. Wiring diagrams and control diagrams
- m. Maintenance and repair procedures
- n. Removal and replacement instructions
- o. Spare parts and supply list
- p. Product submittal data
- q. O&M submittal data
- r. Parts identification
- s. Warranty information
- t. Extended warranty information
- u. Testing equipment and special tool information
- v. Testing and performance data
- w. Contractor information
- x. Field test reports
- 1.6.4 Data Package 4
  - a. Safety precautions and hazards
  - b. Operator prestart
  - c. Startup, shutdown, and post-shutdown procedures
  - d. Normal operations
  - e. Emergency operations
  - f. Operator service requirements
  - g. Environmental conditions
  - h. Operating log
  - i. Lubrication data
  - j. Preventive maintenance plan, schedule, and procedures
  - k. Cleaning recommendations
  - 1. Troubleshooting guides and diagnostic techniques
  - m. Wiring diagrams and control diagrams
  - n. Repair procedures
  - o. Removal and replacement instructions

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- p. Spare parts and supply list
- q. Repair work-hours
- r. Product submittal data
- s. O&M submittal data
- t. Parts identification
- u. Warranty information
- v. Extended warranty information
- w. Personnel training requirements
- x. Testing equipment and special tool information
- y. Testing and performance data
- z. Contractor information
- aa. Field test reports
- 1.6.5 Data Package 5
  - a. Safety precautions and hazards
  - b. Operator prestart
  - c. Start-up, shutdown, and post-shutdown procedures
  - d. Normal operations
  - e. Environmental conditions
  - f. Preventive maintenance plan, schedule, and procedures
  - g. Troubleshooting guides and diagnostic techniques
  - h. Wiring and control diagrams
  - i. Maintenance and repair procedures
  - j. Removal and replacement instructions
  - k. Spare parts and supply list
  - 1. Product submittal data
  - m. Manufacturer's instructions
  - n. O&M submittal data
  - o. Parts identification
  - p. Testing equipment and special tool information
  - q. Warranty information

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- r. Extended warranty information
- s. Testing and performance data
- t. Contractor information
- u. Field test reports
- PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

## 3.1 TRAINING

Prior to acceptance of the facility by the Contracting Officer for Contract Completion, provide comprehensive training for the systems and equipment specified in the technical specifications. The training must be targeted for the building maintenance personnel, and applicable building occupants. Instructors must be well-versed in the particular systems that they are presenting. Address aspects of the Operation and Maintenance Manual submitted in accordance with Section 00 80 00.00 06 SPECIAL PROVISIONS. Training must include classroom or field lectures based on the system operating requirements. The location of classroom training requires approval by the Contracting Officer.

## 3.1.1 Training Plan

Submit a written training plan to the Contracting Officer for approval at least 60 calendar days prior to the scheduled training. Training plan must be approved by the Commissioning Authority (CxA) prior to forwarding to the Contracting Officer. Also, coordinate the training schedule with the Contracting Officer and CxA. Include within the plan the following elements:

- a. Equipment included in training
- b. Intended audience
- c. Location of training
- d. Dates of training
- e. Objectives
- f. Outline of the information to be presented and subjects covered including description
- g. Start and finish times and duration of training on each subject
- h. Methods (e.g. classroom lecture, video, site walk-through, actual operational demonstrations, written handouts)
- i. Instructor names and instructor qualifications for each subject
- j. List of texts and other materials to be furnished by the Contractor that are required to support training

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k. Description of proposed software to be used for video recording of training sessions.

3.1.2 Training Content

The core of this training must be based on manufacturer's recommendations and the operation and maintenance information. The CxA is responsible for overseeing and approving the content and adequacy of the training. Spend 95 percent of the instruction time during the presentation on the OPERATION AND MAINTENANCE DATA. Include the following for each system training presentation:

- a. Start-up, normal operation, shutdown, unoccupied operation, seasonal changeover, manual operation, controls set-up and programming, troubleshooting, and alarms.
- b. Relevant health and safety issues.
- c. Discussion of how the feature or system is environmentally responsive. Advise adjustments and optimizing methods for energy conservation.
- d. Design intent.
- e. Use of O&M Manual Files.
- f. Review of control drawings and schematics.
- g. Interactions with other systems.
- h. Special maintenance and replacement sources.
- i. Tenant interaction issues.
- 3.1.3 Training Outline

Provide the Operation and Maintenance Manual Files (Bookmarked PDF) and a written course outline listing the major and minor topics to be discussed by the instructor on each day of the course to each trainee in the course. Provide the course outline 14 calendar days prior to the training.

## 3.1.4 Training Video Recording

Record classroom training session(s) on video. Provide to the Contracting Officer two copies of the training session(s) in DVD video recording format. Capture within the recording, in video and audio, the instructors' training presentations including question and answer periods with the attendees. The recording camera(s) must be attended by a person during the recording sessions to assure proper size of exhibits and projections during the recording are visible and readable when viewed as training.

3.1.5 Unresolved Questions from Attendees

If, at the end of the training course, there are questions from attendees that remain unresolved, the instructor must send the answers, in writing, to the Contracting Officer for transmittal to the attendees, and the training video must be modified to include the appropriate clarifications.

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# 3.1.6 Validation of Training Completion

Ensure that each attendee at each training session signs a class roster daily to confirm Government participation in the training. At the completion of training, submit a signed validation letter that includes a sample record of training for reporting what systems were included in the training, who provided the training, when and where the training was performed, and copies of the signed class rosters. Provide two copies of the validation to the Contracting Officer, and one copy to the Operation and Maintenance Manual Preparer for inclusion into the Manual's documentation.

# 3.1.7 Quality Control Coordination

Coordinate this training with the CxA in accordance with Section 01 45 04.10 06 CONTRACTOR QUALITY CONTROL.

-- End of Section --

# SECTION 02 41 00

## DEMOLITION 05/10, CHG 2: 02/19

#### PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

ASSP A10.6	(2006) Safety & Health Program
	Requirements for Demolition Operations -
	American National Standard for
	Construction and Demolition Operations

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 (2014) Safety -- Safety and Health Requirements Manual

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 61

National Emission Standards for Hazardous Air Pollutants

#### 1.2 PROJECT DESCRIPTION

1.2.1 Definitions

1.2.1.1 Demolition

Demolition is the process of wrecking or taking out any load-supporting structural member of a facility together with any related handling and disposal operations.

1.2.1.2 Demolition Plan

Demolition Plan is the planned steps and processes for managing demolition activities and identifying the required sequencing activities and disposal mechanisms.

## 1.2.2 Demolition Plan

Prepare a Demolition Plan and submit proposed demolition, and removal procedures for approval before work is started. Include in the plan procedures for careful removal and disposition of materials specified to be salvaged, coordination with other work in progress, a disconnection schedule of utility services, a detailed description of methods and equipment to be used for each operation and of the sequence of operations. Identify components and materials to be salvaged for reuse or recycling with reference to paragraph Existing Facilities to be Removed. Append tracking forms for all removed materials indicating type, quantities,

> SECTION 02 41 00 Page 1 Certified Final Submittal

condition, destination, and end use. Coordinate with Waste Management Plan in accordance with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL. Provide procedures for safe conduct of the work in accordance with EM 385-1-1. Plan shall be approved by Contracting Officer prior to work beginning.

# 1.2.3 General Requirements

Do not begin demolition until authorization is received from the Contracting Officer. The work of this section is to be performed in a manner that maximizes the value derived from the salvage and recycling of materials. Remove rubbish and debris from the project site; do not allow accumulations inside or outside the buildings. The work includes demolition, salvage of identified items and materials, and removal of resulting rubbish and debris. Remove rubbish and debris from Government property daily, unless otherwise directed. Store materials that cannot be removed daily in areas specified by the Contracting Officer. In the interest of occupational safety and health, perform the work in accordance with EM 385-1-1, Section 23, Demolition, and other applicable Sections.

# 1.3 ITEMS TO REMAIN IN PLACE

Take necessary precautions to avoid damage to existing items to remain in place, to be reused, or to remain the property of the Government. Repair or replace damaged items as approved by the Contracting Officer. Coordinate the work of this section with all other work indicated. Construct and maintain shoring, bracing, and supports as required. Ensure that structural elements are not overloaded. Increase structural supports or add new supports as may be required as a result of any cutting, removal, or demolition work performed under this contract. Do not overload pavements to remain. Provide new supports and reinforcement for existing construction weakened by demolition, or removal work. Repairs, reinforcement, or structural replacement require approval by the Contracting Officer prior to performing such work.

# 1.3.1 Existing Construction Limits and Protection

Do not disturb existing construction beyond the extent indicated or necessary for installation of new construction. Provide temporary shoring and bracing for support of building components to prevent settlement or other movement. Provide protective measures to control accumulation and migration of dust and dirt in all work areas. Remove snow, dust, dirt, and debris from work areas daily.

# 1.3.2 Weather Protection

For portions of the building to remain, protect building interior and materials and equipment from the weather at all times. Where removal of existing roofing is necessary to accomplish work, have materials and workmen ready to provide adequate and temporary covering of exposed areas.

# 1.3.3 Trees

Protect trees within the project site which might be damaged during demolition, and which are indicated to be left in place, by a 6 foot high fence. Erect and secure fence a minimum of 5 feet from the trunk of individual trees or follow the outer perimeter of branches or clumps of trees. Replace any tree designated to remain that is damaged during the work under this contract with like-kind or as approved by the Contracting

Officer.

# 1.3.4 Utility Service

Maintain existing utilities indicated to stay in service and protect against damage during demolition operations. Prior to start of work, utilities serving each area of alteration or removal will be shut off by the Government and disconnected and sealed by the Contractor .

# 1.3.5 Facilities

Protect electrical and mechanical services and utilities. Where removal of existing utilities and pavement is specified or indicated, provide approved barricades, temporary covering of exposed areas, and temporary services or connections for electrical and mechanical utilities. Floors, roofs, walls, columns, pilasters, and other structural components that are designed and constructed to stand without lateral support or shoring, and are determined to be in stable condition, must remain standing without additional bracing, shoring, or lateral support until demolished or deconstructed, unless directed otherwise by the Contracting Officer. Ensure that no elements determined to be unstable are left unsupported and place and secure bracing, shoring, or lateral supports as may be required as a result of any cutting, removal, or demolition work performed under this contract.

# 1.4 BURNING

The use of burning at the project site for the disposal of refuse and debris will not be permitted . Where burning is permitted, adhere to federal, state, and local regulations.

## 1.5 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Demolition Plan; G

Existing Conditions

SD-07 Certificates

Notification; G

#### 1.6 QUALITY ASSURANCE

Submit timely notification of demolition projects to Federal, State, regional, and local authorities in accordance with 40 CFR 61, Subpart M. Notify the and the Contracting Officer in writing 10 working days prior to the commencement of work in accordance with 40 CFR 61, Subpart M. Comply with federal, state, and local hauling and disposal regulations. In addition to the requirements of the "Contract Clauses," conform to the safety requirements contained in ASSP A10.6. Comply with the Environmental Protection Agency requirements specified. Use of explosives will not be permitted.

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#### 1.6.1 Dust and Debris Control

Prevent the spread of dust and debris and avoid the creation of a nuisance or hazard in the surrounding area. Do not use water if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution.

1.7 PROTECTION

#### 1.7.1 Traffic Control Signs

a. Where pedestrian and driver safety is endangered in the area of removal work, use traffic barricades with flashing lights. Notify the Contracting Officer prior to beginning such work.

## 1.7.2 Protection of Personnel

Before, during and after the demolition work continuously evaluate the condition of the site and take immediate action to protect all personnel working in and around the project site.

#### 1.8 RELOCATIONS

Perform the removal and reinstallation of relocated items as indicated with workmen skilled in the trades involved. Repair or replace items to be relocated which are damaged by the Contractor with new undamaged items as approved by the Contracting Officer.

#### 1.9 EXISTING CONDITIONS

Before beginning any demolition work, survey the site and examine the drawings and specifications to determine the extent of the work. Record existing conditions in the presence of the Contracting Officer showing the condition of structures and other facilities adjacent to areas of alteration or removal. Photographs sized 4 inch will be acceptable as a record of existing conditions. Include in the record the elevation of the top of foundation walls, finish floor elevations, possible conflicting electrical conduits, plumbing lines, alarms systems, the location and extent of existing cracks and other damage and description of surface conditions that exist prior to before starting work. It is the Contractor's responsibility to verify and document all required outages which will be required during the course of work, and to note these outages on the record document. Submit survey results.

#### PART 2 PRODUCTS

## 2.1 FILL MATERIAL

- a. Comply with excavating, backfilling, and compacting procedures for soils used as backfill material to fill basements, voids, depressions or excavations resulting from demolition of structures.
- b. Fill material shall conform to Specification Section 31 00 00.00 06 EARTHWORK.
- c. Proposed fill material shall conform to Specification Section 31 00 00.00 06 EARTHWORK.

PART 3 EXECUTION

3.1 EXISTING FACILITIES TO BE REMOVED

Existing construction scheduled to be removed for reuse shall be disassembled. Dismantled and removed materials are to be separated, set aside, and prepared as specified, and stored or delivered to a collection point for reuse, remanufacture, recycling, or other disposal, as specified. Materials shall be designated for reuse onsite whenever possible.

3.1.1 Utilities and Related Equipment

## 3.1.1.1 General Requirements

Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by the Contracting Officer. Do not interrupt existing utilities serving facilities occupied and used by the Government except when approved in writing and then only after temporary utility services have been approved and provided. Do not begin demolition work until all utility disconnections have been made. Shut off and cap utilities for future use, as indicated.

3.1.1.2 Disconnecting Existing Utilities

Remove existing utilities, as indicated or uncovered by work and terminate in a manner conforming to the nationally recognized code covering the specific utility and approved by the Contracting Officer. When utility lines are encountered but are not indicated on the drawings, notify the Contracting Officer prior to further work in that area. Remove meters and related equipment and deliver to a location in accordance with instructions of the Contracting Officer.

# 3.1.2 Chain Link Fencing

Remove chain link fencing, gates and other related salvaged items scheduled for removal and transport to designated areas. Remove gates as whole units. Cut chain link fabric to 25 foot lengths and store in rolls off the ground.

## 3.1.3 Paving and Slabs

Remove concrete and asphaltic concrete paving and slabs including aggregate base as indicated to a depth of 6 inches below new finish grade. Provide neat sawcuts at limits of pavement removal as indicated. Pavement and slabs designated to be recycled and utilized in this project shall be moved, ground and stored as directed by the Contracting Officer. Pavement and slabs not to be used in this project shall be removed from the Installation at Contractor's expense.

# 3.1.4 Structural Steel

Dismantle structural steel at field connections and in a manner that will prevent bending or damage. Salvage for recycle structural steel, steel joists, girders, angles, plates, columns and shapes. Flame-cutting torches are permitted when other methods of dismantling are not practical. Transport steel joists and girders as whole units and not dismantled. Transport structural steel shapes to a designated recycling facility , stacked according to size, type of member and length, and stored off the

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ground, protected from the weather.

## 3.1.5 Miscellaneous Metal

Salvage shop-fabricated items such as access doors and frames, steel gratings, metal ladders, wire mesh partitions, metal railings, metal windows and similar items as whole units. Salvage light-gage and cold-formed metal framing, such as steel studs, steel trusses, metal gutters, roofing and siding, metal toilet partitions, toilet accessories and similar items. Recycle scrap metal as part of demolition operations. Provide separate containers to collect scrap metal and transport to a scrap metal collection or recycling facility, in accordance with the Waste Management Plan.

# 3.1.6 Carpentry

Salvage for recycle lumber, and finished boards, and sort by type and size.

# 3.2 CONCURRENT EARTH-MOVING OPERATIONS

Do not begin excavation, filling, and other earth-moving operations that are sequential to demolition work in areas occupied by structures to be demolished or deconstructed until all demolition in the area has been completed and debris removed. Fill holes, open basements and other hazardous openings.

## 3.3 DISPOSITION OF MATERIAL

# 3.3.1 Title to Materials

Except for salvaged items specified in related Sections, and for materials or equipment scheduled for salvage, all materials and equipment removed and not reused or salvaged, shall become the property of the Contractor and shall be removed from Government property. Title to materials resulting from demolition, and materials and equipment to be removed, is vested in the Contractor upon approval by the Contracting Officer of the Contractor's demolition, and removal procedures, and authorization by the Contracting Officer to begin demolition. The Government will not be responsible for the condition or loss of, or damage to, such property after contract award. Showing for sale or selling materials and equipment on site is prohibited.

## 3.3.2 Reuse of Materials and Equipment

Remove and store materials to be reused or relocated to prevent damage, and reinstall as the work progresses. Coordinate the re-use of materials and equipment with the re-use requirements in accordance with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL. Capture re-use of materials in the diversion calculations for the project.

## 3.3.3 Salvaged Materials and Equipment

- a. Salvage items and material to the maximum extent possible.
- b. Store all materials salvaged for the Contractor as approved by the Contracting Officer and remove from Government property before completion of the contract. Coordinate the salvaged materials with tracking requirements in accordance with Section 01 74 19 CONSTRUCTION

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WASTE MANAGEMENT AND DISPOSAL. Capture salvaged materials in the diversion calculations for the project.

- c. Remove salvaged items to remain the property of the Government in a manner to prevent damage, and packed or crated to protect the items from damage while in storage or during shipment. Items damaged during removal or storage must be repaired or replaced to match existing items. Properly identify the contents of containers.
- d. Remove historical items in a manner to prevent damage. Deliver the following historical items to the Government for disposition: Corner stones, contents of corner stones, and document boxes wherever located on the site.

# 3.3.4 Unsalvageable and Non-Recyclable Material

Dispose of unsalvageable and non-recyclable noncombustible material off site. Dispose of unsalvageable and non-recyclable combustible materialoff the site.

3.4 CLEANUP

Remove debris and rubbish from excavations. Remove and transport the debris in a manner that prevents spillage on streets or adjacent areas. Apply local regulations regarding hauling and disposal.

- 3.5 DISPOSAL OF REMOVED MATERIALS
- 3.5.1 Regulation of Removed Materials

Dispose of debris, rubbish, scrap, and other nonsalvageable materials resulting from removal operations with all applicable federal, state and local regulations as contractually specified in the Waste Management Plan. Storage of removed materials on the project site is prohibited.

3.5.2 Removal to Spoil Areas on Government Property

Transport noncombustible materials removed from demolition off site.

3.5.3 Removal from Government Property

Transport waste materials removed from demolished and deconstructed structures, except waste soil, from Government property for legal disposal. Dispose of waste soil as specified in Section 01 57 19.00 06 TEMPORARY ENVIRONMENTAL CONTROLS AND PERMITS.

3.6 REUSE OF SALVAGED ITEMS

Recondition salvaged materials and equipment designated for reuse before installation. Replace items damaged during removal and salvage operations or restore them as necessary to usable condition.

-- End of Section --

SECTION 03 30 00

# CAST-IN-PLACE CONCRETE 02/19, CHG 3: 11/21

# PART 1 GENERAL

# 1.1 REFERENCES

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

AMERICAN CONCRETE INSTITUTE (ACI)

ACI 117		(2010; Errata 2011) Specifications for Tolerances for Concrete Construction and Materials and Commentary
ACI 121R		(2008) Guide for Concrete Construction Quality Systems in Conformance with ISO 9001
ACI 301	,	(2016) Specifications for Structural Concrete
ACI 302.1R		(2015) Guide for Concrete Floor and Slab Construction
ACI 304.2R		(2017) Guide to Placing Concrete by Pumping Methods
ACI 304R	1	(2000; R 2009) Guide for Measuring, Mixing, Transporting, and Placing Concrete
ACI 305.1		(2014) Specification for Hot Weather Concreting
ACI 305R		(2020) Guide to Hot Weather Concreting
ACI 306.1		(1990; R 2002) Standard Specification for Cold Weather Concreting
ACI 306R		(2016) Guide to Cold Weather Concreting
ACI 308.1		(2011) Specification for Curing Concrete
ACI SP-2		(2007; Abstract: 10th Edition) ACI Manual of Concrete Inspection
ACI SP-15		(2011) Field Reference Manual: Standard Specifications for Structural Concrete ACI 301-05 with Selected ACI References

# AMERICAN HARDBOARD ASSOCIATION (AHA)

AHA .	A135.4		(1995;	R	20	04	E)	Basic	Hard	lboard	
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W912QR25R0052 Specs Vol1-0000 P2#: 506474 - Manned/Unmanned Tactical Vehicle Lab (MUMT) Detroit Arsenal, MI AMERICAN WELDING SOCIETY (AWS) AWS D1.4/D1.4M (2011) Structural Welding Code -Reinforcing Steel ASTM INTERNATIONAL (ASTM) ASTM A36/A36M (2019) Standard Specification for Carbon Structural Steel ASTM A184/A184M (2019) Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement (2020) Standard Specification for Deformed ASTM A615/A615M and Plain Carbon-Steel Bars for Concrete Reinforcement ASTM A706/A706M (2016) Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement ASTM A934/A934M (2016) Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars ASTM A970/A970M (2018) Standard Specification for Headed Steel Bars for Concrete Reinforcement (2016a) Standard Specification for Steel ASTM A1044/A1044M Stud Assemblies for Shear Reinforcement of Concrete ASTM A1064/A1064M (2017) Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete ASTM C31/C31M (2021a) Standard Practice for Making and Curing Concrete Test Specimens in the Field ASTM C33/C33M (2018) Standard Specification for Concrete Aggregates ASTM C39/C39M (2021) Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens (2020) Standard Test Method for Obtaining ASTM C42/C42M and Testing Drilled Cores and Sawed Beams of Concrete ASTM C78/C78M (2021) Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading) ASTM C94/C94M (2021a) Standard Specification for Ready-Mixed Concrete

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P2#: 506474 - Manned/Unmanned Tactical Vehicle Lab (MUMT) Detroit Arsenal, MI ASTM C136/C136M (2019) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates ASTM C143/C143M (2020) Standard Test Method for Slump of Hydraulic-Cement Concrete ASTM C150/C150M (2021) Standard Specification for Portland Cement ASTM C172/C172M (2017) Standard Practice for Sampling Freshly Mixed Concrete (2016) Standard Test Method for Air ASTM C173/C173M Content of Freshly Mixed Concrete by the Volumetric Method ASTM C231/C231M (2017a) Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method ASTM C260/C260M (2010a; R 2016) Standard Specification for Air-Entraining Admixtures for Concrete ASTM C311/C311M (2018) Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland-Cement Concrete (2019) Standard Specification for Chemical ASTM C494/C494M Admixtures for Concrete (2021) Standard Specification for Blended ASTM C595/C595M Hydraulic Cements (2019) Standard Specification for Coal Fly ASTM C618 Ash and Raw or Calcined Natural Pozzolan for Use in Concrete ASTM C845/C845M (2018) Standard Specification for Expansive Hydraulic Cement ASTM C920 (2018) Standard Specification for Elastomeric Joint Sealants ASTM C989/C989M (2018a) Standard Specification for Slag Cement for Use in Concrete and Mortars ASTM C1012/C1012M (2018b) Standard Test Method for Length Change of Hydraulic-Cement Mortars Exposed to a Sulfate Solution ASTM C1017/C1017M (2013; E 2015) Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete ASTM C1077 (2017) Standard Practice for Agencies

W912QR25R0052 Specs Vol1-0000

ASTM C1077 (2017) Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation

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	W912QR25R0052_Specs_Vol1-0000
P2#: 506474 - Manned/Unmanned ' Detroit Arsenal, MI	Tactical Vehicle Lab (MUMT)
ASTM C1107/C1107M	(2020) Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
ASTM C1157/C1157M	(2020a) Standard Performance Specification for Hydraulic Cement
ASTM C1218/C1218M	(2020c) Standard Test Method for Water-Soluble Chloride in Mortar and Concrete
ASTM C1260	(2021) Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C1293	(2008; R 2015) Standard Test Method for Determination of Length Change of Concrete Due to Alkali-Silica Reaction
ASTM C1567	(2021) Standard Test Method for Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)
ASTM C1602/C1602M	(2018) Standard Specification for Mixing Water Used in Production of Hydraulic Cement Concrete
ASTM C1778	(2016) Standard Guide for Reducing the Risk of Deleterious Alkali-Aggregate Reaction in Concrete
ASTM D1751	(2018) Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
ASTM D2628	(1991; R 2016) Standard Specification for Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements
ASTM D2835	(1989; R 2017) Standard Specification for Lubricant for Installation of Preformed Compression Seals in Concrete Pavements
ASTM D5759	(2012; R 2020) Characterization of Coal Fly Ash and Clean Coal Combustion Fly Ash for Potential Uses
ASTM D6690	(2015) Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements
ASTM D6866	(2022) Standard Test Methods for Determining the Biobased Content of Solid, Liquid, and Gaseous Samples Using Radiocarbon Analysis
ASTM E96/E96M	(2016) Standard Test Methods for Water

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Vapor Transmission of Materials

- ASTM E329 (2021) Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection
- ASTM E1155 (2020) Standard Test Method for Determining Floor Flatness and Floor Levelness Numbers
- ASTM E1643 (2018a) Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs
- ASTM E1745 (2017) Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs

CONCRETE REINFORCING STEEL INSTITUTE (CRSI)

CRSI 10MSP (	2018)	Manual	of	Standard	Practice	

CRSI RB4.1 (2016) Supports for Reinforcement Used in Concrete

FOREST STEWARDSHIP COUNCIL (FSC)

FSC STD 01 001 (2015) Principles and Criteria for Forest Stewardship

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

NIST PS 1 (2009) DOC Voluntary Product Standard PS 1-07, Structural Plywood

U.S. ARMY CORPS OF ENGINEERS (USACE)

COE CRD-C 104 (1980) Method of Calculation of the Fineness Modulus of Aggregate

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FS SS-S-200 (Rev E; Am 1; Notice 1) Sealant, Joint, Two-Component, Jet-Blast-Resistant, Cold-Applied, for Portland Cement Concrete Pavement

U.S. GREEN BUILDING COUNCIL (USGBC)

LEED v4 BDC Ref Guide (2013; R 2020) USGBC LEED Reference Guide for Building Design and Construction, v4 LEED v4.1 BDC Ref Guide (2023) LEED v4.1 Building Design and

Construction Reference Guide

1.2 DEFINITIONS

a. "Cementitious material" as used herein must include all portland

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cement, pozzolan, fly ash, and slag cement.

- b. "Exposed to public view" means situated so that it can be seen from eye level from a public location after completion of the building. A public location is accessible to persons not responsible for operation or maintenance of the building.
- c. "Chemical admixtures" are materials in the form of powder or fluids that are added to the concrete to give it certain characteristics not obtainable with plain concrete mixes.
- d. "Supplementary cementing materials" (SCM) include coal fly ash, slag cement, natural or calcined pozzolans, and ultra-fine coal ash when used in such proportions to replace the portland cement that result in improvement to sustainability and durability and reduced cost.
- e. "Design strength" (f'c) is the specified compressive strength of concrete at time(s) specified in this section to meet structural design criteria.
- f. "Mass Concrete" is any concrete system that approaches a maximum temperature of 158 degrees F within the first 72 hours of placement. In addition, it includes all concrete elements with a section thickness of 3 feet or more regardless of temperature.
- g. "Mixture proportioning" is the process of designing concrete mixture proportions to enable it to meet the strength, service life and constructability requirements of the project while minimizing the initial and life-cycle cost.
- h. "Mixture proportions" are the masses or volumes of individual ingredients used to make a unit measure (cubic meter or cubic yard) of concrete.
- i. "Pozzolan" is a siliceous or siliceous and aluminous material, which in itself possesses little or no cementitious value but will, in finely divided form and in the presence of moisture, chemically react with calcium hydroxide at ordinary temperatures to form compounds possessing cementitious properties.
- j. "Workability (or consistence)" is the ability of a fresh (plastic) concrete mix to fill the form/mould properly with the desired work (vibration) and without reducing the concrete's quality. Workability depends on water content, chemical admixtures, aggregate (shape and size distribution), cementitious content and age (level of hydration).

#### 1.3 SUSTAINABILITY REPORTING

Work of this section is intended to contribute to the achievement of, or compliance with, the requirements of the Guiding Principles Validation and LEED Prerequisites and attempted Credits. Refer to Section 01 33 29.00 06 SUSTAINABILITY REPORTING for specific documentation requirements and list of Prerequisites, attempted Credits and LEED version.

Comply with product, material content, performance criteria, activity, documentation, and other technical requirements as described in the LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide as applicable.

Collect, organize, and submit product data, drawings, diagrams, photos and

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cost information necessary to demonstrate compliance with LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide requirements as applicable.

Data collection shall commence with the notice to proceed and will only be deemed complete upon acceptance of the Final Sustainability Notebook and LEED Online submission by the Contracting Officer, the LEED Project Administrator, and the Green Building Certification Institute.

# 1.4 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Concrete Curing Plan; G Quality Control Plan; G Quality Control Personnel Certifications; G Quality Control Organizational Chart Laboratory Accreditation; G

## SD-02 Shop Drawings

Reinforcing Steel; G, AE

#### SD-03 Product Data

Joint Sealants; S

Joint Filler; G

Formwork Materials

Cementitious Materials; S

Vapor Barrier

Concrete Curing Materials

Reinforcement; S

Liquid Chemical Floor Hardeners and Sealers; S

Admixtures

Mechanical Reinforcing Bar Connectors

Biodegradable Form Release Agent

Pumping Concrete

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Finishing Plan Nonshrink Grout Environmental Product Declarations; S Embodied Carbon Optimization Report/Action Plan; S Extended Producer Responsibility; S Bio-Based Materials; S Recycled Content Materials; S Local/Regional Materials; S Low-Emitting Materials; S Material Ingredient Reporting; S SD-05 Design Data Concrete Mix Design; G, AE SD-06 Test Reports Concrete Mix Design; G, AE Fly Ash Pozzolan Slag Cement Aggregates Tolerance Report; G Compressive Strength Tests; G, AE Chloride Ion Concentration Air Content Slump Tests Water SD-07 Certificates Reinforcing Bars Welder Qualifications VOC Content for Form Release Agents, Curing Compounds, and Concrete Penetrating Sealers; S Safety Data Sheets

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Certified Wood; S

Field Testing Technician and Testing Agency

SD-08 Manufacturer's Instructions

Liquid Chemical Floor Hardeners and Sealers

Joint Sealants

Curing Compound

# 1.5 MODIFICATION OF REFERENCES

Accomplish work in accordance with ACI publications except as modified herein. Consider the advisory or recommended provisions to be mandatory. Interpret reference to the "Building Official," the "Structural Engineer," and the "Architect/Engineer" to mean the Contracting Officer.

# 1.6 DELIVERY, STORAGE, AND HANDLING

Follow ACI 301, ACI 304R and ASTM A934/A934M requirements and recommendations. Do not deliver concrete until , vapor barrier, forms, reinforcement, embedded items, and chamfer strips are in place and ready for concrete placement. Do not store concrete curing compounds or sealers with materials that have a high capacity to adsorb volatile organic compound (VOC) emissions. Do not store concrete curing compounds or sealers in occupied spaces.

# 1.6.1 Reinforcement

Store reinforcement of different sizes and shapes in separate piles or racks raised above the ground to avoid excessive rusting. Protect from contaminants such as grease, oil, and dirt. Ensure bar sizes can be accurately identified after bundles are broken and tags removed.

## 1.7 QUALITY ASSURANCE

## 1.7.1 Design Data

# 1.7.1.1 Concrete Mix Design

Sixty days minimum prior to concrete placement, submit a mix design for each strength and type of concrete. Submit a complete list of materials including type; brand; source and amount of cement, supplementary cementitious materials, , and admixtures; and applicable reference specifications. Submit mill test and all other test for cement, supplementary cementitious materials, aggregates, and admixtures. Provide documentation of maximum nominal aggregate size, gradation analysis, percentage retained and passing sieve, and a graph of percentage retained verses sieve size. Provide mix proportion data using at least three different water-cementitious material ratios for each type of mixture, which produce a range of strength encompassing those required for each type of concrete required. If source material changes, resubmit mix proportion data using revised source material. Provide only materials that have been proven by trial mix studies to meet the requirements of this specification, unless otherwise approved in writing by the Contracting Officer. Indicate clearly in the submittal where each mix

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design is used when more than one mix design is submitted. Resubmit data on concrete components if the qualities or source of components changes. For previously approved concrete mix designs used within the past twelve months, the previous mix design may be re-submitted without further trial batch testing if accompanied by material test data conducted within the last six months. Obtain mix design approval from the contracting officer prior to concrete placement.

# 1.7.2 Shop Drawings

## 1.7.2.1 Reinforcing Steel

Indicate bending diagrams, assembly diagrams, splicing and laps of bars, shapes, dimensions, and details of bar reinforcing, accessories, and concrete cover. Do not scale dimensions from structural drawings to determine lengths of reinforcing bars. Reproductions of contract drawings are unacceptable.1.7.3 Control Submittals

## 1.7.3.1 Concrete Curing Plan

Submit proposed materials, methods, schedule and duration for curing concrete elements in accordance with ACI 308.1.

## 1.7.3.2 Pumping Concrete

Submit proposed materials and methods for pumping concrete. Submittal must include mix designs, pumping equipment including type of pump and size and material for pipe, and maximum length and height concrete is to be pumped.

# 1.7.3.3 Finishing Plan

Submit proposed material and procedures to be used in obtaining the finish for the floors. Include qualification of person to be used for obtaining floor tolerance measurement, description of measuring equipment to be used, and a sketch showing lines and locations the measuring equipment will follow.

1.7.3.4 VOC Content for form release agents, curing compounds, and concrete penetrating sealers

Submit certification for the form release agent, curing compounds, and concrete penetrating sealers that indicate the VOC content of each product.

# 1.7.3.5 Safety Data Sheets

Submit Safety Data Sheets (SDS) for all materials that are regulated for hazardous health effects. SDS must be readily accessible during each work shift to employees when they are at the construction site.

# 1.7.4 Test Reports

#### 1.7.4.1 Fly Ash and Pozzolan

Submit test results in accordance with ASTM C618 for fly ash and pozzolan. Submit test results performed within 6 months of submittal date.

## 1.7.4.2 Slag Cement

Submit test results in accordance with ASTM C989/C989M for slag cement. Submit test results performed within 6 months of submittal date.

## 1.7.4.3 Aggregates

Submit test results in accordance with ASTM C33/C33Mfor aggregate, and ASTM C1293 or ASTM C1567 as required in the paragraph titled ALKALI-AGGREGATE REACTION.

1.7.5 Quality Control Plan

Develop and submit for approval a concrete quality control program in accordance with the guidelines of ACI 121R and as specified herein. The plan must include approved laboratories. Provide direct oversight for the concrete qualification program inclusive of associated sampling and testing. All quality control reports must be provided to the Contracting Officer, Quality Manager and Concrete Supplier. Maintain a copy of ACI SP-15 and CRSI 10MSP at project site.

1.7.6 Quality Control Personnel Certifications

The Contractor must submit for approval the responsibilities of the various quality control personnel, including the names and qualifications of the individuals in those positions and a quality control organizational chart defining the quality control hierarchy and the responsibility of the various positions. Quality control personnel must be employed by the Contractor.

Submit American Concrete Institute certification for the following:

- a. CQC personnel responsible for inspection of concrete operations.
- b. Lead Foreman or Journeyman of the Concrete Placing, Finishing, and Curing Crews.
- c. Field Testing Technicians: ACI Concrete Field Testing Technician, Grade I.
- 1.7.6.1 Quality Manager Qualifications

The quality manager must hold a current license as a professional engineer in a U.S. state or territory with experience on at least five similar projects. Evidence of extraordinary proven experience may be considered by the Contracting Officer as sufficient to act as the Quality Manager.

## 1.7.6.2 Field Testing Technician and Testing Agency

Submit data on qualifications of proposed testing agency and technicians for approval by the Contracting Officer prior to performing testing on concrete.

a. Work on concrete under this contract must be performed by an ACI Concrete Field Testing Technician Grade 1 qualified in accordance with ACI SP-2 or equivalent. Equivalent certification programs must include requirements for written and performance examinations as stipulated in ACI SP-2.

- b. Testing agencies that perform testing services on reinforcing steel must meet the requirements of ASTM E329.
- c. Testing agencies that perform testing services on concrete materials must meet the requirements of ASTM C1077.
- 1.7.7 Laboratory Qualifications for Concrete Qualification Testing

The concrete testing laboratory must have the necessary equipment and experience to accomplish required testing. The laboratory must meet the requirements of ASTM C1077 and be Cement and Concrete Reference Laboratory (CCRL) inspected.

1.7.8 Laboratory Accreditation

Laboratory and testing facilities must be provided by and at the expense of the Contractor. The laboratories performing the tests must be accredited in accordance with ASTM C1077, including ASTM C78/C78M and ASTM C1260. The accreditation must be current and must include the required test methods, as specified. Furthermore, the testing must comply with the following requirements:

- a. Aggregate Testing and Mix Proportioning: Aggregate testing and mixture proportioning studies must be performed by an accredited laboratory and under the direction of a registered professional engineer in a U.S. state or territory competent in concrete materials who is competent in concrete materials and must sign all reports and designs.
- b. Acceptance Testing: Furnish all materials, labor, and facilities required for molding, curing, testing, and protecting test specimens at the site and in the laboratory. Furnish and maintain boxes or other facilities suitable for storing and curing the specimens at the site while in the mold within the temperature range stipulated by ASTM C31/C31M.
- c. Contractor Quality Control: All sampling and testing must be performed by an approved, onsite, independent, accredited laboratory.

# 1.8 ENVIRONMENTAL REQUIREMENTS

Provide space ventilation according to material manufacturer recommendations, at a minimum, during and following installation of concrete curing compound and sealer. Maintain one of the following ventilation conditions during the curing period or for 72 hours after installation:

- a. Supply 100 percent outside air 24 hours a day.
- b. Supply airflow at a rate of 6 air changes per hour, when outside temperatures are between 55 degrees F and 84 degrees F and humidity is between 30 percent and 60 percent.
- c. Supply airflow at a rate of 1.5 air changes per hour, when outside air conditions are not within the range stipulated above.
- 1.8.1 Submittals for Environmental Performance
  - a. Provide data indication the percentage of post-industrial pozzolan (fly ash, slag cement) cement substitution as a percentage of the full

product composite by weight.

- b. Provide data indicating the percentage of post-industrial and post-consumer recycled content aggregate.
- c. Provide product data indicating the percentage of post-consumer recycled steel content in each type of steel reinforcement as a percentage of the full product composite by weight.
- d. Provide product data stating the location where all products were manufactured
- e. For projects using FSC certified formwork, provide chain-of-custody documentation for all certified wood products.
- f. For projects using reusable formwork, provide data showing how formwork is reused.
- g. Provide SDS product information data showing that form release agents meet any environmental performance goals such as using vegetable and soy based products.
- h. Provide SDS product information data showing that concrete adhesives meet any environmental performance goals including low emitting, low volatile organic compound products.
- 1.9 SUSTAINABLE DESIGN REQUIREMENTS
- 1.9.1 Environmental Product Declarations

At a minimum, use materials or products with an Environmental Product Declaration in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.9.2 Embodied Carbon Optimization Report/Action Plan

At a minimum, use materials or products with an Embodied Carbon Optimization Report/Action Plan in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.9.3 Sourcing of Raw Materials

Provide products that meet one or more of the following categories:

1.9.3.1 Extended Producer Responsibility

At a minimum, use materials or products from manufacturers that participate in an extended producer responsibility program in accordance with the LEED Implementation Plan. Provide manufacturer letter verifying extended producer responsibility program is in place and that product is eligible. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.9.3.2 Bio-Based Materials

At a minimum, use materials or products with bio-based content in accordance with the LEED Implementation Plan. Provide manufacturer signed

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letter confirming ASTM D6866 test method was conducted validating bio-based material weight within product, type of bio-based material used within product, and confirmation raw material was legally harvested. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan. If bio-based content minimum is specified in this section, the greater of the two percentages governs.

## 1.9.3.3 Certified Wood

Use FSC-certified wood where available from a minimum of three sources. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan. Indicate compliance with FSC STD 01 001 and identify certifying organization. Submit FSC certification numbers; identify each certified products on a line-item basis. Submit copies of invoices for all wood products bearing the FSC certification numbers for certified wood products as part of the closeout submittal.

# 1.9.3.4 Recycled Content Materials

At a minimum, use materials or products with recycled content in accordance with the LEED Implementation Plan. Provide manufacturers product literature identifying the percentage of recycled material incorporated within each product used.See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan. If recycled content minimum is specified in this section, the greater of the two percentages governs.

## 1.9.4 Material Ingredient Reporting

At a minimum, use materials or products with chemical inventory to at least 0.1% (1000 ppm) in accordance with the LEED Implementation Plan. Provide Health Product Declaration (HPD), Cradle to Cradle Certificate, Declare label, or other manufacturer's published content inventory in compliance with LEED v4.1 Material Ingredient Reporting credit. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

# 1.9.5 Local/Regional Materials

Use materials or products extracted, harvested, or recovered, as well as manufactured, within a 100 mile radius from the project site, if available from a minimum of three sources. provide a letter from the manufacturer stating the extraction location, manufacturing location, and purchasing location of the products provided, referencing the project name and location specifically and distance to the project site. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

## 1.9.6 Low-Emitting Materials

Use only joint sealants, form release agents, curing compounds, and concrete penetrating sealer products that comply with LEED v4.1 BDC Ref Guide VOC and/or emissions requirements. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for low-emitting material requirements.

# 1.10 QUALIFICATIONS FOR WELDING WORK

Welding procedures must be in accordance with AWS D1.4/D1.4M.

Verify that Welder qualifications are in accordance with AWS D1.4/D1.4M for welding of reinforcement or under an equivalent qualification test approved in advance. Welders are permitted to do only the type of welding for which each is specifically qualified.

## PART 2 PRODUCTS

#### 2.1 FORMWORK MATERIALS

- a. Form-facing material in contact with concrete must be lumber, plywood, tempered concrete-form-grade hardboard, metal, plastic . Submit product information on proposed form-facing materials if different from that specified herein.
- b. Design formwork, shores to support loads transmitted to them and to comply with applicable building code requirements.
- c. Design formwork to withstand pressure resulting from placement and vibration of concrete and to maintain specified tolerances.
- d. Provide temporary openings in formwork if needed to facilitate cleaning and inspection.
- e. Design formwork joints to inhibit leakage of mortar.
- f. Limit deflection of facing materials for concrete surfaces exposed to view to 1/400 of center-to-center spacing of facing supports.
- g. Do not use earth cuts as forms for vertical or sloping surfaces.
- h. Submit product information on proposed form-facing materials if different from that specified herein.
- i. Submit manufacturer's product data on form liner proposed for use with each formed surface.

# 2.1.1 Wood Forms

Use lumber as specified in Section 06 10 00 ROUGH CARPENTRY and as follows. Provide lumber that is square edged or tongue-and-groove boards, free of raised grain, knotholes, or other surface defects. Provide plywood that complies with NIST PS 1, B-B concrete form panels or better or AHA A135.4, hardboard for smooth form lining. Submit data verifying that composite wood products contain no urea formaldehyde resins. Virgin wood used must be FSC-certified.

## 2.1.1.1 Concrete Form Plywood (Standard Rough)

Provide plywood that conforms to NIST PS 1, B-B, concrete form, not less than 5/8-inch thick.

2.1.1.2 Overlaid Concrete Form Plywood (Standard Smooth)

Provide plywood that conforms to NIST PS 1, B-B, high density form overlay, not less than 5/8-inch thick.

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#### 2.1.2 Plastic Forms

Plastic lumber as specified in Section 06 10 00 ROUGH CARPENTRY. Provide plastic forms that contain a minimum of 50 percent post-consumer recycled content, or a minimum of 50 percent post-industrial recycled content.

2.1.3 Steel Forms

Provide steel form surfaces that do not contain irregularities, dents, or sags.

- 2.2 FORMWORK ACCESSORIES
  - a. Use commercially manufactured formwork accessories, including ties and hangers.
  - b. Form ties and accessories must not reduce the effective cover of the reinforcement.

# 2.2.1 Form Ties

- a. Use form ties with ends or end fasteners that can be removed without damage to concrete.
- b. Where indicated in Contract Documents, use form ties with integral water barrier plates or other acceptable positive water barriers in walls.
- c. The breakback distance for ferrous ties must be at least 2 in. 3/4 in. for Surface Finish-2.0 or Surface Finish-3.0, as defined in ACI 301.
- d. If the breakback distance is less than 3/4 in., use coated or corrosion-resistant ties.
- e. Submit manufacturer's data sheet on form ties.
- 2.2.2 Biodegradable Form Release Agent
  - a. Provide form release agent that is colorless, biodegradable, and water-based, with a low (maximum of 55 grams/liter (g/l)) VOC content. A minimum of 85 percent of the total product must be biobased material.
  - b. Provide product that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.
  - c. Provide form release agent that reduces formwork moisture absorption, and does not contain diesel fuel, petroleum-based lubricating oils, waxes, or kerosene. Submit documentation indicating type of biobased material in product and biobased content. Indicate relative dollar value of biobased content products to total dollar value of products included in project.
  - d. Submit manufacturer's product data on formwork release agent for use on each form-facing material.

2.2.3 Chamfer Materials

Use lumber materials with dimensions of  $3/4 \ge 3/4$  in.

- 2.2.4 Construction and movement joints
  - a. Submit details and locations of construction joints in accordance with the requirements herein.
  - b. Locate construction joints within middle one-third of spans of slabs, beams, and girders. If a beam intersects a girder within the middle one-third of girder span, the distance between the construction joint in the girder and the edge of the beam must be at least twice the width of the larger member.
  - c. Make construction joints perpendicular to main reinforcement.
  - d. Provide movement joints where indicated in Contract Documents or in accepted alternate locations.
  - e. Submit location and detail of movement joints if different from those indicated in Contract Documents.
  - f. Submit manufacturer's data sheets on expansion joint materials.
- 2.2.5 Other Embedded items

Use sleeves, inserts, anchors, and other embedded items of material and design indicated in Contract Documents.

- 2.3 CONCRETE MATERIALS
- 2.3.1 Cementitious Materials
- 2.3.1.1 Portland Cement
  - a. Unless otherwise specified, provide cement that conforms to ASTM C150/C150M Type I II
  - b. Use one brand and type of cement for formed concrete having exposed-to-view finished surfaces.
  - c. Supplier must certify that no hazardous waste is used in the fuel mix or raw materials.
  - d. Submit information along with evidence demonstrating compliance with referenced standards. Submittals must include types of cementitious materials, manufacturing locations, shipping locations, and certificates showing compliance.
  - e. Cementitious materials must be stored and kept dry and free from contaminants.

# 2.3.1.2 Blended Cements

- a. Blended cements must conform to ASTM C595/C595M Type IP, IS, IP(MS), IS(MS), IL, or ASTM C1157/C1157M Type GU or MS .
- b. Slag cement added to the Type IS blend must meet ASTM C989/C989M.

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c. The pozzolan added to the Type IS blend must meet ASTM C618 Class F, and must be interground with the cement clinker. The manufacturer must state in writing that the amount of pozzolan in the finished cement will not vary more than plus or minus 5 mass percent of the finished cement from lot-to-lot or within a lot. The percentage and type of pozzolan used in the blend must not change from that submitted for the aggregate evaluation and mixture proportioning.

2.3.1.3 Fly Ash

- a. ASTM C618, Class F, except that the maximum allowable loss on ignition must not exceed 3 percent.
- b. If fly ash is used it shall range from 15 to 30 percent by weight of cementitious material, provided the fly ash does not reduce the amount of cement in the concrete mix below the minimum requirements of local building codes. Where the use of fly ash cannot meet the minimum level, it shall not be used. Report the chemical analysis of the fly ash in accordance with ASTM C311/C311M. Evaluate and classify fly ash in accordance with ASTM D5759.
- 2.3.1.4 Slag Cement

ASTM C989/C989M, Grade 100 or 120.

2.3.1.5 Other Supplementary Cementitious Materials

Natural pozzolan must be raw or calcined and conform to ASTM C618, Class N, including the optional requirement for uniformity.

Ultra Fine Fly Ash (UFFA) and Ultra Fine Pozzolan (UFP) must conform to ASTM C618, Class F or N, and the following additional requirements:

- a. The strength activity index at 28 days of age must be at least 95 percent of the control specimens.
- b. The average particle size must not exceed 6 microns.
- c. The sum of SiO2 + Al2O3 + Fe2O3 must be greater than 77 percent.
- 2.3.2 Water
  - a. Water or ice must comply with the requirements of ASTM C1602/C1602M.
  - b. Minimize the amount of water in the mix. Improve workability by adjusting the grading of the aggregate and using admixture rather than by adding water.
  - c. Water must be potable ; free from injurious amounts of oils, acids, alkalis, salts, organic materials, or other substances deleterious to concrete.
  - d. Protect mixing water and ice from contamination during storage and delivery.
  - e. Submit test report showing water complies with ASTM C1602/C1602M.

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## 2.3.3 Aggregate

- 2.3.3.1 Normal-Weight Aggregate
  - a. Aggregates must conform to ASTM C33/C33M .
  - b. Aggregates used in concrete must be obtained from the same sources and have the same size range as aggregates used in concrete represented by submitted field test records or used in trial mixtures.
  - c. Provide sand that is at least 50 percent natural sand.
  - d. Store and handle aggregate in a manner that will avoid segregation and prevents contamination by other materials or other sizes of aggregates. Store aggregates in locations that will permit them to drain freely. Do not use aggregates that contain frozen lumps.
  - e. Submit types, pit or quarry locations, producers' names, aggregate supplier statement of compliance with ASTM C33/C33M, and ASTM C1293 expansion data not more than 18 months old.

# 2.3.4 Admixtures

- a. Chemical admixtures must conform to ASTM C494/C494M.
- b. Air-entraining admixtures must conform to ASTM C260/C260M.
- c. Chemical admixtures for use in producing flowing concrete must conform to ASTM C1017/C1017M.
- d. Do not use calcium chloride admixtures.
- e. Use a corrosion-inhibiting admixture for concrete classified under exposure category Cl or C2. Use an ASR-inhibiting admixture for concrete containing aggregate susceptible to ASR.
- f. Admixtures used in concrete must be the same as those used in the concrete represented by submitted field test records or used in trial mixtures.
- g. Protect stored admixtures against contamination, evaporation, or damage.
- h. To ensure uniform distribution of constituents, provide agitating equipment for admixtures used in the form of suspensions or unstable solutions. Protect liquid admixtures from freezing and from temperature changes that would adversely affect their characteristics.
- i. Submit types, brand names, producers' names, manufacturer's technical data sheets, and certificates showing compliance with standards required herein.

## 2.4 MISCELLANEOUS MATERIALS

# 2.4.1 Concrete Curing Materials

Provide concrete curing material in accordance with ACI 301 Section 5 and ACI 308.1 Section 2. Submit product data for concrete curing compounds and materials. Submit manufactures instructions for placement of curing

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compound and material.

2.4.2 Nonshrink Grout

Nonshrink grout in accordance with ASTM C1107/C1107M.

2.4.3 Floor Finish Materials

2.4.3.1 Liquid Chemical Floor Hardeners and Sealers

- a. Hardener must be a colorless aqueous solution containing a blend of inorganic silicate or siliconate material and proprietary components combined with a wetting agent; that penetrates, hardens, and densifies concrete surfaces. Submit manufactures instructions for placement of liquid chemical floor hardener.
- b. Use concrete penetrating sealers with a low (maximum 100 grams/liter, less water and less exempt compounds) VOC content. Submit manufactures instructions for placement of sealers.
- 2.4.4 Expansion/Contraction Joint Filler

ASTM D1751. Material must be 1/2 inch thick, unless otherwise indicated.

2.4.5 Joint Sealants

Submit manufacturer's product data, indicating VOC content and emissions data. Joint sealants shall comply with Section 07 92 00 JOINT SEALANTS for VOC content and emissions requirements.

2.4.5.1 Horizontal Surfaces, 3 Percent Slope, Maximum

ASTM D6690 or ASTM C920, Type M, Class 25, Use T. Use ASTM C920 compliant joint filler material in areas of the facility that may be exposed to fuel, gasoline, fuel oil or other caustic liquids.

2.4.5.2 Vertical Surfaces Greater Than 3 Percent Slope

ASTM C920, Type M, Grade NS, Class 25, Use T. FS SS-S-200, no sag.

2.4.5.3 Preformed Polychloroprene Elastomeric Type

ASTM D2628.

2.4.5.4 Lubricant for Preformed Compression Seals

ASTM D2835.

2.4.6 Vapor Barrier

ASTM E1745 Class A polyethylene sheeting, minimum 15 mil thickness with a maximum permeance rating of 0.01 perms per ASTM E96/E96M.

- 2.5 CONCRETE MIX DESIGN
- 2.5.1 Properties and Requirements
  - a. Use materials and material combinations listed in this section and the

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contract documents.

b. Cementitious material content must be adequate for concrete to satisfy the specified requirements for strength, w/cm, durability, and finishability described in this section and the contract documents.

The minimum cementitious material content for concrete used in floors must meet the following requirements:

Nominal maximum size of aggregate, in.	Minimum cementitious material content, pounds per cubic yard
1-1/2	470
3/4	540

- c. Selected target slump must meet the requirements this section, the contract documents, and must not exceed 7 in maximum. Concrete must not show visible signs of segregation.
- d. The target slump must be enforced for the duration of the project. Determine the slump by ASTM C143/C143M. Slump tolerances must meet the requirements of ACI 117.
- e. The nominal maximum size of coarse aggregate for a mixture must not exceed three-fourths of the minimum clear spacing between reinforcement, one-fifth of the narrowest dimension between sides of forms, or one-third of the thickness of slabs or toppings.
- f. Concrete must be air entrained for members assigned to Exposure Class F1, F2, or F3. The total air content must be in accordance with the requirements of the paragraph titled DURABILITY.
- g. Measure air content at the point of delivery in accordance with ASTM C173/C173M or ASTM C231/C231M.
- h. Concrete for slabs to receive a hard-troweled finish must not contain an air-entraining admixture or have a total air content greater than 3 percent.
- i. Concrete properties and requirements for each portion of the structure are specified in the table below. Refer to the paragraph titled DURABILITY for more details on exposure categories and their requirements.

	Minimum <i>f'c</i> psi	Exposure	Miscellaneous Requirements		
		Categories^			
Footings and Foundation Walls	4500 at 28 days	S1; C1; W0; F2	Max. slump:5 in. Nominal maximum aggregate size must be 1 in.		
Exterior Slabs-on-ground	5000 at 28 days	S1; C2; W0; F3	Nominal maximum aggregate size must be 1 1/2 inch.		
Interior Slabs-on-ground	4000 at 28 days	S0; C0; W0; F0	Nominal maximum aggregate size must be 1 1/2 inch.		

## 2.5.2 Durability

# 2.5.2.1 Alkali-Aggregate Reaction

Do not use any aggregate susceptible to alkali-carbonate reaction (ACR). Use one of the three options below for qualifying concrete mixtures to reduce the potential of alkali-silica reaction (ASR):

- a. For each aggregate used in concrete, the expansion result determined in accordance with ASTM C1293 must not exceed 0.04 percent at one year.
- b. For each aggregate used in concrete, the expansion result of the aggregate and cementitious materials combination determined in accordance with ASTM C1567 must not exceed 0.10 percent at an age of 16 days.
- c. Alkali content in concrete (LBA) must not exceed 4 pounds per cubic yard for moderately reactive aggregate or 3 pounds per cubic yard for highly reactive aggregate. Reactivity must be determined by testing in accordance with ASTM C1293 and categorized in accordance with ASTM C1778. Alkali content is calculated as follows: LBA = (cement content, pounds per cubic yard) × (equivalent alkali content of portland cement in percent/100 percent).
- 2.5.2.2 Freezing and Thawing Resistance
  - a. Provide concrete meeting the following requirements based on exposure class assigned to members for freezing-and-thawing exposure in Contract Documents:

Exposure class	Maximum	Minimum f'c, psi	Air	Additional
	w/cm*		content	Requirements
FO	N/A	2500		N/A
Exposure class	Maximum	Minimum f'c, psi	Air	Additional
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	w/cm*		content	Requirements
Fl	0.55	3500	Depends on aggregate size	N/A
F2	0.45	4500	Depends on aggregate size	See limits on maximum cementitious material by mass
F3	0.40	5000	Depends on aggregate size	See limits on maximum cementitious material by mass
F3 plain concrete	0.45	4500	Depends on aggregate size	See limits on maximum cementitious material by mass

b. Concrete must be air entrained for members assigned to Exposure Class F1, F2, or F3. The total air content must meet the requirements of the following table:

Total air content, percent*^			
Exposure Class F2 and F3	Exposure Class F1		
7.5	6.0		
7.0	5.5		
6.0	5.0		
6.0	4.5		
5.5	4.5		
5.0	4.0		
5.5	3.5		
	Total air contr           Exposure Class F2           and F3           7.5           7.0           6.0           6.0           5.5           5.0           5.5		

\*Tolerance on air content as delivered must be plus/minus 1.5 percent. ^For f'c greater than 5000 psi, reducing air content by 1.0 percentage

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point is acceptable.

- c. Submit documentation verifying compliance with specified requirements.
- d. For sections of the structure that are assigned Exposure Class F3, submit certification on cement composition verifying that concrete mixture meets the requirements of the following table:

Cementitious material	Maximum percent of total cementitious material by mass*
Fly ash or other pozzolans conforming to ASTM C618	25
Slag cement conforming to ASTM C989/C989M	50
Total of fly ash or other pozzolans and slag cement	50^
Total of fly ash or other pozzolans	35^

\*Total cementitious material also includes ASTM C150/C150M, ASTM C595/C595M, ASTM C845/C845M, and ASTM C1157/C1157M cement. The maximum percentages above must include:

i. Fly ash or other pozzolans present in ASTM C1157/C1157M or ASTM C595/C595M Type IP blended cement.

ii. Slag cement present in ASTM C1157/C1157M or ASTM C595/C595M Type IS blended cement.

^Fly ash or other pozzolans must constitute no more than 25 percent and 10 percent, respectively, of the total mass of the cementitious materials.

- 2.5.2.3 Corrosion and Chloride Content
  - a. Provide concrete meeting the requirements of the following table based on the exposure class assigned to members requiring protection against reinforcement corrosion in Contract Documents.
  - b. Submit documentation verifying compliance with specified requirements.
  - c. Water-soluble chloride ion content contributed from constituents including water, aggregates, cementitious materials, and admixtures must be determined for the concrete mixture by ASTM C1218/C1218M at age between 28 and 42 days.
  - d. The maximum water-soluble chloride ion (Cl-) content in concrete, percent by mass of cement is as follows:

Exposure class	Maximum w/cm*	Minimum f'c, psi	Maximum water-soluble chloride ion (CL-) content in concrete, percent by mass of cement	
Reinforced concrete				
C0	N/A	2500	1.00	
C1	N/A	2500	0.30	
C2	0.4	5000	0.15	
	Pre	stressed cor	ncrete	
C0	N/A	2500	0.06	
C1	N/A	2500	0.06	
C2	0.4	5000	0.06	

## 2.5.2.4 Sulfate Resistance

a. Provide concrete meeting the requirements of the following table based on the exposure class assigned to members for sulfate exposure.

Exposure	Maximum	Minimum	Required cementitious materials-types			Calcium
class	w/cm	f'c, psi				chloride
		PDI	ASTM	ASTM	ASTM	uumiintuitt
			C150/C150M	C595/C595M	C1157/C1157M	
S0	N/A	2500	N/A	N/A	N/A	No restrictions
S1	0.50	4000	II^	IP(MS); IS(<70)(MS); IT(MS)	MS	No restrictions
S2	0.45	4500	IA.	IP(HS); IS(<70)(HS); IT(HS)	HS	Not permitted
S3	0.45	4500	V + pozzolan or slag cement**	<pre>IP(HS)+ pozzolan or     slag cement^; IS (&lt;70)(HS) + pozzolan or     slag cement^; IT     (HS) + pozzolan or     slag cement**</pre>	HS + pozzolan or slag cement**	Not permitted

\*\* The amount of the specific source of the pozzolan or slag cement to be used shall be at least the amount determined by test or service record to improve sulfate resistance when used in concrete containing Type V cement. Alternatively, the amount of the specific source of

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> the pozzolan or slag used shall not be less than the amount tested in accordance with ASTM C1012/C1012M and meeting the requirements maximum expansion requirements listed herein. ^ Other available types of cement, such as Type III or Type I, are acceptable in exposure classes S1 or S2 if the C3A contents are less than 8 or 5 percent, respectively.

b. Alternative combinations of cementitious materials of those listed in this paragraph are acceptable if they meet the maximum expansion requirements listed in the following table:

Exposure class	Maximum expansion when tested using ASTM C1012/C1012M			
	At 6 months	At 12 months	At 18 months	
S1	0.10 percent	N/A	N/A	
S2	0.05 percent	0.10 percent <sup>^</sup>	N/A	
S3	N/A	N/A	0.10 percent	

^The 12-month expansion limit applies only when the measured expansion exceeds the 6-month maximum expansion limit.

2.5.2.5 Concrete Temperature

The temperature of concrete as delivered must not exceed 95°F .

- 2.5.2.6 Concrete permeability
  - a. Provide concrete meeting the requirements of the following table based on exposure class assigned to members requiring low permeability in the Contract Documents.

Exposure class	Maximum w/cm*	Minimum f'c, psi	Additional minimum requirements
WO	N/A	2500	None
W1	0.5	4000	None

- b. Submit documentation verifying compliance with specified requirements.
- 2.5.3 Trial Mixtures

Trial mixtures must be in accordance to ACI 301.

2.5.4 Ready-Mix Concrete

Provide concrete that meets the requirements of ASTM C94/C94M.

Ready-mixed concrete manufacturer must provide duplicate delivery tickets with each load of concrete delivered. Provide delivery tickets with the following information in addition to that required by ASTM C94/C94M:

- a. Type and brand cement
- b. Cement and supplementary cementitious materials content in 94-pound bags per cubic yard of concrete
- c. Maximum size of aggregate
- d. Amount and brand name of admixtures
- e. Total water content expressed by water cementitious material ratio

#### 2.6 REINFORCEMENT

- a. Bend reinforcement cold. Fabricate reinforcement in accordance with fabricating tolerances of ACI 117.
- b. When handling and storing coated reinforcement, use equipment and methods that do not damage the coating. If stored outdoors for more than 2 months, cover coated reinforcement with opaque protective material.
- c. Submit manufacturer's certified test report for reinforcement.
- d. Submit placing drawings showing fabrication dimensions and placement locations of reinforcement and reinforcement supports. Placing drawings must indicate locations of splices, lengths of lap splices, and details of mechanical and welded splices.
- e. Submit request with locations and details of splices not indicated in Contract Documents.
- f. Submit request to place column dowels without using templates.
- g. Submit request and procedure to field-bend or straighten reinforcing bars partially embedded in concrete. Field bending or straightening of reinforcing bars is not permitted without prior approval from the Contracting Officer or Structural Engineer of Record.
- h. Submit request for field cutting, including location and type of bar to be cut and reason field cutting is required.

#### 2.6.1 Reinforcing Bars

- a. Reinforcing bars must be deformed, except spirals, load-transfer dowels, and welded wire reinforcement, which may be plain.
- b. ASTM A615/A615M with the bars marked S, Grade 60 Cold drawn wire used for spiral reinforcement must conform to ASTM A1064/A1064M. Provide reinforcing bars that contain a minimum of 100 percent recycled content. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative total recycled content requirements.
- c. Reinforcing bars may contain post-consumer or post-industrial recycled content. Submit documentation indicating percentage of post-industrial and post-consumer recycled content per unit of product. Indicate relative dollar value of recycled content products to total dollar value of products included in project.
- d. Submit mill certificates for reinforcing bars.

## 2.6.1.1 Headed Reinforcing Bars

Headed reinforcing bars must conform to ASTM A970/A970M including Annex A1, and other specified requirements.

- 2.6.1.2 Bar Mats
  - a. Bar mats must conform to ASTM A184/A184M.
- 2.6.1.3 Headed Shear Stud Reinforcement

Headed studs and headed stud assemblies must conform to ASTM A1044/A1044M.

- 2.6.2 Mechanical Reinforcing Bar Connectors
  - a. Provide 125 percent minimum yield strength of the reinforcement bar.
  - b. Submit data on mechanical splices demonstrating compliance with this paragraph.

# 2.6.3 Wire

- a. Provide wire reinforcement that contains a minimum of 100 percent recycled content.See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative total recycled content requirements. Wire reinforcement may contain post-consumer or post-industrial recycled content. Provide flat sheets of welded wire reinforcement for slabs and toppings.
- b. Plain or deformed steel wire must conform to ASTM A1064/A1064M.
- 2.6.4 Welded wire reinforcement
  - a. Use welded wire reinforcement where specified in Contract Documents and conforming to one or more of the specifications given herein.
  - b. Plain welded wire reinforcement must conform to ASTM A1064/A1064M, with welded intersections spaced no greater than 12 in. apart in direction of principal reinforcement.
  - c. Deformed welded wire reinforcement must conform to ASTM A1064/A1064M, with welded intersections spaced no greater than 16 in. apart in direction of principal reinforcement.
- 2.6.5 Reinforcing Bar Supports
  - a. Provide reinforcement support types within structure as required by Contract Documents. Reinforcement supports must conform to CRSI RB4.1.
  - b. Legs of supports in contact with formwork must be plastic coated after fabrication, or stainless-steel bar supports.
  - c. Minimum 5 percent post-consumer recycled content, or minimum 20 percent post-industrial recycled content. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative total recycled content requirements. Plastic and steel may contain post-consumer or post-industrial recycled content.

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2.6.6 Dowels for Load Transfer in Floors

Provide dowels for load transfer in floors of the type, design, weight, and dimensions indicated. Provide dowel bars that are plain-billet steel conforming to ASTM A36/A36M as indicated on the Contract Document Structural Drawings.

- 2.6.7 Welding
  - a. Provide weldable reinforcing bars that conform to ASTM A706/A706M.
  - b. Comply with AWS D1.4/D1.4M unless otherwise specified. Do not tack weld reinforcing bars.
  - c. Welded assemblies of steel reinforcement produced under factory conditions, such as welded wire reinforcement, bar mats, and deformed bar anchors, are allowed.

#### PART 3 EXECUTION

## 3.1 EXAMINATION

- a. Do not begin installation until substrates have been properly constructed; verify that substrates are level.
- b. If substrate preparation is the responsibility of another installer, notify Contracting Officer of unsatisfactory preparation before processing.
- c. Check field dimensions before beginning installation. If dimensions vary too much from design dimensions for proper installation, notify Contracting Officer and wait for instructions before beginning installation.

#### 3.2 PREPARATION

Determine quantity of concrete needed and minimize the production of excess concrete. Designate locations or uses for potential excess concrete before the concrete is poured.

# 3.2.1 General

- a. Surfaces against which concrete is to be placed must be free of debris, loose material, standing water, snow, ice, and other deleterious substances before start of concrete placing.
- b. Remove standing water without washing over freshly deposited concrete. Divert flow of water through side drains provided for such purpose.
- 3.2.2 Subgrade Under Foundations and Footings
  - a. When subgrade material is semi-porous and dry, sprinkle subgrade surface with water as required to eliminate suction at the time concrete is deposited, or seal subgrade surface by covering surface with specified vapor retarder system.
  - b. When subgrade material is porous, seal subgrade surface by covering surface with specified vapor retarder system.

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- 3.2.3 Subgrade Under Slabs on Ground
  - a. Before construction of slabs on ground, have underground work on pipes and conduits completed and approved.
  - b. Previously constructed subgrade or fill must be cleaned of foreign materials
  - c. Finish surface of capillary water barrier under interior slabs on ground must not show deviation in excess of 1/4 inch when tested with a 10-foot straightedge parallel with and at right angles to building lines.
  - d. Finished surface of subgrade or fill under exterior slabs on ground must not be more than 0.02-foot above or 0.10-foot below elevation indicated.
- 3.2.4 Edge Forms and Screed Strips for Slabs
  - a. Set edge forms or bulkheads and intermediate screed strips for slabs to obtain indicated elevations and contours in finished slab surface and must be strong enough to support vibrating bridge screeds or roller pipe screeds if nature of specified slab finish requires use of such equipment Use of grade stakes or other means and methods that result in damage or punctures to the vapor barrier for interior slabs on grade are not permitted.
  - b. Align concrete surface to elevation of screed strips by use of strike-off templates or approved compacting-type screeds.
- 3.2.5 Reinforcement and Other Embedded Items
  - a. Secure reinforcement, joint materials, and other embedded materials in position, inspected, and approved before start of concrete placing.
  - b. When concrete is placed, reinforcement must be free of materials deleterious to bond. Reinforcement with rust, mill scale, or a combination of both will be considered satisfactory, provided minimum nominal dimensions, nominal weight, and minimum average height of deformations of a hand-wire-brushed test specimen are not less than applicable ASTM specification requirements.

# 3.3 FORMS

- a. Provide forms, shoring, and scaffolding for concrete placement. Set forms mortar-tight and true to line and grade.
- b. Chamfer all above grade exposed joints, edges, and external corners of concrete 0.75 inch. Place chamfer strips in corners of formwork to produce beveled edges on permanently exposed surfaces. Do not bevel reentrant corners or edges of formed joints of concrete.
- c. Provide formwork with clean-out openings to permit inspection and removal of debris.
- d. Inspect formwork and remove foreign material before concrete is placed.
- e. At construction joints, lap form-facing materials over the concrete of previous placement. Ensure formwork is placed against hardened

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concrete so offsets at construction joints conform to specified tolerances.

- f. Provide positive means of adjustment (such as wedges or jacks) of shores and struts. Do not make adjustments in formwork after concrete has reached initial setting. Brace formwork to resist lateral deflection and lateral instability.
- g. Fasten form wedges in place after final adjustment of forms and before concrete placement.
- h. Provide anchoring and bracing to control upward and lateral movement of formwork system.
- i. Construct formwork for openings to facilitate removal and to produce opening dimensions as specified and within tolerances.
- j. Provide runways for moving equipment. Support runways directly on formwork or structural members. Do not support runways on reinforcement. Loading applied by runways must not exceed capacity of formwork or structural members.
- k. Position and support expansion joint materials, waterstops, and other embedded items to prevent displacement. Fill voids in sleeves, inserts, and anchor slots temporarily with removable material to prevent concrete entry into voids.
- 1. Clean surfaces of formwork and embedded materials of mortar, grout, and foreign materials before concrete placement.

# 3.3.1 Coating

- a. Cover formwork surfaces with an acceptable material that inhibits bond with concrete.
- b. If formwork release agent is used, apply to formwork surfaces in accordance with manufacturer's recommendations before placing reinforcement. Remove excess release agent on formwork prior to concrete placement.
- c. Do not allow formwork release agent to contact reinforcement or hardened concrete against which fresh concrete is to be placed.

## 3.3.2 Reuse

- a. Reuse forms providing the structural integrity of concrete and the aesthetics of exposed concrete are not compromised.
- b. Wood forms must not be clogged with paste and must be capable of absorbing high water-cementitious material ratio paste.
- c. Remove leaked mortar from formwork joints before reuse.
- 3.3.3 Forms for Standard Rough Form Finish

Provide formwork in accordance with ACI 301 Section 5 with a surface finish, SF-1.0, for formed surfaces that are to be concealed by other construction.

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3.3.4 Forms for Standard Smooth Form Finish

Provide formwork in accordance with ACI 301 Section 5 with a surface finish, SF-3.0, for formed surfaces that are exposed to view. 3.3.5 Form Ties

- a. After ends or end fasteners of form ties have been removed, repair tie holes in accordance with ACI 301 Section 5 requirements.
- 3.3.6 Tolerances for Form Construction
  - a. Construct formwork so concrete surfaces conform to tolerances in ACI 117.
  - b. Position and secure sleeves, inserts, anchors embeds for precast concrete connections, and other embedded items such that embedded items are positioned within ACI 117 tolerances.
  - c. To maintain specified elevation and thickness within tolerances, install formwork to compensate for deflection and anticipated settlement in formwork during concrete placement. Set formwork and intermediate screed strips for slabs to produce designated elevation, camber, and contour of finished surface before formwork removal. If specified finish requires use of vibrating screeds or roller pipe screeds, ensure that edge forms and screed strips are strong enough to support such equipment.
- 3.3.7 Removal of Forms and Supports
  - a. If vertical formed surfaces require finishing, remove forms as soon as removal operations will not damage concrete.
  - b. Remove top forms on sloping surfaces of concrete as soon as removal will not allow concrete to sag. Perform repairs and finishing operations required. If forms are removed before end of specified curing period, provide curing and protection.
  - c. Do not damage concrete during removal of vertical formwork for columns, walls, and sides of beams. Perform needed repair and finishing operations required on vertical surfaces. If forms are removed before end of specified curing period, provide curing and protection.
  - d. Leave formwork and shoring in place to support construction loads and weight of concrete in structural members until in-place required strength of concrete is reached.
  - e. Form-facing material and horizontal facing support members may be removed before in-place concrete reaches specified compressive strength if shores and other supports are designed to allow facing removal without deflection of supported slab or member.
- 3.4 PLACING REINFORCEMENT AND MISCELLANEOUS MATERIALS
  - a. Unless otherwise specified, placing reinforcement and miscellaneous materials must be in accordance to ACI 301. Provide bars, welded wire reinforcement, wire ties, supports, and other devices necessary to install and secure reinforcement.

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- b. Reinforcement must not have rust, scale, oil, grease, clay, or foreign substances that would reduce the bond. Rusting of reinforcement is a basis of rejection if the effective cross-sectional area or the nominal weight per unit length has been reduced. Remove loose rust prior to placing steel. Tack welding is prohibited.
- c. Nonprestressed cast-in-place concrete members must have concrete cover for reinforcement given in the following table:

Concrete Exposure	Member	Reinforcement	Specified cover, in.
Cast against and permanently in contact with ground	All	All	3
Exposed to weather or in contact with ground	All	No. 6 through No. 18 bars	2
		No. 5 bar, W31 or D31 wire, and smaller	1-1/2
Not exposed to weather or in contact with ground	Slabs, joists, and walls	No. 14 and No. 18 bars	1-1/2
		No. 11 bar and smaller	3/4
	Beams, columns, pedestals, and tension ties	Primary reinforcement, stirrups, ties, spirals, and hoops	1-1/2

d. Cast-in-place prestressed concrete members must have concrete cover for reinforcement, ducts, and end fittings given in the following table:

Concrete	Member	Reinforcement	Specified
Cast against and permanently in contact with ground	All	All	3

Concrete	Member	Reinforcement	Specified
Exposed to weather or in contact with ground	Slabs, joists, and walls	All	1
	All other	All	1-1/2
Not exposed to weather or in contact with ground	Slabs, joists, and walls	All	3/4
	Beams, columns, and tension ties	Primary reinforcement	1-1/2
		Stirrups, ties, spirals, and hoops	1

e. Precast nonprestressed or prestressed concrete members manufactured under plant conditions must have concrete cover for reinforcement, ducts, and end fittings given in the following table:

Concrete Exposure	Member	Reinforcement	Specified cover, in.
Exposed to weather or in contact with ground	Walls	No. 14 and No. 18 bars; tendons larger than 1-1/2 in. diameter	1-1/2
		No. 11 bars and smaller; W31 and D31 wire, and smaller; tendons and strands 1-1/2 in.	3/4
	All other	No. 14 and No. 18 bars; tendons larger than 1-1/2 in.	2
		No. 6 through No. 11 bars; tendons and strands larger than 5/8 in. diameter through 1-1/2 in.	1-1/2
		No. 5 bar, W31 or D31 wire, and smaller; tendons and strands 5/8 in. diameter and smaller	1-1/4

Concrete Exposure	Member	Reinforcement	Specified cover, in.
Not exposed to weather or in contact with ground	Slabs, joists, and walls	No. 14 and No. 18 bars; tendons larger than 1-1/2 in. diameter	1-1/4
		Tendons and strands 1-1/2 in. diameter and smaller	3/4
		No. 11 bar, W31 or D31	5/8
	Beams, columns, pedestals, and tension ties	Primary reinforcement	Greater of bar diameter and 5/8 and need not exceed 1-1/2
		Stirrups, ties, spirals, and hoops	3/8

# 3.4.1 General

Provide details of reinforcement that are in accordance with the Contract Documents.

# 3.4.2 Vapor Barrier

- a. Install in accordance with ASTM E1643. Provide beneath the on-grade concrete floor slab in accordance with the Contract Documents. Use the greatest widths and lengths practicable to eliminate joints wherever possible. Lap joints a minimum of 12 inches and seal with tape in accordance with manufacturer's directions.
- Remove torn, punctured, or damaged vapor barrier system material and provide with new vapor barrier system prior to placing concrete. Concrete placement must not damage vapor barrier system.Control concrete placement so as to prevent damage to the vapor barrier system.

# 3.4.3 Perimeter Insulation

Install perimeter insulation at locations indicated. Adhesive must be used where insulation is applied to the interior surface of foundation walls and may be used for exterior application.

# 3.4.4 Reinforcement Supports

Provide reinforcement support in accordance with CRSI RB4.1 and ACI 301 Section 3 requirements.

## 3.4.5 Splicing

As indicated in the Contract Documents. For splices not indicated follow ACI 301. Do not splice at points of maximum stress. Overlap welded wire reinforcement the spacing of the cross wires, plus 2 inches. AWS D1.4/D1.4M. Approval by the Contracting Officer or Structural Engineer of Record is required for welded splices not otherwise indicated prior to use.

# 3.4.6 Future Bonding

Plug exposed, threaded, mechanical reinforcement bar connectors with a greased bolt. Provide bolt threads that match the connector. Countersink the connector in the concrete. Caulk the depression after the bolt is installed.

#### 3.4.7 Setting Miscellaneous Material

Place and secure anchors and bolts, embeds for precast concrete connections,pipe sleeves, conduits, and other such items in position before concrete placement and support against displacement. Coordinate requirements for precast concrete connection embeds prior to fabrication or installation in form work. Note that the design and detailing for the precast concrete support connection embeds must be provided as part of the Contractor's Delegated Design for the Precast Concrete System. Locate, plumb and align anchor bolts and precast concrete connection embeds. Coordinate and verify installation at proper locations and elevations. Install anchor rods for structural steel, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303. Temporarily fill voids in sleeves with readily removable material to prevent the entry of concrete.

# 3.4.8 Fabrication

Shop fabricate reinforcing bars to conform to shapes and dimensions indicated for reinforcement, and as follows:

- a. Provide fabrication tolerances that are in accordance with ACI 117.
- b. Provide hooks and bends that are in accordance with the Contract Documents.

Reinforcement must be bent cold to shapes as indicated. Bending must be done in the shop. Rebending of a reinforcing bar that has been bent incorrectly is not be permitted. Bending must be in accordance with standard approved practice and by approved machine methods.

Deliver reinforcing bars bundled, tagged, and marked. Tags must be metal with bar size, length, mark, and other information pressed in by machine. Marks must correspond with those used on the placing drawings.

Do not use reinforcement that has any of the following defects:

- a. Bar lengths, depths, and bends beyond specified fabrication tolerances
- b. Bends or kinks not indicated on drawings or approved shop drawings
- c. Bars with reduced cross-section due to rusting or other cause

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Replace defective reinforcement with new reinforcement having required shape, form, and cross-section area.

3.4.9 Placing Reinforcement

Place reinforcement in accordance with ACI 301.

For slabs on grade (placed on earth or on vapor barrier system over capillary water barrier) and for footing reinforcement, support bars or welded wire reinforcement on precast concrete blocks, spaced at intervals required by size of reinforcement, to keep reinforcement the minimum height specified above the underside of slab or footing.

Provide reinforcement that is supported and secured together to prevent displacement by construction loads or by placing of wet concrete, and as follows:

- a. Provide supports for reinforcing bars that are sufficient in number and have sufficient strength to carry the reinforcement they support, and in accordance with ACI 301 and CRSI 10MSP. Do not use supports to support runways for concrete conveying equipment and similar construction loads.
- b. Equip supports on ground and similar surfaces with sand-plates.
- c. Support welded wire reinforcement where allowed as required for reinforcing bars.
- d. Secure reinforcements to supports by means of tie wire. Wire must be black, soft iron wire, not less than 16 gage.
- e. Reinforcement must be accurately placed, securely tied at intersections, and held in position during placing of concrete by spacers, chairs, or other approved supports. Point wire-tie ends away from the form. Unless otherwise indicated, numbers, type, and spacing of supports must conform to the Contract Documents.
- f. Bending of reinforcing bars partially embedded in concrete is permitted only as specified in the Contract Documents.
- 3.4.10 Spacing of Reinforcing Bars
  - a. Spacing must be as indicated in the Contract Documents.
  - b. Reinforcing bars may be relocated to avoid interference with other reinforcement, or with conduit, pipe, or other embedded items. If any reinforcing bar is moved a distance exceeding one bar diameter or specified placing tolerance, resulting rearrangement of reinforcement is subject to preapproval by the Contracting Officer.
- 3.4.11 Concrete Protection for Reinforcement

Additional concrete protection must be in accordance with the Contract Documents.

3.5 BATCHING, MEASURING, MIXING, AND TRANSPORTING CONCRETE

In accordance with ASTM C94/C94M, ACI 301, ACI 302.1R and ACI 304R, except as modified herein. Batching equipment must be such that the concrete

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ingredients are consistently measured within the following tolerances: 1 percent for cement and water, 2 percent for aggregate, and 3 percent for admixtures. Furnish mandatory batch ticket information for each load of ready mix concrete.

3.5.1 Measuring

Make measurements at intervals as specified in paragraphs SAMPLING and TESTING.

- 3.5.2 Mixing
  - a. Mix concrete in accordance with ASTM C94/C94M, ACI 301 and ACI 304R.
  - b. Machine mix concrete. Begin mixing within 30 minutes after the cement has been added to the aggregates. Place concrete within 90 minutes of either addition of mixing water to cement and aggregates or addition of cement to aggregates if the concrete temperature is less than 84 degrees F.
  - c. Place concrete within 60 minutes if the concrete temperature is greater than 84 degrees F except as follows: if set retarding admixture is used and slump requirements can be met, limit for placing concrete may remain at 90 minutes. Additional water may be added, provided that both the specified maximum slump and submitted water-cementitious material ratio are not exceeded and the required concrete strength is still met. When additional water is added, an additional 30 revolutions of the mixer at mixing speed is required.
  - d. If the entrained air content falls below the specified limit, add a sufficient quantity of admixture, within the manufacturer's recommended dosage, to bring the entrained air content within the specified limits. Dissolve admixtures in the mixing water and mix in the drum to uniformly distribute the admixture throughout the batch. Do not reconstitute concrete that has begun to solidify.

# 3.5.3 Transporting

Transport concrete from the mixer to the forms as rapidly as practicable. Prevent segregation or loss of ingredients. Clean transporting equipment thoroughly before each batch. Do not use aluminum pipe or chutes. Remove concrete which has segregated in transporting and dispose of as directed.

#### 3.6 PLACING CONCRETE

Place concrete in accordance with ACI 301 Section 5. Concrete shall be placed within 15 minutes of discharge into non-agitating equipment.

#### 3.6.1 Foundation Placement

Concrete for foundations must be placed in excavations with formed sides.

# 3.6.2 Pumping

ACI 304R and ACI 304.2R. Pumping must not result in separation or loss of materials nor cause interruptions sufficient to permit loss of plasticity between successive increments. Loss of slump in pumping equipment must not exceed 2 inches at discharge/placement. Do not convey concrete through pipe made of aluminum or aluminum alloy. Avoid rapid changes in

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pipe sizes. Limit maximum size of course aggregate to 33 percent of the diameter of the pipe. Limit maximum size of well-rounded aggregate to 40 percent of the pipe diameter. Take samples for testing at both the point of delivery to the pump and at the discharge end.

## 3.6.3 Cold Weather

Cold weather concrete must meet the requirements of ACI 306.1 unless otherwise specified. Do not allow concrete temperature to decrease below 50 degrees F. Obtain approval prior to placing concrete when the ambient temperature is below 40 degrees F or when concrete is likely to be subjected to freezing temperatures within 24 hours. Cover concrete and provide sufficient heat to maintain 50 degrees F minimum adjacent to both the formwork and the structure while curing. Limit the rate of cooling to 37 degrees F in any 1 hour and 50 degrees F per 24 hours after heat application.

## 3.6.4 Hot Weather

Hot weather concrete must meet the requirements of ACI 305.1 unless otherwise specified. Maintain required concrete temperature using Figure 4.2 in ACI 305R to prevent the evaporation rate from exceeding 0.2 pound of water per square foot of exposed concrete per hour. Cool ingredients before mixing or use other suitable means to control concrete temperature and prevent rapid drying of newly placed concrete. Shade the fresh concrete as soon as possible after placing. Start curing when the surface of the fresh concrete is sufficiently hard to permit curing without damage. Provide water hoses, pipes, spraying equipment, and water hauling equipment, where job site is remote to water source, to maintain a moist concrete surface throughout the curing period. Provide burlap cover or other suitable, permeable material with fog spray or continuous wetting of the concrete when weather conditions prevent the use of either liquid membrane curing compound or impervious sheets. For vertical surfaces, protect forms from direct sunlight and add water to top of structure once concrete is set.

# 3.6.5 Bonding

Surfaces of set concrete at joints, must be roughened and cleaned of laitance, coatings, loose particles, and foreign matter. Roughen surfaces in a manner that exposes the aggregate uniformly and does not leave laitance, loosened particles of aggregate, nor damaged concrete at the surface.

Obtain bonding of fresh concrete that has set as follows:

- a. At joints between footings and walls or columns, between walls or columns and the beams or slabs they support, and elsewhere unless otherwise specified; roughened and cleaned surface of set concrete must be dampened, but not saturated, immediately prior to placing of fresh concrete.
- b. At joints in exposed-to-view work; at vertical joints in walls; at joints near midpoint of span in girders, beams, supported slabs, other structural members; in work designed to contain liquids; the roughened and cleaned surface of set concrete must be dampened but not saturated and covered with a cement grout coating.
- c. Provide cement grout that consists of equal parts of portland cement

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and fine aggregate by weight with not more than 6 gallons of water per sack of cement. Apply cement grout with a stiff broom or brush to a minimum thickness of 1/16 inch. Deposit fresh concrete before cement grout has attained its initial set.

#### 3.7 WASTE MANAGEMENT

Provide as specified in the Waste Management Plan and as follows.

#### 3.7.1 Mixing Equipment

Before concrete pours, designate Contractor-owned site meeting environmental standards for cleaning out concrete mixing trucks. Minimize water used to wash equipment.

# 3.7.2 Hardened, Cured Waste Concrete

Crush and reuse hardened, cured waste concrete as fill where allowed by the Contracting Officer as a base course for pavement. Hardened, cured waste concrete may not be used as aggregate in concrete mix.

3.7.3 Reinforcing Steel

Collect reinforcing steel and place in designated area for recycling.

3.7.4 Other Waste

Identify concrete manufacturer's or supplier's policy for collection or return of construction waste, unused material, deconstruction waste, and/or packaging material. Return excess cement to supplier. Institute deconstruction and construction waste separation and recycling for use in manufacturer's programs. When such a program is not available, seek local recyclers to reclaim the materials.

- 3.8 SURFACE FINISHES EXCEPT FLOOR, SLAB, AND PAVEMENT FINISHES
- 3.8.1 Defects

Repair surface defects in accordance with ACI 301 Section 5.

3.8.2 Not Against Forms (Top of Walls)

Surfaces not otherwise specified must be finished with wood floats to even surfaces. Finish must match adjacent finishes.

#### 3.8.3 Formed Surfaces

3.8.3.1 Tolerances

Tolerances in accordance with ACI 117 and as indicated.

# 3.8.3.2 As-Cast Rough Form

Provide for surfaces not exposed to public view a surface finish SF-1.0. Patch holes and defects in accordance with ACI 301.

## 3.8.3.3 Standard Smooth Finish

Provide for surfaces exposed to public view a surface finish SF-3.0. Patch

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holes and defects in accordance with ACI 301.

3.9 FLOOR, SLAB, AND PAVEMENT FINISHES AND MISCELLANEOUS CONSTRUCTION

In accordance with ACI 301 and ACI 302.1R, unless otherwise specified. Slope floors uniformly to drains where drains are provided. Depress the concrete base slab where indicated. Steel trowel and fine-broom finish concrete slabs that are to receive quarry tile, ceramic tile, or paver tile. Where straightedge measurements are specified, Contractor must provide straightedge.

#### 3.9.1 Finish

Place, consolidate, and immediately strike off concrete to obtain proper contour, grade, and elevation before bleedwater appears. Permit concrete to attain a set sufficient for floating and supporting the weight of the finisher and equipment. If bleedwater is present prior to floating the surface, drag the excess water off or remove by absorption with porous materials. Do not use dry cement to absorb bleedwater. Grate tampers ("jitterbugs") shall not be used.

## 3.9.1.1 Scratched

Use for surfaces intended to receive bonded applied cementitious applications. Finish concrete in accordance with ACI 301 Section 5 for a scratched finish.

# 3.9.1.2 Floated

Use for surfaces to receive roofing, and exterior slabs where not otherwise specified. Finish concrete in accordance with ACI 301 Section 5 for a floated finish.

## 3.9.1.3 Steel Troweled

Use for floors intended as walking surfaces and for reception of floor coverings . Finish concrete in accordance with ACI 301 Section 5 for a steel troweled finish.

#### 3.9.1.4 Nonslip Finish

Use on surfaces of exterior platforms, steps, and landings; stoops, and on exterior pedestrian ramps. Finish concrete in accordance with ACI 301 Section 5. After the selected material has been floated, complete the operation with a broomed finish.

## 3.9.1.5 Broomed

Use on surfaces of exterior walks, platforms, patios, and ramps, unless otherwise indicated. Finish concrete in accordance with ACI 301 Section 5 for a broomed finish.

# 3.9.1.6 Pavement

Screed the concrete with a template advanced with a combined longitudinal and crosswise motion. Maintain a slight surplus of concrete ahead of the template. After screeding, float the concrete longitudinally. Use a straightedge to check slope and flatness; correct and refloat as necessary. Obtain final finish by belting or a burlap drag. Lay belt

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flat on the concrete surface and advance with a sawing motion; continue until a uniform but gritty nonslip surface is obtained.For a burlap drag. Drag a strip of clean, wet burlap from 3 to 10 feet wide and 2 feet longer than the pavement width across the slab. Produce a fine, granular, sandy textured surface without disfiguring marks. Round edges and joints with an edger having a radius of 1/8 inch.

# 3.9.1.7 Chemical-Hardener Treatment

Apply liquid-chemical floor hardener where indicated after curing and drying concrete surface. Dilute liquid hardener with water and apply in three coats. First coat must be one-third strength, second coat one-half strength, and third coat two-thirds strength. Apply each coat evenly and allow to dry 24 hours between coats.

Approved proprietary chemical hardeners must be applied in accordance with manufacturer's printed directions.

3.9.2 Flat Floor Finishes

ACI 302.1R. Construct in accordance with the methods recommended in Table 10.15.3a, "Slab-on-ground flatness/levelness construction guide" appropriate for the type of construction. ACI 117 for tolerance tested by ASTM E1155.

a. Slabs-On-Ground, UNO:

Floor Flatness (FF) 35 Overall (30 Minimum) Floor Levelness (FL) 25 Overall (20 Minimum)

## 3.9.2.1 Measurement of Floor Tolerances

Test slab within 24 hours of the final troweling. Provide tests to Contracting Officer within 12 hours after collecting the data. Floor flatness inspector is required to provide a tolerance report which must include:

- a. Key plan showing location of data collected.
- b. Results required by ASTM E1155.
- 3.9.2.2 Remedies for Out of Tolerance Work

Contractor is required to repair and retest any floors not meeting specified tolerances. Prior to repair, Contractor must submit and receive approval for the proposed repair, including product data from any materials proposed. Repairs must not result in damage to structural integrity of the floor. For floors exposed to public view, repairs must prevent any uneven or unusual coloring of the surface.

# 3.9.3 Concrete Walks

Provide 4 inches thick minimum. Provide contraction joints spaced every 5 linear feet unless otherwise indicated. Cut contraction joints 1 inch deep, or one fourth the slab thickness whichever is deeper, with a jointing tool after the surface has been finished. Provide 0.5 inch thick transverse expansion joints at changes in direction where sidewalk abuts curb, steps, rigid pavement, or other similar structures; space expansion joints every 50 feet maximum. Give walks a broomed finish. Unless

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indicated otherwise, provide a transverse slope of 1/48. Limit variation in cross section to 1/4 inch in 5 feet.

# 3.9.4 Pits and Trenches

Place bottoms and walls monolithically or provide waterstops and keys.

3.9.5 Curbs and Gutters

Provide contraction joints spaced every 10 feet maximum unless otherwise indicated. Cut contraction joints 3/4 inch deep with a jointing tool after the surface has been finished. Provide expansion joints 1/2 inch thick and spaced every 100 feet maximum unless otherwise indicated. Perform pavement finish.

3.9.6 Splash Blocks

Provide at outlets of downspouts emptying at grade. Splash blocks may be precast concrete, and must be 24 inches long, 12 inches wide and 4 inches thick, unless otherwise indicated, with smooth-finished countersunk dishes sloped to drain away from the building.

3.10 JOINTS

## 3.10.1 Construction Joints

Make and locate joints not indicated so as not to impair strength and appearance of the structure, as approved. Joints must be perpendicular to main reinforcement. Reinforcement must be continued and developed across construction joints. Locate construction joints as follows:

- 3.10.1.1 Maximum Allowable Construction Joint Spacing
  - a. In walls at not more than 60 feet in any horizontal direction.
  - b. In slabs on ground, so as to divide slab into areas not in excess of 1,200 square feet.
- 3.10.1.2 Construction Joints for Constructability Purposes
  - a. In walls, at top of footing; at top of slabs on ground; at top and bottom of door and window openings or where required to conform to architectural detail.
  - b. At top of footing; at top of slabs on ground; and at underside of deepest beam framing into footing or wall.

Provide keyways at least 1-1/2-inches deep in vertical construction joints in walls; approved bulkheads may be used for slabs.

# 3.10.2 Isolation Joints in Slabs on Ground

- a. Provide joints at points of contact between slabs on ground and vertical surfaces, such as column pedestals, foundation walls, grade beams, and elsewhere as indicated.
- b. Fill joints with premolded joint filler strips 1/2 inch thick, extending full slab depth. Install filler strips at proper level below finish floor elevation with a slightly tapered, dress-and-oiled

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> wood strip temporarily secured to top of filler strip to form a groove not less than 3/4 inch in depth where joint is sealed with sealing compound and not less than 1/4 inch in depth where joint sealing is not required. Remove wood strip after concrete has set. Contractor must clean groove of foreign matter and loose particles after surface has dried.

- 3.10.3 Contraction Joints in Slabs on Ground
  - a. Provide joints to form panels as indicated.
  - b. Sawcut contraction joints into slab on ground in accordance with ACI 301 Section 5.
  - c. Sawcutting will be limited to within 12 hours after completing finishing operations and concrete set with an early entry saw without raveling the concrete and at 1/4 slab depth.
- 3.10.4 Sealing Joints in Slabs on Ground
  - a. Contraction and control joints which are to receive finish flooring material must be sealed with joint sealing compound after concrete curing period. Slightly underfill groove with joint sealing compound to prevent extrusion of compound. Remove excess material as soon after sealing as possible.
  - b. Sealed groove must be left ready to receive filling material that is provided as part of finish floor covering work.
- 3.11 CURING AND PROTECTION

Curing and protection in accordance with ACI 301 Section 5, unless otherwise specified. Begin curing immediately following form removal. Avoid damage to concrete from vibration created by movement of equipment in the vicinity, disturbance of formwork or protruding reinforcement, and any other activity resulting in ground vibrations. Protect concrete from injurious action by sun, rain, flowing water, frost, mechanical injury, tire marks, and oil stains. Do not allow concrete to dry out from time of placement until the expiration of the specified curing period. Do not use membrane-forming compound on surfaces where appearance would be objectionable, on any surface to be painted, where coverings are to be bonded to the concrete, or on concrete to which other concrete is to be bonded. If forms are removed prior to the expiration of the curing period, provide another curing procedure specified herein for the remaining portion of the curing period. Provide curing using moisture-retaining cover curing materials for those areas receiving liquid chemical sealer, hardener, or epoxy coating. Allow curing compound/sealer installations to cure prior to the installation of materials that adsorb VOCs.

3.11.1 Requirements for Type III, High-Early-Strength Portland Cement

The curing periods for high-early-strength concrete if permitted by the Contracting Officer are required to be not less than one-fourth of those specified for portland cement, but in no case less than 72 hours.

## 3.11.2 Curing Periods

ACI 301 Section 5, except 10 days for retaining walls, pavement or

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chimneys. Begin curing immediately after placement. Protect concrete from premature drying, excessively hot temperatures, and mechanical injury; and maintain minimal moisture loss at a relatively constant temperature for the period necessary for hydration of the cement and hardening of the concrete. The materials and methods of curing are subject to approval by the Contracting Officer.

## 3.11.3 Curing Formed Surfaces

Accomplish curing of formed surfaces, including undersurfaces of girders, beams, supported slabs, and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed before end of curing period, accomplish final curing of formed surfaces by any of the curing methods specified above, as applicable.

- 3.11.4 Curing Unformed Surfaces
  - a. Accomplish initial curing of unformed surfaces, such as monolithic slabs, and other flat surfaces except slabs on ground by membrane curing.
  - b. Accomplish final curing of unformed surfaces except slabs on ground by any of curing methods specified, as applicable.
  - c. Accomplish initial and final curing of slabs on ground and concrete surfaces to receive liquid floor hardener of finish flooring by moisture-retaining cover curing.

## 3.11.5 Temperature of Concrete During Curing

When temperature of atmosphere is 41 degrees F and below, maintain temperature of concrete at not less than 55 degrees F throughout concrete curing period or 45 degrees F when the curing period is measured by maturity. When necessary, make arrangements before start of concrete placing for heating, covering, insulation, or housing as required to maintain specified temperature and moisture conditions for concrete during curing period.

When the temperature of atmosphere is 80 degrees F and above or during other climatic conditions which cause too rapid drying of concrete, make arrangements before start of concrete placing for installation of wind breaks, of shading, and for fog spraying or moisture-retaining covering of light color as required to protect concrete during curing period.

Changes in temperature of concrete must be uniform and not exceed 37 degrees F in any 1 hour nor 80 degrees F in any 24-hour period.

## 3.11.6 Protection from Mechanical Injury

During curing period, protect concrete from damaging mechanical disturbances, particularly load stresses, heavy shock, and excessive vibration and from damage caused by rain or running water.

## 3.11.7 Protection After Curing

Protect finished concrete surfaces from damage by construction operations.

## 3.12 FIELD QUALITY CONTROL

# 3.12.1 Aggregate Testing

# 3.12.1.1 Fine Aggregate

At least once during each shift when the concrete plant is operating, there shall be one sieve analysis and fineness modulus determination in accordance with ASTM C136/C136M and COE CRD-C 104 for the fine aggregate or for each fine aggregate if it is batched in more than one size or classification. The location at which samples are taken may be selected by the Contractor as the most advantageous for control. However, the Contractor is responsible for delivering fine aggregate to the mixer within specification limits. When the amount passing on any sieve is outside the specification limits, the fine aggregate shall be immediately resampled and retested. If there is another failure on any sieve, the fact shall be immediately reported to the Contracting Officer, concreting shall be stopped, and immediate steps taken to correct the grading.

# 3.12.1.2 Coarse Aggregate

At least once during each shift in which the concrete plant is operating, there shall be a sieve analysis in accordance with ASTM C136/C136M for each size of coarse aggregate. The location at which samples are taken may be selected by the Contractor as the most advantageous for production control. However, the Contractor shall be responsible for delivering the aggregate to the mixer within specification limits. A test record of samples of aggregate taken at the same locations shall show the results of the current test as well as the average results of the five most recent tests including the current test. The Contractor may adopt limits for control coarser than the specification limits for samples taken other than as delivered to the mixer to allow for degradation during handling. When the amount passing any sieve is outside the specification limits, the coarse aggregate shall be immediately resampled and retested. If the second sample fails on any sieve, that fact shall be reported to the Contracting Officer. Where two consecutive averages of 5 tests are outside specification limits, the operation shall be considered out of control and reported to the Contracting Officer. Concreting shall be stopped and immediate steps shall be taken to correct the grading.

#### 3.12.2 Concrete Sampling

ASTM C172/C172M. Collect samples of fresh concrete to perform tests specified. ASTM C31/C31M for making test specimens.

## 3.12.3 Concrete Testing

## 3.12.3.1 Slump Tests

ASTM C143/C143M. Take concrete samples during concrete placement/discharge. The maximum slump may be increased as specified with the addition of an approved admixture provided that the water-cementitious material ratio is not exceeded. Perform tests at commencement of concrete placement, when test cylinders are made, and for each batch (minimum) or every 20 cubic yards (maximum) of concrete.

#### 3.12.3.2 Temperature Tests

Test the concrete delivered and the concrete in the forms. Perform tests

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in hot or cold weather conditions (below 50 degrees F and above 80 degrees F) for each batch (minimum) or every 20 cubic yards (maximum) of concrete, until the specified temperature is obtained, and whenever test cylinders and slump tests are made.

#### 3.12.3.3 Compressive Strength Tests

ASTM C39/C39M. Make six 6 inch by 12 inch test cylinders for each set of tests in accordance with ASTM C31/C31M, ASTM C172/C172M and applicable requirements of ACI 305R and ACI 306R. Take precautions to prevent evaporation and loss of water from the specimen. Test two cylinders at 7 days, two cylinders at 28 days, and hold two cylinder in reserve. Take samples for strength tests of each class of concrete mixture placed each day but not less than once a day, nor less than once for each 100 cubic yards of concrete for the first 150 cubic yards, 150 cubic yards thereafter, nor less than once for each 5000 square feet of surface area for slabs or walls. For the entire project, take no less than five sets of samples and perform strength tests for each mix design of concrete placed. Each strength test result must be the average of two cylinders from the same concrete sample tested at 28 days. Concrete compressive tests must meet the requirements of this section, the Contract Document, and ACI 301. Retest locations represented by erratic core strengths. Where retest does not meet concrete compressive strength requirements submit a mitigation or remediation plan for review and approval by the contracting officer. Repair core holes with nonshrink grout. Match color and finish of adjacent concrete.

## 3.12.3.4 Air Content

ASTM C173/C173M or ASTM C231/C231M for normal weight concrete . Test air-entrained concrete for air content at the same frequency as specified for slump tests.

3.12.3.5 Chloride Ion Concentration

Chloride ion concentration must meet the requirements of the paragraph titled CORROSION AND CHLORIDE CONTENT. Determine water soluble ion concentration in accordance with ASTM Cl218/Cl218M. Perform test once for each mix design.

3.12.3.6 Strength of Concrete Structure

The strength of the concrete structure will be considered to be deficient if any of the following conditions are identified:

- a. Failure to meet compressive strength tests as evaluated.
- b. Reinforcement not conforming to requirements specified.
- c. Concrete which differs from required dimensions or location in such a manner as to reduce strength.
- d. Concrete curing and protection of concrete against extremes of temperature during curing, not conforming to requirements specified.
- e. Concrete subjected to damaging mechanical disturbances, particularly load stresses, heavy shock, and excessive vibration.
- f. Poor workmanship likely to result in deficient strength.

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Where the strength of the concrete structure is considered deficient submit a mitigation or remediation plan for review and approval by the C ontracting Officer.

## 3.12.3.7 Non-Conforming Materials

Factors that indicate that there are non-conforming materials include (but not limited to) excessive compressive strength, inadequate compressive strength, excessive slump, excessive voids and honeycombing, concrete delivery records that indicate excessive time between mixing and placement, or excessive water was added to the mixture during delivery and placement. Any of these indicators alone are sufficient reason for the Contracting Officer to request additional sampling and testing.

Investigations into non-conforming materials must be conducted at the Contractor's expense. The Contractor must be responsible for the investigation and must make written recommendations to adequately mitigate or remediate the non-conforming material. The Contracting Officer may accept, accept with reduced payment, require mitigation, or require removal and replacement of non-conforming material at no additional cost to the Government.

## 3.12.3.8 Testing Concrete Structure for Strength

When there is evidence that strength of concrete structure in place does not meet specification requirements or there are non-conforming materials, make cores drilled from hardened concrete for compressive strength determination in accordance with ASTM C42/C42M, and as follows:

- a. Take at least three representative cores from each member or area of concrete-in-place that is considered potentially deficient. Location of cores will be determined by the Contracting Officer.
- b. Test cores after moisture conditioning in accordance with ASTM C42/C42M if concrete they represent is more than superficially wet under service.
- c. Air dry cores, (60 to 80 degrees F with relative humidity less than 60 percent) for 7 days before test and test dry if concrete they represent is dry under service conditions.
- d. Strength of cores from each member or area are considered satisfactory if their average is equal to or greater than 85 percent of the 28-day design compressive strength of the class of concrete.
- e. Core specimens will be taken and tested by the Government. If the results of core-boring tests indicate that the concrete as placed does not conform to the drawings and specification, the cost of such tests and restoration required must be borne by the Contractor.

Fill core holes solid with patching mortar and finished to match adjacent concrete surfaces.

Correct concrete work that is found inadequate by core tests in a manner approved by the Contracting Officer.

# 3.13 REPAIR, REHABILITATION AND REMOVAL

Before the Contracting Officer accepts the structure the Contractor must inspect the structure for cracks, damage and substandard concrete placements that may adversely affect the service life of the structure. A report documenting these defects must be prepared which includes recommendations for repair, removal or remediation must be submitted to the Contracting Officer for approval before any corrective work is accomplished.

3.13.1 Repair of Weak Surfaces

Weak surfaces are defined as mortar-rich, rain-damaged, uncured, or containing exposed voids or deleterious materials. Concrete surfaces with weak surfaces less than 1/4 inch thick must be diamond ground to remove the weak surface. Surfaces containing weak surfaces greater than 1/4 inch thick must be removed and replaced or mitigated in a manner acceptable to the Contracting Officer.

3.13.2 Failure of Quality Assurance Test Results

Proposed mitigation efforts by the Contractor must be approved by the Contracting Officer prior to proceeding.

-- End of Section --

## SECTION 03 45 00

# PRECAST ARCHITECTURAL CONCRETE 05/16, CHG 2: 11/21

## PART 1 GENERAL

## 1.1 REFERENCES

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

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 251	(2006; R 2011) Standard Specification for
	Plain and Laminated Elastomeric Bridge
	Bearings

AMERICAN CONCRETE INSTITUTE (ACI)

ACI	211.1	(1991; R 2009) Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete
ACI	214R	(2011) Evaluation of Strength Test Results of Concrete
ACI	301	(2016) Specifications for Structural Concrete
ACI	304R	(2000; R 2009) Guide for Measuring, Mixing, Transporting, and Placing Concrete
ACI	305R	(2020) Guide to Hot Weather Concreting
ACI	306.1	(1990; R 2002) Standard Specification for Cold Weather Concreting
ACI	318	(2014; Errata 1-2 2014; Errata 3-5 2015; Errata 6 2016; Errata 7-9 2017) Building Code Requirements for Structural Concrete (ACI 318-14) and Commentary (ACI 318R-14)
ACI	SP-66	(2004) ACI Detailing Manual
	AMERICAN HARDBOARD ASSO	CIATION (AHA)
AHA	A135.4	(1995; R 2004) Basic Hardboard

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7-16 (2017; Errata 2018; Supp 1 2018) Minimum Design Loads and Associated Criteria for Buildings and Other Structures

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W912QR25R0052 Specs Vol1-0000 P2#: 506474 - Manned/Unmanned Tactical Vehicle Lab (MUMT) Detroit Arsenal, MI AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE) ASHRAE 90.1 - IP (2013) Energy Standard for Buildings Except Low-Rise Residential Buildings AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) ASME B18.21.1 (2009; R 2016) Washers: Helical Spring-Lock, Tooth Lock, and Plain Washers (Inch Series) AMERICAN WELDING SOCIETY (AWS) AWS D1.1/D1.1M (2020) Structural Welding Code - Steel AMERICAN WOOD PROTECTION ASSOCIATION (AWPA) AWPA U1 (2021) Use Category System: User Specification for Treated Wood ASTM INTERNATIONAL (ASTM) ASTM A27/A27M (2020) Standard Specification for Steel Castings, Carbon, for General Application ASTM A36/A36M (2019) Standard Specification for Carbon Structural Steel (1999; R 2018; E 2018) Standard ASTM A47/A47M Specification for Ferritic Malleable Iron Castings ASTM A153/A153M (2016a) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware ASTM A283/A283M (2013) Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates ASTM A416/A416M (2018) Standard Specification for Low-Relaxation, Seven-Wire for Prestressed Concrete ASTM A449 (2014; R 2020) Standard Specification for Hex Cap Screws, Bolts, and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use ASTM A563 (2015) Standard Specification for Carbon and Alloy Steel Nuts ASTM A615/A615M (2020) Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement ASTM A653/A653M (2020) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or

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Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

- ASTM A666 (2015) Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate and Flat Bar
- ASTM A706/A706M (2016) Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
- ASTM A1064/A1064M (2017) Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
- ASTM C31/C31M (2021a) Standard Practice for Making and Curing Concrete Test Specimens in the Field

ASTM C33/C33M (2018) Standard Specification for Concrete Aggregates

ASTM C39/C39M (2021) Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens

- ASTM C42/C42M (2020) Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
- ASTM C94/C94M (2021a) Standard Specification for Ready-Mixed Concrete

ASTM C143/C143M (2020) Standard Test Method for Slump of Hydraulic-Cement Concrete

- ASTM C150/C150M (2021) Standard Specification for Portland Cement
- ASTM C172/C172M (2017) Standard Practice for Sampling Freshly Mixed Concrete

ASTM C231/C231M (2017a) Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

ASTM C260/C260M (2010a; R 2016) Standard Specification for Air-Entraining Admixtures for Concrete

ASTM C311/C311M (2018) Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland-Cement Concrete

ASTM C494/C494M (2019) Standard Specification for Chemical Admixtures for Concrete

ASTM C591 (2021) Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation

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ASTM C595/C595M	(2021) Standard Specification for Blended Hydraulic Cements	
ASTM C618	(2019) Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete	
ASTM C979/C979M	(2016) Standard Specification for Pigments for Integrally Colored Concrete	
ASTM C989/C989M	(2018a) Standard Specification for Slag Cement for Use in Concrete and Mortars	
ASTM C1107/C1107M	(2020) Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)	
ASTM C1218/C1218M	(2020c) Standard Test Method for Water-Soluble Chloride in Mortar and Concrete	
ASTM C1602/C1602M	(2018) Standard Specification for Mixing Water Used in Production of Hydraulic Cement Concrete	
ASTM D635	(2018) Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position	
ASTM D746	(2014) Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact	
ASTM D1056	(2020) Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber	
ASTM D1149	(2007; R 2012) Standard Test Method for Rubber Deterioration - Surface Ozone Cracking in a Chamber	
ASTM D2240	(2015; E 2017) Standard Test Method for Rubber Property - Durometer Hardness	
ASTM D5759	(2012; R 2020) Characterization of Coal Fly Ash and Clean Coal Combustion Fly Ash for Potential Uses	
PRECAST/PRESTRESSED CONCRETE INSTITUTE (PCI)		
PCI MNL-117	(2013) Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products, 3rd Edition	
PCI MNL-122	(2007) Architectural Precast Concrete, 3rd Edition	
PCI MNL-135	(2000) Tolerance Manual for Precast and Prestressed Concrete Construction	

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U.S. GREEN BUILDING COUNCIL (USGBC)

(2013; R 2020) USGBC LEED Reference Guide
for Building Design and Construction, v4
(2023) LEED v4.1 Building Design and

## 1.2 SUSTAINABILITY REPORTING

Work of this section is intended to contribute to the achievement of, or compliance with, the requirements of the Guiding Principles Validation and LEED Prerequisites and attempted Credits. Refer to Section 01 33 29.00 06 SUSTAINABILITY REPORTING for specific documentation requirements and list of Prerequisites, attempted Credits and LEED version.

Comply with product, material content, performance criteria, activity, documentation, and other technical requirements as described in the LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide as applicable.

Collect, organize, and submit product data, drawings, diagrams, photos and cost information necessary to demonstrate compliance with LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide requirements as applicable.

Data collection shall commence with the notice to proceed and will only be deemed complete upon acceptance of the Final Sustainability Notebook and LEED Online submission by the Contracting Officer, the LEED Project Administrator, and the Green Building Certification Institute.

## 1.3 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Pre-Installation Meeting

SD-02 Shop Drawings

Precast Drawings; G, AE

SD-03 Product Data

Cast-In Embedded Items And Connectors; G, AE

Connection Devices; G, AE

Admixtures

Gasket

Bearing Pads

Environmental Product Declarations; S

Embodied Carbon Optimization Report/Action Plan; S

Extended Producer Responsibility; S

Local/Regional Materials; S

Material Ingredient Reporting; S

Recycled Content Of Cementitious Materials; S

Recycled Content For Insulation; S

SD-04 Samples

Concrete Wall Panel Surface Finish; G, AE

Mock-up

Full Size Sample Wall Panel

Full size sample mock-up wall panel req'd for PCI Architectural Certification Categories AA, AB, AC and recommended for Category AD.

SD-05 Design Data

Design Calculations; G, AE

Contractor-Furnished Mix Design; G, AE

Concrete Mix Design for Repair of Surface Defects; G, AE

Thermal Calculations; G, AE

SD-06 Test Reports

Strength Tests; G, AE

Slump

Air Content

Test for Concrete Materials

Water

Testing Precast Units for Strength

SD-07 Certificates

Manufacturer's Qualifications; G, AE

Fabricator Quality Certifications

Erector Certification

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SD-08 Manufacturer's Instructions

Installation; G

Cleaning; G

SD-11 Closeout Submittals

Concrete Batch Ticket Information; G

#### 1.4 MODIFICATION OF REFERENCES

In the referenced ACI and PCI publications, consider the advisory provisions to be mandatory. Interpret reference to the "Building Official," the "Structural Engineer," and the "Architect/Engineer" to mean the Contracting Officer.

- 1.5 SUSTAINABLE DESIGN REQUIREMENTS
- 1.5.1 Environmental Product Declarations

At a minimum, use materials or products with an Environmental Product Declaration in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.5.2 Embodied Carbon Optimization Report/Action Plan

At a minimum, use materials or products with an Embodied Carbon Optimization Report/Action Plan in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.5.3 Sourcing of Raw Materials

Provide products that meet one or more of the following categories:

1.5.3.1 Extended Producer Responsibility

At a minimum, use materials or products from manufacturers that participate in an extended producer responsibility program in accordance with the LEED Implementation Plan. Provide manufacturer letter verifying extended producer responsibility program is in place and that product is eligible. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.5.3.2 Recycled Content Materials

At a minimum, use materials or products with recycled content in accordance with the LEED Implementation Plan. Provide manufacturers product literature identifying the percentage of recycled material incorporated within each product used.See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan. If recycled content minimum is specified in this section, the greater of the two percentages governs.

1.5.4 Material Ingredient Reporting

At a minimum, use materials or products with chemical inventory to at

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least 0.1% (1000 ppm) in accordance with the LEED Implementation Plan. Provide Health Product Declaration (HPD), Cradle to Cradle Certificate, Declare label, or other manufacturer's published content inventory in compliance with LEED v4.1 Material Ingredient Reporting credit. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

## 1.5.5 Local/Regional Materials

Use materials or products extracted, harvested, or recovered, as well as manufactured, within a 100 mile radius from the project site, if available from a minimum of three sources. provide a letter from the manufacturer stating the extraction location, manufacturing location, and purchasing location of the products provided, referencing the project name and location specifically and distance to the project site. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

## 1.6 GENERAL REQUIREMENTS

Precast concrete units must be designed and fabricated by an experienced and certified precast concrete manufacturer. The manufacturer needs to have been regularly and continuously engaged in the manufacture of precast concrete work similar to that indicated on the drawings for at least 3 years. The Contractor must submit a statement detailing the Manufacturer's Qualifications. Coordinate precast work with the work of other trades.

## 1.7 DESIGN

# 1.7.1 Standards and Loads

Precast unit design must conform to ASCE 7-16, ACI 318 and PCI MNL-122. See Structural drawings and General Structural Notes for design criteria and load information and requirements. Indicate design loads for precast concrete on the drawings. A differential temperature of 192 degrees F, between interior and exterior faces of the units, must be considered in the design. Stresses due to restrained volume change caused by shrinkage and temperature differential, handling, transportation and erection must be accounted for in the design.

# 1.7.2 Connections

Connection of units to other members, or to other units must be of the type and configuration indicated on the contract document drawings and as required by the Contractor's and/or Precast Concrete Manufacturer's qualified delegated design engineer. The design and sizing of connections for all design loads will be completed by the Contractor.

## 1.7.3 Concrete Proportion

Base the selection of proportions for concrete on the methodology presented in ACI 211.1 for normal weight concrete. Develop the concrete proportion using the same type and brand of cement, the same type and gradation of aggregates, and the same type and brand of admixture that will be used in the manufacture of precast concrete units for the project. Do not use calcium chloride in precast concrete and admixtures containing chloride ions, nitrates, or other substances that are corrosive will not be used in prestressed concrete.
### 1.7.4 Design Calculations

Calculations for design of members, connections and embedments not shown must be made by a registered professional engineer experienced in the design of precast architectural concrete. Calculation will include the analysis of member for lifting stresses and the sizing of the lifting inserts. Submit calculations for review and approval prior to fabrication, signed and sealed by the registered design professional who prepared the design.

# 1.7.5 Thermal Calculations

Submit thermal calculations prepared and sealed by a registered professional engineer for review complying with ASHRAE 90.1 - IP, for the steady state thermal resistance for the precast concrete wall panels. Thermal calculations must demonstrate the thermal conductivity of all components, the spacing of all connectors, the percent area of the wall that is solid concrete, and the thermal resistance of all components.

## 1.8 DELIVERY, STORAGE, AND HANDLING

Deliver packaged materials, except for wall panels, to the project site in the original, unbroken packages or containers, each bearing a label clearly identifying manufacturer's name, brand name, weight or volume, and other pertinent information. Store packaged materials, and materials in containers, in a weathertight and dry place until ready for use.

Store products in manufacturer's unopened packaging in dry storage area, with ambient temperature between 30 degrees F and 120 degrees F, until installation.

## 1.9 STORAGE AND INSPECTION AT MANUFACTURER'S PLANT

Protect precast units temporarily stored at the manufacturer's plant from damage in accordance with PCI MNL-117 and PCI MNL-135. Immediately prior to shipment to the jobsite, all precast concrete units must be inspected for quality to insure all precast units conform to the requirements specified. Inspection for quality will include, but will not be limited to, the following elements: color, texture, dimensional tolerances, chipping, cracking, staining, warping and honeycombing. Replace or repair all defective precast concrete units as approved.

## 1.10 PLANT INSPECTION

At the option of the Contracting Officer, precast units may be inspected. Precast units must be inspected by the QC representative prior to being transported to the job site. The Contractor is to give notice 14 days prior to the time the units will be available for plant inspection. Neither the exercise nor waiver of inspection at the plant will affect the Government's right to enforce contractual provisions after units are transported or erected.

### 1.10.1 Fabricator Quality Certifications

Plants must be certified by the PCI Plant Certification Program for Category AC Architectural Precast Concrete.

## 1.11 ERECTOR CERTIFICATION

Erector with erecting organization and all erecting crews certified and designated by PCI's Certificate of Compliance to erect Category A (Architectural Systems) for non-load-bearing members.

# 1.12 CONCRETE SAMPLING AND TESTING

1.12.1 Test for Concrete Materials

Sample and test concrete materials proposed for use in the work in accordance with PCI MNL-117.

Submit reports for each material sampled and tested prior to the start of work. Reports must contain the project name and number, date, name of Contractor, name of precast unit manufacturer, name of concrete testing service, source of concrete aggregates, generic name of aggregate, and values specified.

## 1.12.2 Quality Control Testing During Fabrication

Sample and test concrete for quality control during fabrication as follows:

REQUIREMENT	TEST METHOD	NUMBER OF TESTS		
Sampling fresh concrete	ASTM C172/C172M except modified for slump per ASTM C94/C94M	As required for each test		
Slump test	ASTM C143/C143M	One for each concrete load at point of discharge and one for each set of compressive strength tests		
Air Content by pressure method	ASTM C231/C231M	One for each set of compressive strength tests		
Compressive test specimens	ASTM C31/C31M	One set of six specimens for each Compressive Strength test, one set per day or for every 20 cubic yards of concrete placed, whichever is greater.		

Compression test specimens may be either standard 6 by 12 inch cylinders or 4-inch cubes. Cubes may be molded individually or cut from slabs.

Preparation and testing of cube specimens must be as nearly consistent with the test methods specified as possible, with the exception that the concrete will be placed in a single layer.

Curing of compression test specimens must be the same as the curing method used for the precast concrete wall panels until panels are stripped of forms and then standard moist cure will continue.

REQUIREMENT	TEST METHOD	NUMBER OF TESTS
Concrete temperature		Each time a set of compression test specimens is made
Compressive strength tests	ASTM C39/C39M	One set of facing strength tests mix and one set of backing mix for every ten panels or fraction thereof cast in any one day; two specimens in each set tested at 7 calendar days; three specimens in each set tested at 28 calendar days, and one specimen in each set retained in reserve for testing if required

Evaluate compression test results at 28 days in accordance with ACI 214R using a coefficient of variation of 20 percent. Evaluate the strength of concrete by averaging the test results (two specimens) of standard cylinders tested at 28 days. Not more than 20 percent of the individual tests can have an average compressive strength less than the specified ultimate compressive strength. Submit test reports on the same day that tests are made.

Reports for Compressive Strength tests need to contain the project name and number, date of concrete placement, name of Contractor, name of precast concrete wall panel manufacturer, name of concrete testing service, panel identification letter and number, use of concrete mixture (facing or backing), design compressive strength at 28 calendar days, concrete-mix proportions and materials, and compressive breaking strength and type of break.

If 4-inch cubes are used for compressive strength specimens, average strength of the cubes at any test age must be multiplied by the factor of 0.8 to arrive at an estimate of the corresponding 6 by 12 inch cylinder strength. Report both of these values.

## 1.13 QUALITY ASSURANCE

## 1.13.1 Precast Drawings

Submit precast drawings with the following information:

a. Precast dimensions, cross-section, and edge details; location, size, and type of reinforcement, including reinforcement necessary for safe

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handling and erection of precast units and other embedded items. Comply with ACI SP-66.

- b. Layout, dimensions, and identification of each precast unit, corresponding to installation sequence.
- c. Setting drawings, instructions, and directions for installation of concrete inserts.
- d. Location and details of anchorage devices and lifting devices embedded in panels, and connection details to building framing system.
- 1.13.2 Concrete Wall Panel Surface Finish Sample

Submit a concrete wall panel sample 12 inches by 12 inches by approximately 1 1/2 inches in thickness, to illustrate quality, color, and texture of both exposed-to-view surface finish and finish of panel surfaces that will be concealed by other construction. Obtain approval prior to submission of sample panels.

After approval of the surface, Contractor must provide one full size sample Wall Panel. Approved sample may be used in construction when properly identified.

1.13.3 Required Records

ASTM C94/C94M. Submit mandatory batch ticket information for each load of ready-mixed concrete.

1.13.4 Mock-Up

Full size sample mock-up wall panel req'd for PCI Architectural Certification Categories AA, AB, AC and recommended for Category AD.

Provide mock-up to establish that proposed materials and construction techniques provide acceptable visual effect. Materials used for mock-up should be those proposed for actual construction. Include all anchors, connections, flashing and joint fillers. Apply specified products to determine acceptability of appearance and optimum coverage rate required for application

Provide mock-up sections of building and structures which typify the most difficult areas to build.

- a. Finish areas designated by Contracting Officer.
- b. Apply water repellent in accordance with manufacturer's instructions.
- c. After materials have cured, water test surface to determine that sufficient water repellent has been applied.
- d. Do not proceed with remaining work until workmanship, color, and detail are approved by Contracting Officer.
- e. Modify mock-up area as required to produce acceptable work.

Job Mock Up Panel: Minimum 4 feet by 4 feet

a. Incorporate edge, reveal as shown on drawings.

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- c. Show clean, pressure washed concrete surface.
- d. Utilize full range of color of concrete mortar joints.
- e. Maintain Mock Up for comparison with finished work.

After approval by Contracting Officer, transport mock-up to job-site and erect where directed by Contracting Officer.

### 1.13.5 Pre-Installation Meeting

Hold a meeting at the job site with representative of the manufacturer and the applicator prior to application of water repellents and all other trades that may be effected by work of this section. Notify the Contracting Officer at least 3 days in advance of the time of the meeting.

## 1.14 TOLERANCES

Dimensions of the finished panel, at the time of erection in the structure, must conform to the tolerances for precast, non-prestressed elements in PCI MNL-117 and PCI MNL-135, unless otherwise specified by the Architect.

## PART 2 PRODUCTS

#### 2.1 CONCRETE

2.1.1 Contractor-Furnished Mix Design

ACI 211.1 and ACI 301. The Contractor must submit the mix design report giving the maximum nominal coarse aggregate size, the proportions of all ingredients and the type and amount of any admixtures that will be used in the manufacture of each strength and type of concrete, a minimum of sixty days prior to commencing operations. Provide mix proportion data using at least three different water-cementitious material ratios for each type of mixture, which produce a range of strength encompassing those required for each type of concrete required. Plot a curve for each concrete mixture, showing the relationships between water-cementitious material ratios and compressive strengths. Maximum permissible water-cementitious material ratio must be that value not exceeding the maximum water-cementitious material ratio specified, indicated by the curve to produce a design minimum laboratory compressive strength at 28 calendar days not less than that specified. The mix design report is to contain the project name and number, date, name of Contractor, name of precast concrete wall panel manufacturer, name of concrete testing service, use of concrete mixture (facing or backing), source of concrete aggregates for each mixture. Submit certified copies of laboratory test reports, including mill tests and all other test data, for portland cement, blended cement, pozzolan, ground granulated blast furnace slag and aggregates. The statement must be accompanied by test results from an approved testing laboratory, certifying that the proportions selected will produce concrete of the properties required. Make no substitutions without additional tests to verify that the concrete properties are satisfactory. Concrete must have a 28-day compressive strength of 5000 psi. Air content of plastic concrete must be between 4 and 6 percent air by volume.

If, the compressive strength falls below that specified, adjust the mix proportions and water content and make necessary changes in the

temperature, moisture, and curing procedures to secure the specified strength. Notify the Contracting Officer of all changes.

### 2.1.2 Exposed-to-View Facing Mixture

Provide aggregates for exposed-to-view facing mixture; white, gray, or buff portland cement or a blend of two or more portland cements; air-entraining admixture; and water. Provide exact proportions of facing mixture to produce concrete having the specified properties and capable of obtaining the approved surface color and finish.

## 2.1.3 Backing Mixture

Provide the approved mix design.

## 2.2 MATERIALS

#### 2.2.1 Fine Aggregates

ASTM C33/C33M. The optional method of reducing the No. 50 and No. 100 sieve aggregates does not apply. The restriction to use only fine aggregates that do not contain any materials that are deleteriously reactive with alkalis in cement does apply.

## 2.2.2 Coarse Aggregate

ASTM C33/C33M, Size No. 57 , Class 5S. The restriction to use only coarse aggregates that do not contain any materials that are deleteriously reactive with alkalis in cement does apply. Aggregate must not contain slag or crushed concrete.

## 2.2.3 Exposed Aggregate

In addition to the above, facing mixture aggregate will be gravel, crushed gravel, or crushed stone of size and color to produce exposed surfaces to match the color and texture of the sample on file with the Contracting Officer.

## 2.2.4 Cementitious Materials

For exposed concrete, use one manufacturer and one source for each type of cement, ground slag, fly ash, and pozzolan. Provide documentation for recycled content of cementitious materials.

2.2.4.1 Fly Ash

ASTM C618, Class F, except that the maximum allowable loss on ignition must not exceed 3 percent.

Add with cement. Fly ash content must be a minimum of 15 percent by weight of cementitious material, provided the fly ash does not reduce the amount of cement in the concrete mix below the minimum requirements of local building codes. Where the use of fly ash cannot meet the minimum level, provide the maximum amount of fly ash permittable that meets the code requirements for cement content. Report the chemical analysis of the fly ash in accordance with ASTM C311/C311M. Evaluate and classify fly ash in accordance with ASTM D5759.

## 2.2.4.2 Raw or Calcined Natural Pozzolan

Natural pozzolan must be raw or calcined and conform to ASTM C618, Class N, including the optional requirement for uniformity.

2.2.4.3 Ultra Fine Fly Ash and Ultra Fine Pozzolan

Ultra Fine Fly Ash (UFFA) and Ultra Fine Pozzolan (UFP) must conform to ASTM C618, Class F or N, and the following additional requirements:

- a. The strength activity index at 28 days of age must be at least 95 percent of the control specimens.
- b. The average particle size must not exceed 6 microns.
- c. The sum of SiO2 + Al2O3 + Fe2O3 must be greater than 77 percent.
- 2.2.4.4 Ground Granulated Blast-Furnace Slag

ASTM C989/C989M, Grade 100 or 120. Slag content must be a minimum of 25 percent by weight of cementitious material.

## 2.2.4.5 Portland Cement

Provide cement that conforms to ASTM C150/C150M, Type II, with tri-calcium aluminates (C3A) content less than 8 percent and a maximum cement-alkali content of 0.80 percent Na2Oe (sodium oxide) equivalent. Use one brand and type of cement for formed concrete having exposed-to-view finished surfaces.

For portland cement manufactured in a kiln fueled by hazardous waste, maintain a record of source for each batch. Supplier must certify that no hazardous waste is used in the fuel mix or raw materials.

### 2.2.4.6 Blended Cements

- a. Blended cements must conform to ASTM C595/C595M Type IP, IS, IL, IT.
- b. Slag cement added to the Type IS blend must meet ASTM C989/C989M.
- c. The pozzolan added to the Type IP blend must be ASTM C618 Class F, and must be interground with the cement clinker. The manufacturer must state in writing that the amount of pozzolan in the finished cement will not vary more than plus or minus 5 mass percent of the finished cement from lot-to-lot or within a lot. The percentage and type of pozzolan used in the blend must not change from that submitted for the aggregate evaluation and mixture proportioning.

#### 2.2.5 Admixtures

ASTM C260/C260M for air-entraining admixtures. Other admixtures: ASTM C494/C494M. Certify that admixtures are free of chlorides. Coloring Admixture: ASTM C979/C979M, synthetic or natural mineral oxide or colored water reducing admixtures, temperature stable, and non-fading. Certify that coloring admixtures are free of chlorides.

2.2.6 Water

Water must comply with the requirements of ASTM C1602/C1602M. Minimize the

amount of water in the mix. Improve workability by adjusting the grading rather than by adding water. Water must be potable; free from injurious amounts of oils, acids, alkalis, salts, organic materials, or other substances deleterious to concrete. Submit test report showing water complies with ASTM C1602/C1602M.

## 2.2.7 Reinforcement

All exposed steel must be phosphate treated, primed, and coated to prevent rust.

2.2.7.1 Reinforcing Bars

ACI 301 unless otherwise specified. ASTM A615/A615M, Grade 60, ASTM A706/A706M, Grade 60.

2.2.7.2 Welded Wire Reinforcement

ASTM A1064/A1064M.

2.2.7.3 Supports for Concrete Reinforcement

Include bolsters, chairs, spacers, and other devices necessary for proper spacing, supporting, and fastening in place in accordance with PCI MNL-117.

2.2.8 Prestressing Strands

Prestressing strands need to conform to ASTM A416/A416M Grade 270.

2.2.9 Tie Wire

Tie wire must be soft monel or 18-8 stainless steel.

2.2.10 Plates, Angles, Anchors and Embedment

ASTM A36/A36M, ferrous metal plate connectors for attachment to the structural framing using manufacturer standard construction procedures. Headed studs will use 60,000 psi steel with construction conforming to AWS D1.1/D1.1M, Type B. Deformed bar anchors must conform to ASTM A1064/A1064M. Coat steel items, other than stainless, with a rust-inhibiting paint or provide hot-dip galvanized after fabrication in accordance with ASTM A153/A153M.

Furnish and install anchors, inserts, lifting devices, and other accessories which are to be embedded in the precast units in accordance with the approved detail drawings. Embedded items must be accurately positioned in their designed location, and have sufficient anchorage and embedment to satisfy design requirements.

2.2.11 Form Release Agent

Release agent must be manufacturer's standard non-staining type.

2.2.12 Grout

Packaged, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C1107/C1107M and of consistency suitable for application within a 30-minute working time.

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Water-soluble chloride ion content less than 0.06 percent by weight of cement when tested according to ASTM C1218/C1218M.

- 2.3 CAST-IN EMBEDDED ITEMS AND CONNECTORS
- 2.3.1 Inserts
- 2.3.1.1 Threaded-Type Concrete Inserts

ASTM A47/A47M, Grade 32510 or 35018, or may be medium strength cast steel conforming to ASTM A27/A27M, Grade U-60-30. Provide galvanized ferrous casting having enlarged base with two nailing lugs minimum length less than the thickness of panel less 3/4 inch, and internally threaded to receive 3/4 inch diameter machine bolt. Ferrous castings must be ferritic malleable iron. Provide inserts hot-dip galvanized after fabrication in accordance with ASTM A153/A153M.

2.3.1.2 Wedge-Type Concrete Inserts

Provide galvanized, box-type ferrous castings with integral anchor loop at back of box to accept 3/4 inch diameter bolts having special wedge-shaped head. Provide ferrous castings ASTM A47/A47M, Grade 32510 or 35018, ferritic malleable iron or ASTM A27/A27M, Grade U-60-30, medium-strength cast steel. Provide inserts hot-dip galvanized after fabrication in accordance with ASTM A153/A153M.

2.3.1.3 Slotted-Type Concrete Inserts

Provide pressed steel plate, welded construction, box type with slot to receive 3/4 inch diameter square head bolt, and provide lateral adjustment of bolt. Length of insert body, less anchorage lugs, must be 4 1/2 inches minimum. Provide insert with knockout cover. Steel plate must be 1/8 inch minimum thickness, ASTM A283/A283M, Grade C. Provide inserts hot-dip galvanized after fabrication in accordance with ASTM A153/A153M.

#### 2.3.1.4 Wood Nailer Inserts

Inserts will be kiln-dried "standard" grade Douglas fir or "No. 2" grade southern pine, surfaced 4 sides, and sized as indicated. Treat with waterborne pressure-preservative in accordance with AWPA U1, use category UC3A. All wood needs to be air or kiln dried after treatment. Verify specific treatments by the report of an approved independent inspection agency. The AWPA U1 Quality Mark "UC3A" on each piece will be accepted, in lieu of inspection reports, as evidence of compliance with applicable AWPA treatment standards.

### 2.3.1.5 Flashing Reglets

Reglets must be sheet metal open-type with continuous groove not less than 1-1/8 inches deep by 3/16-inch wide at opening and sloped upward, designed to anchor snap-lock counter flashing.

Metal must be minimum 0.011-inch thick conforming to ASTM A666, Type 302 or 304, No. 1 finish, soft temper.

Metal is to be 26-gage galvanized steel sheet conforming to ASTM A653/A653M, G90.

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- 2.3.2 Connection Devices
- 2.3.2.1 Clip Angles

ASTM A36/A36M steel, galvanized after fabrication in accordance with ASTM A153/A153M.

2.3.2.2 Ferrous Casting Clamps

ASTM A47/A47M, Grade 32510 or Grade 35018 malleable iron or cast steel, or ASTM A27/A27M, Grade 60-30, cast steel casting, hot-dip galvanized in accordance with ASTM A153/A153M.

2.3.2.3 Threaded Fasteners

Provide galvanized machine bolts, washers and, when required, nuts.

- a. Bolts: ASTM A449, 3/4 inch diameter machine bolts with hexagon head.
- b. Washers: ASME B18.21.1, medium or heavy lock-spring washers.
- c. Nuts: ASTM A563, Grade C, heavy, hexagon-type nuts.
- d. Square Nuts: ASTM A563, Grade A, plain, square-type nuts where required for slotted-type concrete inserts.

2.4 PRECAST ELEMENT FABRICATION

2.4.1 Formwork and Fabrication Tolerances

Provide forms and form-facing materials of wood, metal, plastic, or other approved material to produce concrete having the specified finish. Construct forms mortar-tight and of sufficient strength to withstand all pressures due to concrete placing operations and temperature changes. Brace and stiffen against deformation. Provide form liners where required to produce indicated finish. Provide dimensional tolerances per PCI MNL-117and PCI MNL-135.

# 2.4.2 Reinforcement

ACI 301. Place reinforcing bars and welded wire reinforcement. Secure in position with tie wires, bar supports, and spacers.

2.4.3 Preparation for Placing Concrete

Remove hardened concrete, excess form parting compound, standing water, ice, snow, or other deleterious substances from form interiors and reinforcement before concrete placement. Secure reinforcement and embedded items.

- 2.4.4 Concrete Mixing and Conveying
- 2.4.4.1 Batch Plant, Mixer, Mixing, and Measuring of Materials

ASTM C94/C94M.

# 2.4.4.2 Conveying

Prevent segregation and loss of materials.

### 2.4.5 Concrete Placing

ACI 304R. Deposit concrete in the forms continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause formation of seams or planes of weakness within the precast concrete units. Place concrete at a constant temperature of between50 and 90 degrees F throughout fabrication of each unit. Make temperature of forms or molds the same as or close to the concrete temperature. For hot or cold weather, use methods recommended by ACI 305R and ACI 306.1. Vibrate and consolidate concrete to prevent segregation and to produce a high-density concrete free of honeycomb and rock pockets. When specified, the exposed-to-view facing mixture is required to be a minimum thickness of 3/4 inches. Place backing mixture before facing mixture attains initial set.

### 2.4.6 Identification Markings

Permanently mark each precast unit to indicate pick-up points, location, orientation in the building, and date of casting. Identification markings need to correlate with approved detail drawings. Do not locate in exposed-to-view finished surfaces.

## 2.4.7 Finishing

2.4.7.1 Unformed Concealed Surfaces (Standard Smooth Finish)

Provide a trowel finish. Level surface with a straightedge, and strike off. After surface water has disappeared, float and trowel surface. Provide smooth finished surface, free of trowel marks, and uniform in texture and appearance.

#### 2.4.7.2 Smooth, Exposed-to-View Surfaces

Provide a standard smooth finish to all exposed-to-view surfaces of panels, unless otherwise indicated. Provide a concrete surface having the texture imparted by a steel form or other approved smooth surfaces form-facing material.

# 2.4.7.3 Other Surfaces

Surfaces of precast units not exposed to view or not otherwise indicated to be finished are to be finished in accordance with ACI 301 for a Surface Finish of 1.0.

## 2.4.8 Curing

Provide moist or steam curing or curing compound. Do not remove precast units from forms; prevent moisture loss and maintain 50 degrees F minimum for at least 24 hours after finishing. Maintain precast units in a surface damp condition at 50 degrees F minimum until concrete has attained 75 percent minimum of the design compressive strength. Do not use steam curing with wood forms or in connection with chemically retarded exposed aggregate surfaces.

## 2.4.9 Repair of Surface Defects

Cut out defective areas to solid concrete, with edges of cuts perpendicular to the surface of the concrete, and clean thoroughly. Dampen area to be patched and brush-coat with nonshrink grout or bonding agent. Patch the surface in accordance with procedures previously submitted by the Contractor and approved by the Contracting Officer. Where exposed to view, the patches, when dry, needs to be indistinguishable from the surrounding surfaces.

## 2.4.9.1 Smooth, Concealed Surfaces

Acceptable defective area will be limited to holes left by rods and other temporary inserts, and to honeycomb or rock pockets of 1/4 inch diameter maximum. Remove fins and other projections on the surfaces.

### 2.4.9.2 Exposed-to-View Surfaces

The combined area of acceptable defective areas must not exceed 0.2 percent of the exposed-to-view surface area and will be limited to holes of 1/4 inch diameter maximum.

## 2.4.10 Stripping

Do not remove precast concrete units from forms until units develop sufficient strength to safely strip the formwork and to remove the precast concrete units from the forms to prevent damage to the units from overstress or chipping.

## 2.4.11 Built-In Anchorage Devices

Accurately position and securely anchor all anchorage devices. Openings in anchorage devices must be filled temporarily to prevent entry of concrete.

### 2.4.12 Lifting Devices

Lifting devices must be provided, and designed for a safety factor of 4, which includes 100 percent impact. Do not use brittle material.

## 2.4.13 Finishing for Formed Surfaces

Upon removal of forms, repair and patch defective areas. Where the finished surface will be exposed to view, the combined area of defective areas must not exceed 0.2 percent of the surface and will be limited to honeycomb or rock pockets not deep enough to expose the reinforcement. Where the finished surface will be concealed by other construction, defective areas are limited to holes left by the rods and other temporary inserts and honeycomb or rock pockets not deep enough to expose the reinforcement. Defective areas must be cut out to solid concrete, cleaned, and patched with grout. Where concrete surface will be exposed to view, the patches, when dry, must be indistinguishable from the surrounding surfaces.

Create an abrasive-blast finish using an abrasive grit, equipment, application techniques, and cleaning procedures to expose aggregate and surrounding matrix surfaces.

Create an acid-etched finish using acid and hot-water solution, equipment,

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application techniques, and cleaning procedures to expose aggregate and surrounding matrix surfaces. Protect hardware, connections, and insulation from acid attach.

Create a honed finish using a continuous mechanical abrasion with fine grit, followed by filling and rubbing procedures.

Create a polished finish using a continuous mechanical abrasion with fine grit, followed by filling and rubbing procedures.

### 2.5 JOINT MATERIALS

Gasket must be elastomeric material, premolded to cross section indicated.

Material must be a vulcanized closed-cell expanded chloroprene conforming to ASTM D1056, Grade No. 2A2, with the following additional properties:

- a. Brittleness temperature will be minus 40 degrees F when tested in accordance with ASTM D746.
- b. Flammability resistance needs to be self-extinguishing when tested in accordance with ASTM D635.
- c. Resistance to ozone must be "no cracks" after exposure of a sample, at 20 percent elongation, to an ozone concentration of 100 parts per million of air by volume in air for 100 hours at 104 degrees F when tested in accordance with ASTM D1149.
- 2.6 BEARING PADS

Submit product data for all bearing pads being used.

2.6.1 Elastomeric

AASHTO M 251, for plain neoprene bearings.

2.6.2 Hardboard (Interior Only)

AHA A135.4, class as specified by the precast manufacturer.

2.6.3 Random-Oriented, Fiber-Reinforced Elastomeric Pads

Preformed, randomly oriented synthetic fibers set in elastomer. Surface hardness of 70 to 90 Shore A durometer according to ASTM D2240. Capable of supporting a compressive stress of 3000 psi with no cracking, splitting or delaminating in the internal portion of the pad.

### 2.6.4 Cotton-Duck-Fabric-Reinforced Elastomeric Pads

Preformed, horizontally layered cotton-duck fabric bonded to an elastomer. Surface hardness of 80 to 100 Shore A durometer according to ASTM D2240. Conforming to Division II, Section 18.10.2 of AASHTO LRFD Bridge Design Specifications or Military Specification MIL-C-882E.

2.6.5 Frictionless Pads

Polytetrafluoroethylene (PTFE), glass-fiber reinforced, bonded to stainless or mild-steel plates, or random-oriented, fiber-reinforced elastomeric pads, of type required for in-service stress.

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### 2.6.6 High-Density Plastic

Multimonomer, nonleaching, plastic strip capable of supporting loads with no visible overall expansion.

## 2.7 INSULATED PANEL ACCESSORIES

2.7.1 Polyisocyanurate Board Insulation

ASTM C591, Type I, 1.8 lb/cu. ft. Provide polyisocyanurate board insulation materials containing a minimum of 9 percent recycled content. Provide data identifying percentage of recycled content for insulation.

#### PART 3 EXECUTION

#### 3.1 PREPARATION

Deliver anchorage devices to the site in time to be installed before the start of concrete placing or during steel erection. Contractor must provide setting drawings, instructions, and directions for the installation of anchorage devices.

#### 3.2 EXAMINATION

Do not begin installation until supporting structures have been properly prepared.

Verify that all parts of the supporting structure are complete and ready to receive the precast units and that site conditions are conducive to proper installation.

If support structure is the responsibility of another installer, notify Contracting Officer of unsatisfactory preparation before proceeding.

#### 3.3 INSTALLATION

Install precast concrete units and accessories in accordance with approved detail drawings and descriptive data, and as specified below.

### 3.3.1 Building Framing System

Provide supporting members, including anchorage items attached to or embedded in building structural elements, prior to placement of precast units.

# 3.3.2 Concrete Strength at Time of Precast Unit Installation

Do not install precast units until concrete has attained the minimum laboratory compressive strength at 28 calendar days specified.

# 3.3.3 Erection

Erect precast units in accordance with the detail drawings and without damage to other units or to adjacent members. Set units true to alignment and level, with joints properly spaced and aligned both vertically and horizontally. Erection tolerances must be in accordance with the requirements of PCI MNL-117 and PCI MNL-135. As units are being erected, shims and wedges will be placed as required to maintain correct

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alignment. After final attachment, grout precast units as shown. After erection, clean and touch-up welds and abraded surfaces of steel with a zinc-rich paint. Welds must be made by a certified welder in accordance with the manufacturer's erection drawings. Finish pickup points, boxouts, inserts, and similar items to match adjacent areas after erection. Erection of precast units must be supervised and performed by workmen skilled in this type of work. Welding and the qualifications of welders must be in accordance with AWS D1.1/D1.1M.

## 3.3.4 Erection Tolerances

Erect architectural precast concrete units level, plumb, square and in alignment without exceeding the noncumulative erection tolerances of PCI MNL-117 and PCI MNL-135.

# 3.3.5 Joints

Joint widths between precast units will be as specified unless otherwise indicated.

## 3.3.5.1 Joint Sealing

Joint sealing will be as specified in Section 07 92 00 JOINT SEALANTS.

## 3.3.6 Protection

Protect exposed-to-view facing from staining and other damage from subsequent operations. Do not allow laitance to penetrate, stain, or harden on exposed surfaces.

## 3.4 DEFECTIVE WORK

Repair precast concrete units damaged during erection as soon after occurrence as possible or replaced, as directed, using approved procedures. All repairs to precast concrete units must match the adjacent surfaces in color and texture, as approved. Unless otherwise approved, repair procedures will conform to PCI MNL-117.

## 3.5 JOINTS AND GASKETS

Joints between precast units must be the width indicated and within limits of installation tolerances.

Install gaskets in joints as indicated, continuous throughout the joint length, and compressed at least 25 percent by volume.

### 3.6 INSPECTION AND ACCEPTANCE PROVISIONS

## 3.6.1 Dimensional Tolerances

Precast units having dimensions outside the limits for fabrication tolerances will be rejected.

# 3.6.2 Surface Finish Requirements

Precast units will be rejected for the following surface finish deficiencies:

a. Exposed-to-view surfaces that do not match the color, aggregate size

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and distribution, and texture of the approved sample

- b. Exposed-to-view surfaces that contain defects that affect the appearance of the finish, such as cracks, spalls, honeycomb, rock pockets, or stains and discoloration of aggregate or matrix that cannot be removed by cleaning
- c. Concealed surfaces that contain cracks in excess of 0.01 inch wide, cracks that penetrate to the reinforcement regardless of width, honeycomb, rock pockets, and spalls except minor breakage at corners and edges
- 3.6.3 Strength of Precast Units

Strength of precast concrete units will be considered potentially deficient if the units fail to comply with the requirements that control the strength of the units, including the following conditions:

- a. Failure to meet compressive strength tests
- b. Reinforcement not conforming to the requirements specified
- c. Concrete curing and protection of precast units against extremes of temperature during curing not conforming to the requirements specified
- d. Precast units damaged during handling and erection
- 3.6.4 Testing Precast Units for Strength

When there is evidence that the strength of precast concrete units does not meet specification requirements, cores drilled from hardened concrete for compressive strength determination must be made in accordance with ASTM C42/C42M and as follows:

- a. Take at least three representative cores from the precast-concrete units that are considered potentially deficient.
- b. Test cores with the saturated surface dry.
- c. Strength of cores will be considered satisfactory if their average is equal to or greater than 90 percent of the 28-day design compressive strength of 6 by 12 inch cylinders.

Submit test reports on the same day that tests are made. Reports must contain the project name and number, date, name of contractor, name of precast concrete wall units manufacturer, name of concrete-testing service, identification letter and number of units represented by core tests, nominal maximum size of aggregate, design compressive strength of concrete at 28 calendar days, compressive breaking strength and type of break, length of core test specimen before capping, compressive strength after correcting for length diameter ratio, direction of application of the load on the core test specimen with respect to the horizontal plane of the concrete as placed, and the moisture condition of the core test specimen at time of testing.

If the results of the core tests are unsatisfactory or if core tests are impractical to obtain, a static load tests of a precast unit will be evaluated in accordance with ACI 318.

Replace precast units used for core tests or static load tests with units that meet the requirements of this section.

#### 3.7 SAMPLING AND TESTING

### 3.7.1 Rejection

Precast units in place may be rejected for any one of the following product defects or installation deficiencies remaining after repairs and cleaning have been accomplished. "Visible" means visible to a person with normal eyesight when viewed from a distance of 20 feet in broad daylight.

- a. Nonconformance to specified tolerances.
- b. Air voids (bugholes or blowholes) larger than 3/8 inch diameter.
- c. Visible casting lines.
- d. Visible from joints.
- e. Visible irregularities.
- f. Visible stains on precast unit surfaces.
- g. Visible differences between precast unit and approved sample.
- h. Visible non-uniformity of textures or color.
- i. Visible areas of backup concrete bleeding through the facing concrete.
- j. Visible foreign material embedded in the face.
- k. Visible repairs.
- 1. Visible reinforcement shadow lines.
- m. Visible cracks.
- n. Precast units that are damaged during construction operations.

#### 3.7.2 Field Quality Control

Perform field inspection of precast unit connections. Notify the Contracting Officer in writing of defective welds, bolts, nuts and washers within 7 working days of the date of inspection. All defective connections or welds are to be removed and re-welded or repaired as required by the Contracting Officer.

3.7.2.1 Welded Connection Visual Inspection

AWS D1.1/D1.1M, furnish the services of AWS-certified welding inspector for erection inspections. Welding inspector must visually inspect all welds and identify all defective welds.

## 3.8 CLEANING

Clean exposed-to-view surfaces of precast units thoroughly with detergent and water; use a brush to remove foreign matter. Remove stains that

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remain after washing in accordance with recommendations of the precast manufacturer. Surfaces must be clean and uniform in color. Include precast concrete wall panel manufacturer's written recommendations for installation and cleaning.

-- End of Section --

## SECTION 04 20 00

## UNIT MASONRY 11/15, CHG 2: 05/19

### PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN CONCRETE INSTITUTE (ACI)

ACI	216.1	(2014) Code Requirements for Determining Fire Resistance of Concrete and Masonry Construction Assemblies			
ACI	318	(2014; Errata 1-2 2014; Errata 3-5 2015; Errata 6 2016; Errata 7-9 2017) Building Code Requirements for Structural Concrete (ACI 318-14) and Commentary (ACI 318R-14)			

ACI SP-66 (2004) ACI Detailing Manual

ASTM INTERNATIONAL (ASTM)

- ASTM A153/A153M (2016a) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- ASTM A167 (2011) Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
- ASTM A185/A185M (2007) Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete

ASTM A615/A615M (2020) Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

ASTM A641/A641M (2019) Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire

ASTM A653/A653M (2020) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

ASTM A951/A951M (2011) Standard Specification for Steel Wire for Masonry Joint Reinforcement

ASTM A1008/A1008M (2021) Standard Specification for Steel,

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		High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable
ASTM	A1064/A1064M	(2017) Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
ASTM	C90	(2016) Standard Specification for Loadbearing Concrete Masonry Units
ASTM	C270	(2019a; E 2019) Standard Specification for Mortar for Unit Masonry
ASTM	C476	(2020) Standard Specification for Grout for Masonry
ASTM	C494/C494M	(2019) Standard Specification for Chemical Admixtures for Concrete
ASTM	C641	(2017) Standard Test Method for Iron Staining Materials in Lightweight Concrete Aggregates
ASTM	C1019	(2019) Standard Test Method for Sampling and Testing Grout
ASTM	C1384	(2012a) Standard Specification for Admixtures for Masonry Mortars
ASTM	C1611/C1611M	(2021) Standard Test Method for Slump Flow of Self-Consolidating Concrete
ASTM	D2000	(2018) Standard Classification System for Rubber Products in Automotive Applications
ASTM	D2287	(2019) Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds
ASTM	E514/E514M	(2020) Standard Test Method for Water Penetration and Leakage Through Masonry

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH (CDPH)

CDPH 01350 (2017; Version 1.2) Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources using Environmental Chambers

## THE MASONRY SOCIETY (TMS)

TMS MSJC (2016) Masonry Standard Joint Committee's (MSJC) Book - Building Code Requirements and Specification for Masonry Structures, Containing TMS 402/ACI 530/ASCE 5, TMS 602/ACI 530.1/ASCE 6, and Companion Commentaries

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U.S. GREEN BUILDING COUNCIL (USGBC)

(2013; R 2020) USGBC LEED Reference Guide
for Building Design and Construction, v4
(2023) LEED v4.1 Building Design and

## 1.2 SUSTAINABILITY REPORTING

Work of this section is intended to contribute to the achievement of, or compliance with, the requirements of the Guiding Principles Validation and LEED Prerequisites and attempted Credits. Refer to Section 01 33 29.00 06 SUSTAINABILITY REPORTING for specific documentation requirements and list of Prerequisites, attempted Credits and LEED version.

Comply with product, material content, performance criteria, activity, documentation, and other technical requirements as described in the LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide as applicable.

Collect, organize, and submit product data, drawings, diagrams, photos and cost information necessary to demonstrate compliance with LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide requirements as applicable.

Data collection shall commence with the notice to proceed and will only be deemed complete upon acceptance of the Final Sustainability Notebook and LEED Online submission by the Contracting Officer, the LEED Project Administrator, and the Green Building Certification Institute.

## 1.3 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Cut CMU Drawings; G, AE Reinforcement Detail Drawings; G, AE SD-03 Product Data Hot Weather Procedures; G, AE Cold Weather Procedures; G, AE Cement; G, AE Cement; G, AE Environmental Product Declarations; S Embodied Carbon Optimization Report/Action Plan; S

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P2#: 506474 - Manned/Unmanned Tactical Vehicle Lab (MUMT)
Detroit Arsenal, MI
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Extended Producer Responsibility; S Recycled Content; S Local/Regional Materials; S Material Ingredient Reporting; S Low-Emitting Materials; S

#### SD-04 Samples

Concrete Masonry Units (CMU); G, AE

Admixtures for Masonry Mortar; G

Anchors, Ties, and Bar Positioners; G, AE

Joint Reinforcement; G, AE

SD-05 Design Data

Masonry Compressive Strength; G, AE

Fire-Rated Concrete Masonry Units

### SD-06 Test Reports

Fire-Rated Concrete Masonry Units Field Testing of Grout Single-Wythe Masonry Wall Water Penetration TestSD-07 Certificates Special Masonry Inspector Qualifications Concrete Masonry Units (CMU) Precast Concrete Units Cementitious Materials Admixtures for Masonry Mortar Admixtures for Grout Anchors, Ties, and Bar Positioners Joint Reinforcement SD-08 Manufacturer's Instructions Admixtures for Grout SD-10 Operation and Maintenance Data

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Take-Back Program

#### 1.4 SUSTAINABLE DESIGN REQUIREMENTS

1.4.1 Environmental Product Declarations

At a minimum, use materials or products with an Environmental Product Declaration in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.4.2 Embodied Carbon Optimization Report/Action Plan

At a minimum, use materials or products with an Embodied Carbon Optimization Report/Action Plan in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.4.3 Sourcing of Raw Materials

Provide products that meet one or more of the following categories:

### 1.4.3.1 Extended Producer Responsibility

At a minimum, use materials or products from manufacturers that participate in an extended producer responsibility program in accordance with the LEED Implementation Plan. Provide manufacturer letter verifying extended producer responsibility program is in place and that product is eligible. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.4.3.2 Recycled Content Materials

At a minimum, use materials or products with recycled content in accordance with the LEED Implementation Plan. Provide manufacturers product literature identifying the percentage of recycled material incorporated within each product used. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan. If recycled content minimum is specified in this section, the greater of the two percentages governs.

1.4.4 Material Ingredient Reporting

At a minimum, use materials or products with chemical inventory to at least 0.1% (1000 ppm) in accordance with the LEED Implementation Plan. Provide Health Product Declaration (HPD), Cradle to Cradle Certificate, Declare label, or other manufacturer's published content inventory in compliance with LEED v4.1 Material Ingredient Reporting credit. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

# 1.4.5 Local/Regional Materials

Use materials or products extracted, harvested, or recovered, as well as manufactured, within a 100 mile radius from the project site, if available from a minimum of three sources. provide a letter from the manufacturer stating the extraction location, manufacturing location, and purchasing location of the products provided, referencing the project name and location specifically and distance to the project site. See Section

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01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.4.6 Low-Emitting Materials

Use only CMU products on the interior that comply with LEED v4.1 BDC Ref Guide requirements. Provide manufacturer's literature identifying compliance with CDPH 01350. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for low-emitting material requirements.

- 1.5 QUALITY ASSURANCE
- 1.5.1 Special Masonry Inspector Qualifications

Refer to Section 01 45 35 SPECIAL INSPECTIONS for qualifications and responsibilities of the masonry special inspector.

1.6 DELIVERY, STORAGE, AND HANDLING

Deliver, store, handle, and protect material to avoid chipping, breakage, and contact with soil or contaminating material. Store and prepare materials in already disturbed areas to minimize project site disturbance and size of project site.

1.6.1 Masonry Units

Cover and protect masonry units from precipitation. Conform to handling and storage requirements of TMS MSJC.

- a. Mark prefabricated lintels on top sides to show either the lintel schedule number or the number and size of top and bottom bars.
- 1.6.2 Reinforcement, Anchors, and Ties

Store steel reinforcing bars, coated anchors, ties, and joint reinforcement above the ground. Maintain steel reinforcing bars and uncoated ties free of loose mill scale and loose rust.

1.6.3 Cementitious Materials, Sand and Aggregates

Deliver cementitious and other packaged materials in unopened containers, plainly marked and labeled with manufacturers' names and brands. Store cementitious material in dry, weathertight enclosures or completely cover. Handle cementitious materials in a manner that will prevent the inclusion of foreign materials and damage by water or dampness. Store sand and aggregates in a manner to prevent contamination and segregation.

1.7 PROJECT/SITE CONDITIONS

Conform to TMS MSJC for hot and cold weather masonry erection.

1.7.1 Hot Weather Procedures

When ambient air temperature exceeds 100 degrees F, or exceeds 90 degrees F and the wind velocity is greater than 8 mph, comply with TMS MSJC Article 1.8 D for: preparation prior to conducting masonry work; construction while masonry work is in progress; and protection for newly completed masonry.

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# 1.7.2 Cold Weather Procedures

When ambient temperature is below 40 degrees F, comply with TMS MSJC Article 1.8 C for: preparation prior to conducting masonry work; construction while masonry work is in progress; and protection for newly completed masonry.

- PART 2 PRODUCTS
- 2.1 SYSTEM DESCRIPTION
- 2.1.1 Design Specified Compressive Strength of Masonry

The specified compressive strength of masonry, f'm, is as indicated in the Contract Document drawings for each type of masonry.

2.1.2 Performance - Verify Masonry Compressive Strength

Verify specified compressive strength of masonry using the "Unit Strength Method" of TMS MSJC. Submit calculations and certifications of unit and mortar strength.

#### 2.2 MANUFACTURED UNITS

2.2.1 General Requirements

Do not change the source of materials, which will affect the appearance of the finished work, after the work has started except with Contracting Officer's approval. Submit test reports from an approved independent laboratory. Certify test reports on a previously tested material as the same materials as that proposed for use in this project. Submit certificates of compliance stating that the materials meet the specified requirements.

### 2.2.2 Concrete Units

2.2.2.1 Aggregates

Test lightweight aggregates, and blends of lightweight and heavier aggregates in proportions used in producing the units, for stain-producing iron compounds in accordance with ASTM C641, visual classification method. Do not incorporate aggregates for which the iron stain deposited on the filter paper exceeds the "light stain" classification.

### 2.2.2.2 Concrete Masonry Units (CMU)

2.2.2.2.1 Cement

Use only cement that has a low alkali content and is of one brand.

## 2.2.2.2. Recycled Content

Provide units with a minimum of 5 percent post-consumer recycled content, or a minimum of 20 percent post-industrial recycled content, based on mass, cost, or volume.Units may contain post-consumer or post-industrial recycled content.

## 2.2.2.2.3 Size

Provide units with dimensions indicated in Contract Documents.

### 2.2.2.4 Surfaces

For units that are to be plastered or stuccoed, provide surfaces that are sufficiently rough to provide bond. Provide units with exposed surfaces that are smooth and of uniform texture.

## 2.2.2.2.5 Unit Types

a. Hollow Load-Bearing Units: ASTM C90 normal weight. Provide load-bearing units for exterior walls, interior walls, foundation walls, load-bearing walls, and shear walls.

## 2.2.2.2.6 Jamb Units

Provide jamb units of the shapes and sizes to conform with wall units. Solid units may be incorporated in the masonry work where necessary to fill out at corners, gable slopes, and elsewhere as approved.

Provide sash jamb units with a 3/4 by 3/4 inch groove near the center at end of each unit.

### 2.2.2.3 Fire-Rated Concrete Masonry Units

For indicated fire-rated construction, provide concrete masonry units of minimum equivalent thickness for the fire rating indicated and the corresponding type of aggregates indicated in TABLE I. Units containing more than one of the aggregates listed in TABLE I will be rated by linear interpolation based on the percent by dry-rodded volume of each aggregate used in manufacturing the units.

TABLE I FIRE-RATED CONCRETE MASONRY UNITS							
Aggregate Type	Minimum Equivalent Thickness for Fire-Resistance Rating, inch						
	1/2 hour	3/4 hour	1 hour	1-1/2 hour	2 hours	3 hours	4 hours
Calcareous or siliceous gravel (other than limestone)	2.0	2.4	2.8	3.6	4.2	5.3	6.2
Limestone, cinders, or air-cooled slag	1.9	2.3	2.7	3.4	4.0	5.0	5.9
Expanded clay, expanded shale, or expanded slate	1.8	2.2	2.6	3.3	3.6	4.4	5.1
Expanded slag or pumice	1.5	1.9	2.1	2.7	3.2	4.0	4.7

Determine equivalent thickness in accordance with ACI 216.1. Where walls are to receive plaster or be faced with brick, or otherwise form an assembly; include the thickness of plaster or brick or other material in

the assembly in determining the equivalent thickness. Submit calculation results.

- 2.2.3 Precast Concrete Units
- 2.2.3.1 General
  - a. Provide precast concrete trim, lintels, copings, splashblocks and sills that are factory-made units in a plant regularly engaged in producing precast concrete units. Unless otherwise indicated, provide precast concrete with minimum 4,000 psi compressive strength, conforming to Section 03 30 00 CAST-IN-PLACE CONCRETE using 1/2 inch to No. 4 nominal-size coarse aggregate, and with reinforcement required for handling of the units. Maintain minimum clearance of 3/4 inch between reinforcement and faces of units.
  - b. Unless precast-concrete items have been subjected during manufacture to saturated-steam pressure of at least 120 psi for at least 5 hours, either damp-cure for 24 hours or steam-cure and then age under cover for 28 days or longer. In precast concrete members weighing over 80 pounds provide built-in loops of galvanized wire or other approved provisions for lifting and anchoring.
  - c. Fabricate units with beds and joints at right angles to the face, with sharp true arises and with drip grooves on the underside where units overhang walls. Form exposed-to-view surfaces free of surface voids, spalls, cracks, and chipped or broken edges and with uniform appearance and color. Unless otherwise specified, provide units with a smooth dense finish.
  - d. Prior to installation, wet and inspect each unit for crazing. Items showing evidence of dusting, spalling, crazing, or having surfaces treated with a protective coating will be rejected.
  - e. Submit specified factory certificates.
  - f. Provide architectural cast stone masonry trim, copings, heads, and sills that are manufactured in a plant by a producer regularly engaged in producing cast stone. Provide cast stone units that comply with ASTM C1364. Submit test reports and three exemplars of the same cast stone product installed in similar projects in similar climatic conditions.
- 2.2.3.2 Precast Concrete Lintels

Provide precast concrete lintels, unless otherwise shown, of a thickness equal to the wall and reinforced with minimum two No. 4 bars for the full length. Provide top and bottom bars for lintels over 36 inches in length. Provide at least 8 inches bearing at each end. Label the top of lintels and clearly mark each lintel to show location in the structure. Design reinforced lintels in conformance with ACI 318 for flexural and shear strength, using concrete with a minimum 28 day compressive strength of 5000 psi. Limit lintel deflection due to dead plus live load to L/600 or 0.3 inches.

2.2.3.3 Precast Concrete Sills and Copings

Cast sills and copings washes. For windows having mullions, cast sills in sections with head joints at mullions and a 1/4 inch allowance for mortar

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joints. Roughen the ends of sills, except a 3/4 inch wide margin at exposed surfaces, for bond. Provide rounded nosings on treads of door sills. Reinforce sills with not less than two No. 4 bars.

- 2.3 EQUIPMENT
- 2.3.1 Vibrators

Maintain at least one spare vibrator on site at all times.

2.3.2 Grout Pumps

Pumping through aluminum tubes is not permitted.

- 2.4 MATERIALS
- 2.4.1 Mortar Materials
- 2.4.1.1 Cementitious Materials

Provide cementitious materials that conform to those permitted by ASTM C270.

2.4.1.2 Admixtures for Masonry Mortar

In cold weather, use a non-chloride based accelerating admixture that conforms to ASTM C1384, unless Type III portland cement is used in the mortar.

In showers and kitchens, use mortar that contains a water-repellent admixture that conforms to ASTM C1384. Provide a water-repellent admixture, conforming to ASTM C1384 and of the same brand and manufacturer as the block's integral water-repellent, in the mortar used to place concrete masonry units that have an integral water-repellent admixture.

2.4.1.3 Aggregate and Water

Provide aggregate (sand) and water that conform to materials permitted by ASTM C270.

- 2.4.2 Grout and Ready-Mix Grout Materials
- 2.4.2.1 Cementitious Materials for Grout

Provide cementitious materials that conform to those permitted by ASTM C476.

2.4.2.2 Admixtures for Grout

Water-reducing admixtures that conform to ASTM C494/C494M Type F or G and viscosity-modifying admixtures that conform to ASTM C494/C494M Type S are permitted for use in grout. Other admixtures require approval by the Contracting Officer.

In cold weather, a non-chloride based accelerating admixture may be used subject to approval by the Contracting Officer; use accelerating admixture that is non-corrosive and conforms to ASTM C494/C494M, Type C.

2.4.2.3 Aggregate and Water

Provide fine and coarse aggregates and water that conform to materials

permitted by ASTM C476.

- 2.5 MORTAR AND GROUT MIXES
- 2.5.1 Mortar Mix
  - a. Provide mortar Type S unless specified otherwise herein. Do not use masonry cement in the mortar. Do not use air-entrainment in the mortar.
  - b. Use ASTM C270 Type S cement-lime mortar or mortar cement mortar for seismic-force-resisting elements indicated.
  - c. Provide Type S mortar for non-load-bearing, non-shear-wall interior masonry.
  - d. For field-batched mortar, measure component materials by volume. Use measuring boxes for materials that do not come in packages, such as sand, for consistent batching. Mix cementitious materials and aggregates between 3 and 5 minutes in a mechanical batch mixer with a sufficient amount of water to produce a workable consistency. Do not hand mix mortar unless approved by the Contracting Officer. Maintain workability of mortar by remixing or retempering. Discard mortar that has begun to stiffen or is not used within 2-1/2 hours after initial mixing.
  - e. For preblended mortar, follow manufacturer's mixing instructions.
- 2.5.2 Grout and Ready Mix Grout Mix

Use grout that conforms to ASTM C476, fine or coarse. Use conventional grout with a slump between 8 and 11 inches. Use self-consolidating grout with slump flow of 24 to 30 inches and a visual stability index (VSI) not greater than 1. Provide minimum grout strength of 2500 psi in 28 days, as tested in accordance with ASTM C1019. Do not change proportions and do not use materials with different physical or chemical characteristics in grout for the work unless additional evidence is furnished that grout meets the specified requirements. Use ready-mixed grout that conforms to ASTM C476.

- 2.6 ACCESSORIES
- 2.6.1 Grout Barriers

Grout barriers for vertical cores that consist of fine mesh wire, fiberglass, or expanded metal.

- 2.6.2 Anchors, Ties, and Bar Positioners
- 2.6.2.1 General
  - a. Fabricate anchors and ties without drips or crimps. Size anchors and ties to provide a minimum of 5/8 inch mortar cover from each face of masonry.
  - b. Fabricate steel wire anchors and ties shall from wire conforming to ASTM A1064/A1064M and hot-dip galvanize in accordance with ASTM A153/A153M.
  - c. Fabricate joint reinforcement in conformance with ASTM A951/A951M.

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> Hot dip galvanize joint reinforcement in exterior walls and in interior walls exposed to moist environment in conformance with ASTM A153/A153M. Galvanize joint reinforcement in other interior walls in conformance with ASTM A641/A641M; coordinate with paragraph JOINT REINFORCEMENT below.

- d. Fabricate sheet metal anchors and ties in conformance with ASTM A1008/A1008M. Hot dip galvanize sheet metal anchors and ties in exterior walls and in interior walls exposed to moist environment in compliance with ASTM A153/A153M Class B. Galvanize sheet metal anchors and ties in other interior walls in compliance with ASTM A653/A653M, Coating Designation G60.
- e. Submit two anchors, ties and bar positioners of each type used, as samples.

#### 2.6.2.2 Wire Mesh Anchors

Provide wire mesh anchors of 1/4 inch mesh galvanized hardware cloth, conforming to ASTM A185/A185M, with length not less than 12 inches, at intersections of interior non-bearing masonry walls.

- 2.6.2.3 Adjustable Anchors
- 2.6.2.3.1 Anchorage to Structural Steel

Provide hot-dip galvanized adjustable anchors for connecting masonry walls to the structural steel frame as detailed on the drawings . Provide zinc-rich paint for touching up paint after welding galvanized anchors to structural steel.

2.6.2.4 Bar Positioners

Factory-fabricate bar positioners, used to prevent displacement of reinforcing bars during the course of construction, from 9 gauge steel wire or equivalent, and hot-dip galvanized. Bar positioners must be suitable for intended use and be corrosion resistant steel. Bar positioners not fully contained within the wythe must be hot-dip galvanized.

2.6.3 Joint Reinforcement

Factory fabricate joint reinforcement in conformance with ASTM A951/A951M, welded construction. Provide ladder type joint reinforcement, having one longitudinal wire in the mortar bed of each face shell for hollow units and one wire for solid units and with all wires a minimum of 9 gauge. Size joint reinforcement to provide a minimum of 5/8 inch cover from each face. Space crosswires not more than 16 inches. Provide joint reinforcement for straight runs in flat sections not less than 10 feet long. Provide joint reinforcement with factory formed corners and intersections. If approved for use, joint reinforcement may be furnished with adjustable wall tie features. Submit one piece of each type used, including corner and wall intersection pieces, showing at least two cross wires.

## 2.6.4 Reinforcing Steel Bars

Reinforcing steel bars and rods shall conform to ASTM A615/A615M, Grade 60.

## 2.6.5 Concrete Masonry Control Joint Keys

Provide control joint keys of a factory fabricated solid section of natural or synthetic rubber (or combination thereof) conforming to ASTM D2000 M2AA-805 with a minimum durometer hardness of 80 or polyvinyl chloride conforming to ASTM D2287 Type PVC 654-4 with a minimum durometer hardness of 85. Form the control joint key with a solid shear section not less than 5/8 inch thick and 3/8 inch thick flanges, with a tolerance of plus or minus1/16 inch, to fit neatly, but without forcing, in masonry unit jamb sash grooves.

2.6.6 Through Wall Flashing and Weeps

## 2.6.6.1 General

Provide stainless steel sheet, self-adhesive rubberized sheet, or reinforced membrane sheet flashing except that flashing indicated to terminate in reglets shall be metal or coated-metal flashing and except that the material shall be one which is not adversely affected by dampproofing material.

2.6.6.2 Stainless Steel Flashing

Provide stainless steel, ASTM A167, Type 304 or 316, 0.015 inch thick, No. 2D finish. Where indicated, provide with factory-fabricated deformations that mechanically bond flashing against horizontal movement in all directions, where deformations consist of dimples, diagonal corrugations, or a combination of dimples and transverse corrugations.

#### 2.6.6.3 Reinforced Membrane Flashing

Provide polyester film core with a reinforcing fiberglass scrim bonded to one side. Provide membrane that is impervious to moisture, flexible, is not affected by caustic alkalis, and after being exposed for not less than 1/2 hour to a temperature of 32 degrees F, shows no cracking when, at that temperature, it is bent 180 degrees over a 1/16 inch diameter mandrel and then bent at the same point over the same size mandrel in the opposite direction 360 degrees.

## 2.6.6.4 Rubberized Flashing

Provide self-adhesive rubberized asphalt sheet flashing consisting of 32-mil thick pliable and highly adhesive rubberized asphalt compound bonded completely and integrally to 8-mil thick, high density, cross-laminated polyethylene film to produce an overall thickness of 40 mils. Provide rubberized, asphalt-based mastic and surface conditioner that are each approved by flashing manufacturer for use with flashing material.

## 2.6.6.5 Weep Ventilators

Provide weep ventilators that are prefabricated from stainless steel or plastic. Provide inserts with grill or louver-type openings designed to allow the passage of moisture from cavities and to prevent the entrance of insects, and with a rectangular closure strip to prevent mortar droppings from clogging the opening. Provide ventilators with compressible flanges to fit in a standard 3/8 inch wide mortar joint and with height equal to the nominal height of the unit.

## 2.6.6.6 Metal Drip Edge

Provide stainless steel drip edge, 15-mil thick, hemmed edges, with down-turned drip at the outside edge and upturned dam at the inside edge for use with membrane flashings.

## PART 3 EXECUTION

#### 3.1 EXAMINATION

Prior to start of work, verify the applicable conditions as set forth in TMS MSJC, inspection.

### 3.2 PREPARATION

## 3.2.1 Stains

Protect exposed surfaces from mortar and other stains. When mortar joints are tooled, remove mortar from exposed surfaces with fiber brushes and wooden paddles. Protect base of walls from splash stains by covering adjacent ground with sand, sawdust, or polyethylene.

### 3.2.2 Loads

Do not apply uniform loads for at least 12 hours or concentrated loads for at least 72 hours after masonry is constructed. Provide temporary bracing as required.

### 3.2.3 Concrete Surfaces

Where masonry is to be placed, clean concrete of laitance, dust, dirt, oil, organic matter, or other foreign materials and slightly roughen to provide a surface texture with a depth of at least 1/8 inch. Sandblast, if necessary, to remove laitance from pores and to expose the aggregate.

3.2.4 Bracing

Provide bracing and scaffolding necessary for masonry work and as required to resist wind pressure as required by OSHA and local codes. Do not remove bracing in less than 10 days.

- 3.3 ERECTION
- 3.3.1 General
  - a. Coordinate masonry work with the work of other trades to accommodate built-in items and to avoid cutting and patching. Lay masonry units in running bond pattern. Lay facing courses level with back-up courses, unless the use of adjustable ties has been approved in which case the tolerances is plus or minus 1/2 inch. Adjust each unit to its final position while mortar is still soft and has plastic consistency.
  - b. Remove and clean units that have been disturbed after the mortar has stiffened, and relay with fresh mortar. Keep air spaces, cavities, chases, expansion joints, and spaces to be grouted free from mortar and other debris. Select units to be used in exposed masonry surfaces from those having the least amount of chipped edges or other imperfections detracting from the appearance of the finished work.

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- c. When necessary to temporarily discontinue the work, step (rack) back the masonry for joining when work resumes. Toothing may be used only when specifically approved by the Contracting Officer. Before resuming work, remove loose mortar and thoroughly clean the exposed joint. Cover the top of walls subjected to rain or snow with nonstaining waterproof covering or membrane when work is not in process. Extend the covering a minimum of 610 mm 2 feet down on each side of the wall and hold securely in place.
- d. Ensure that units being laid and surfaces to receive units are free of water film and frost. Lay solid units in a nonfurrowed full bed of mortar. Bevel mortar for veneer wythes and slope down toward the cavity side. Shove units into place so that the vertical joints are tight. Completely fill vertical joints between solid units with mortar, except where indicated at control, expansion, and isolation joints. Place hollow units so that mortar extends to the depth of the face shell at heads and beds, unless otherwise indicated. Mortar will be permitted to protrude up to 1/2 inch into the space or cells to be grouted. Provide means to prevent mortar from dropping into the space below or clean grout spaces prior to grouting.
- e. In multi-wythe construction with collar joints no more than 3/4 inch wide, bring up the inner wythe not more than 16 inches ahead of the outer wythe. Fill collar joints with mortar during the laying of the facing wythe, and filling shall not lag the laying of the facing wythe by back-buttering each unit as it is laid.

### 3.3.1.1 Jointing

Tool mortar joints when the mortar is thumbprint hard. Tool horizontal joints after tooling vertical joints. Brush mortar joints to remove loose and excess mortar.

### 3.3.1.1.1 Tooled Joints

Tool mortar joints in exposed exterior and interior masonry surfaces concave, using a jointer that is slightly larger than the joint width so that complete contact is made along the edges of the unit. Perform tooling so that the mortar is compressed and the joint surface is sealed. Use a jointer of sufficient length to obtain a straight and true mortar joint. No exterior joints are to be left un-tooled.

## 3.3.1.1.2 Flush Joints

Flush cut mortar joints in concealed masonry surfaces and joints at electrical outlet boxes in wet areas. Finish flush cut joints by cutting off the mortar flush with the face of the wall. Point joints in unparged masonry walls below grade tight. For architectural units, such as fluted units, completely fill both the head and bed joints and flush cut.

# 3.3.1.1.3 Door and Window Frame Joints

On the exposed interior side of exterior frames, joints between frames and abutting masonry walls shall be raked to a depth of 3/8 inch. On the exterior side of exterior frames, joints between frames and abutting masonry walls shall be raked to a depth of 3/8 inch.

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## 3.3.1.1.4 Joint Widths

- a. Provide 3/8 inch wide mortar joints in concrete masonry, except for prefaced concrete masonry units.
- b. Maintain mortar joint widths within tolerances permitted by TMS MSJC

### 3.3.1.2 Cutting and Fitting

Use full units of the proper size wherever possible, in lieu of cut units. Locate cut units where they would have the least impact on the architectural aesthetic goals of the facility. Perform cutting and fitting, including that required to accommodate the work of others, by masonry mechanics using power masonry saws. Concrete masonry units may be wet or dry cut. Before being placed in the work, dry wet-cut units to the same surface-dry appearance as uncut units being laid in the wall. Provide cut edges that are clean, true and sharp.

- a. Carefully make openings in the masonry so that wall plates, cover plates or escutcheons required by the installation will completely conceal the openings and will have bottoms parallel with the masonry bed joints. Provide reinforced masonry lintels above openings over 12 inches wide for pipes, ducts, cable trays, and other wall penetrations, unless steel sleeves are used.
- b. Do not reduce masonry units in size by more than one-third in height and one-half in length. Do not locate cut products at ends of walls, corners, and other openings.

## 3.3.1.3 Unfinished Work

Rack back unfinished work for joining with new work. Toothing may be resorted to only when specifically approved by the Contracting Officer. Remove loose mortar and thoroughly clean the exposed joints before laying new work.

## 3.3.1.4 Control Joints

Provide control joints in concrete masonry as indicated. Construct by using special control-joint unitsor using sash jamb units with control joint keyin accordance with the details shown on the Drawings. Form a continuous vertical joint at control joint locations, including through bond beams, by utilizing half blocks in alternating courses on each side of the joint. Interrupt the control joint key in courses containing continuous bond beam reinforcement. Interrupt the horizontal reinforcement and grout in bond beams at the control joint except reinforcement in bond beams at the floor and roof diaphragms and in bond beams and joint reinforcing within 16 inches of the top of walls shall be continuous.

Where mortar was placed in the joint, rake both faces of the control joints to a depth of 3/4 inch. Install backer rod and sealant on both faces in accordance with Section 07 92 00 JOINT SEALANTS.

3.3.2 Reinforced, Single Wythe Concrete Masonry Units Walls

### 3.3.2.1 Concrete Masonry Unit Placement

a. Fully bed units used to form, pilasters, columns, starting courses on

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> footings, walls, lintels, and beams, and where cells are to be filled with grout in mortar under both face shells and webs. Provide mortar beds under both face shells for other units. Mortar head joints for a distance in from the face of the unit not less than the thickness of the face shell.

- b. Stiffen double walls at wall-mounted plumbing fixtures by use of strap anchors, two above each fixture and two below each fixture, located to avoid pipe runs, and extending from center to center of each wall within the double wall. Adequately reinforce walls and partitions for support of wall-hung plumbing fixtures when chair carriers are not specified.
- c. Submit CMU wall layout plans and elevations for approval prior to beginning construction. The CMU wall layout plans and elevations shall be submitted with the reinforcing steel shop drawings for the supporting foundation. The CMU wall layout plans and elevations shall identify, locate, and dimension all CMU wall vertical and horizontal reinforcing steel, CMU walls, wall openings, lintels, masonry control and isolation joints, cut CMU products and block units, and all CMU vertical and horizontal cells that will be grouted, reinforced, and contain dowels.

## 3.3.2.2 Preparation for Reinforcement

Lay units in such a manner as to preserve the unobstructed vertical continuity of cores to be grouted. Remove mortar protrusions extending 1/2 inch or more into cells before placing grout. Position reinforcing bars accurately as indicated before placing grout. Where vertical reinforcement occurs, fill cores solid with grout in accordance with paragraph PLACING GROUT in this Section.

#### 3.3.3 Lintels

### 3.3.3.1 Masonry Lintels

Construct masonry lintels with lintel units filled solid with grout in all courses and reinforced with a minimum of two No. 4 bars in the bottom course unless otherwise indicated. See Contract Document Structural drawings for lintel schedule and additional information. Extend lintel reinforcement beyond each side of masonry opening 40 bar diameters or 24 inches, whichever is greater. Support reinforcing bars in place prior to grouting and locate 1/2 inch above the bottom inside surface of the lintel unit.

### 3.3.3.2 Precast Concrete and Steel Lintels

Provide precast concrete and steel lintels as shown on the Drawings. Set lintels in a full bed of mortar with faces plumb and true. Provide steel and precast lintels with a minimum bearing length of 8 inches unless otherwise indicated. In partially grouted masonry, provide fully grouted units under the full lintel bearing length, unless otherwise indicated.

## 3.3.4 Sills and Copings

Set sills and copings in a full bed of mortar with faces plumb and true. Slope sills and copings to drain water. Mechanically anchor copings and sills longer than 4 feet as indicated.

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## 3.4 INSTALLATION

# 3.4.1 Bar Reinforcement Installation

## 3.4.1.1 Preparation

Submit detail drawings showing bar splice locations. Identify bent bars on a bending diagram and reference and locate such bars on the drawings. Show wall dimensions, bar clearances, and wall openings including dimensioned opening sizes and locations. See Section 3.3.3.1 "Concrete Masonry Unit Placement" for additonal information and requirements. Utilize bending details that conform to the requirements of ACI SP-66. No approval will be given to the shop drawings until the Contractor certifies that all openings, including those for mechanical and electrical service, are shown. If, during construction, additional masonry openings are required, resubmit the approved shop drawings with the additional openings shown along with the proposed changes. Clearly highlight location of these additional openings. Provide wall elevation drawings with minimum scale of 1/4 inch per foot. Submit drawings including plans, elevations, and details of wall reinforcement; details of reinforcing bars at corners and wall intersections; offsets; tops, bottoms, and ends of walls; control and expansion joints; lintels; and wall openings.

Clean reinforcement of loose, flaky rust, scale, grease, mortar, grout, and other coatings that might destroy or reduce its bond prior to placing grout. Do not use bars with kinks or bends not shown on the approved shop drawings. Place reinforcement prior to grouting. Unless otherwise indicated, extend vertical wall reinforcement to within 2 inches of tops of walls.

## 3.4.1.2 Positioning Bars

- a. Accurately place vertical bars within the cells at the positions indicated on the drawings. A minimum clearance of 1/2 inch shall be maintained between the bars and masonry units. Provide minimum clearance between parallel bars of 1/2 inch between the bars and masonry units for coarse grout and a minimum clearance of 1/4 inch between the bars and masonry units for fine grout. Provide minimum clearance between parallel bars of 1 inch or one diameter of the reinforcement, whichever is greater. Vertical reinforcement may be held in place using bar positioners located near the ends of each bar and at intermediate intervals of not more than 192 diameters of the reinforcement or by other means to prevent displacement beyond permitted tolerances. As masonry work progresses, secure vertical reinforcement to prevent displacement beyond allowable tolerances.
- b. Wire column and pilaster lateral ties in position around the vertical reinforcing bars. Place lateral ties in contact with the vertical reinforcement and do not place in horizontal mortar bed joints.
- c. Position horizontal reinforcing bars as indicated. Stagger splices in adjacent horizontal bars, unless otherwise indicated.
- d. Form splices by lapping bars as indicated. Do not cut, bend or eliminate reinforcing bars. Foundation dowel bars may be field-bent when permitted by TMS MSJC.

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# 3.4.1.3 Splices of Bar Reinforcement

Lap splice reinforcing bars as indicated. When used, provide welded or mechanical connections that develop at least 125 percent of the specified yield strength of the reinforcement.

#### 3.4.2 Placing Grout

# 3.4.2.1 General

Fill cells containing reinforcing bars with grout. Solidly grout hollow masonry units in walls or partitions supporting plumbing, heating, or other mechanical fixtures, voids at door and window jambs, and other indicated spaces. Solidly grout cells under lintel bearings on each side of openings for full height of openings. Solidly grout walls below grade, lintels, and bond beams. Units other than open end units may require grouting each course to preclude voids in the units.

Discard site-mixed grout that is not placed within 1-1/2 hours after water is first added to the batch or when the specified slump is not met without adding water after initial mixing. Discard ready-mixed grout that does not meet the specified slump without adding water other than water that was added at the time of initial discharge. Allow sufficient time between grout lifts to preclude displacement or cracking of face shells of masonry units. Provide a grout shear key between lifts when grouting is delayed and the lower lift loses plasticity. If blowouts, flowouts, misalignment, or cracking of face shells should occur during construction, tear down the wall and rebuild.

## 3.4.2.2 Horizontal Grout Barriers

Embed horizontal grout barriers in mortar below cells of hollow units receiving grout.

3.4.2.3 Grout Holes and Cleanouts

# 3.4.2.3.1 Grout Holes

Provide grouting holes in slabs, spandrel beams, and other in-place overhead construction. Locate holes over vertical reinforcing bars or as required to facilitate grout fill in bond beams. Provide additional openings spaced not more than 16 inches on centers where grouting of hollow unit masonry is indicated. Form such openings not less than 4 inches in diameter or 3 by 4 inches in horizontal dimensions. Upon completion of grouting operations, plug and finish grouting holes to match surrounding surfaces.

## 3.4.2.3.2 Cleanouts for Hollow Unit Masonry Construction

For hollow masonry units. provide cleanout holes at the bottom of every grout pour in cores containing vertical reinforcement when the height of the grout pour exceeds 5 feet 4 inches. Where all cells are to be grouted, construct cleanout courses using bond beam units in an inverted position to permit cleaning of all cells. Provide cleanout holes at a maximum spacing of 32 inches where all cells are to be filled with grout.

Establish a new series of cleanouts if grouting operations are stopped for more than 4 hours. Provide cleanouts not less than 3 by 3 inch by cutting openings in one face shell. Manufacturer's standard cutout units

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may be used at the Contractor's option. Do not cleanout holes until masonry work, reinforcement, and final cleaning of the grout spaces have been completed and inspected. For walls which will be exposed to view, close cleanout holes in an approved manner to match surrounding masonry.

# 3.4.2.4 Grout Placement

A grout pour is the total height of masonry to be grouted prior to erection of additional masonry. A grout lift is an increment of grout placement within a grout pour. A grout pour is filled by one or more lifts of grout.

- a. Lay masonry to the top of a pour permitted by TMS MSJC Table 7, based on the size of the grout space and the type of grout. Prior to grouting, remove masonry protrusions that extend 1/2 inch or more into cells or spaces to be grouted. Provide grout holes and cleanouts in accordance with paragraph GROUT HOLES AND CLEANOUTS above when the grout pour height exceeds 5 feet 4 inches. Hold reinforcement, bolts, and embedded connections rigidly in position before grouting is started. Do not prewet concrete masonry units.
- b. Place grout using a hand bucket, concrete hopper, or grout pump to fill the grout space without segregation of aggregate. Operate grout pumps to produce a continuous stream of grout without air pockets, segregation, or contamination.
- c. If the masonry has cured at least 4 hours, grout slump is maintained between 10 to 11 inches, and no intermediate reinforced bond beams are placed between the top and bottom of the pour height, place conventional grout in lifts not exceeding 12 feet 8 inches. For the same curing and slump conditions but with intermediate bond beams, limit conventional grout lift to the bottom of the lowest bond beam that is more than 5 feet 4 inches above the bottom of the lift, but do not exceed 12 feet 8 inches. If masonry has not cured at least 4 hours or grout slump is not maintained between 10 to 11 inches, place conventional grout in lifts not exceeding 5 feet 4 inches.
- d. Consolidate conventional grout lift and reconsolidate after initial settlement before placing next lift. For grout pours that are 12 inches or less in height, consolidate and reconsolidate grout by mechanical vibration or puddling. For grout pours that are greater than 12 inches in height, consolidate and reconsolidate grout by mechanical vibration. Apply vibrators at uniformly spaced points not further apart than the visible effectiveness of the machine. Limit duration of vibration to time necessary to produce satisfactory consolidation without causing segregation. If previous lift is not permitted to set, dip vibrator into previous lift. Do not insert vibrators into lower lifts that are in a semi-solidified state. If lower lift sets prior to placement of subsequent lift, form a grout key by terminating grout a minimum of 1-1/2 inch below a mortar joint. Vibrate each vertical cell containing reinforcement in partially grouted masonry. Do not form grout keys within beams.
- e. If the masonry has cured 4 hours, place self-consolidating grout (SCG) in lifts not exceeding the pour height. If masonry has not cured for at least 4 hours, place SCG in lifts not exceeding 5 feet 4 inches. Do not mechanically consolidate self-consolidating grout. Place self-consolidating grout in accordance with manufacturer's recommendations.

- f. Upon completion of each day's grouting, remove waste materials and debris from the equipment, and dispose of outside the masonry.
- 3.4.3 Joint Reinforcement Installation

Install joint reinforcement at 16 inches on center unless otherwise indicated. Lap joint reinforcement not less than 6 inches. Install prefabricated sections at corners and wall intersections. Place the longitudinal wires of joint reinforcement in mortar beds to provide not less than 5/8 inch cover to either face of the unit.

## 3.4.4 Bond Beams

Reinforce and grout bond beams as indicated and as described in paragraphs above. Install grout barriers under bond beam units to retain the grout as required, unless wall is fully grouted or solid bottom units are used. For high lift grouting in partially grouted masonry, provide grout retaining material on the top of bond beams to prevent upward flow of grout. Ensure that reinforcement is continuous, including around corners, except through control joints or expansion joints, unless otherwise indicated.

#### 3.5 APPLICATION

#### 3.5.1 Insulation

Insulate cavity walls (multi-wythe noncomposite masonry walls), where shown, by installing board-type insulation on the cavity side of the inner wythe. Apply board type insulation directly to the masonry or thru-wall flashing with adhesive. Neatly fit insulation between obstructions without impaling insulation on ties or anchors. Apply insulation in parallel courses with vertical joints breaking midway over the course below and in moderate contact with adjoining units without forcing. Cut to fit neatly against adjoining surfaces. Tape or seal the joints between the boards.

3.5.2 Interface with Other Products

#### 3.5.2.1 Built-In Items

Fill spaces around built-in items with mortar. Point openings around flush-mount electrical outlet boxes in wet locations with mortar. Embed anchors, ties, wall plugs, accessories, flashing, pipe sleeves and other items required to be built-in as the masonry work progresses. Fully embed anchors, ties and joint reinforcement in the mortar. Fill cells receiving anchor bolts and cells of the first course below bearing plates with grout, unless otherwise indicated. Built-In items not allowed in fire-rated cmu walls.

# 3.5.2.2 Door and Window Frame Joints

On the exposed interior and exterior sides of exterior frames, rake joints between frames and abutting masonry walls to a depth of 3/8 inch.

## 3.5.2.3 Bearing Plates

Set bearing plates for beams, joists, and similar structural members to the proper line and elevation with damp-pack bedding mortar, except where

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non-shrink grout is indicated. Provide bedding mortar and non-shrink grout s specified in Section 03 30 00 CAST-IN-PLACE CONCRETE.

3.5.3 Tolerances

Lay masonry plumb, true to line, with courses level within the tolerances of TMS MSJC, Article 3.3 F.

- 3.6 FIELD QUALITY CONTROL
- 3.6.1 Tests
- 3.6.1.1 Field Testing of Grout
  - Perform grout testing at the following frequency: two times per day. For each required grout property to be evaluated, provide a minimum of three specimens.
  - b. Sample and test conventional and self-conslidating grout for compressive strength and temperature in accordance with ASTM C1019.
  - c. Evaluate slump in conventional grout in accordance with ASTM C1019.
  - d. Evaluate slump flow and visual stability index of self-consolidating grout in accordance with ASTM C1611/C1611M.
- 3.6.1.2 Single-Wythe Masonry Wall Water Penetration Test

Prior to start of field construction of the single-wythe concrete masonry wall, perform masonry wall water penetration test on mock-up wall assemblies consisting of the identical design, materials, mix, and construction methods as the actual wall construction and in accordance with ASTM E514/E514M. Prepare a minimum of three specimens and cure for minimum 28 days prior to testing. Construct panels by the same methods, processes, and applications to be used on the project's construction site. Spray test for 6 hours on each specimen. If water is visible on back of test panels during the test and areas of dampness on the backside of the test panels do not exceed 25 percent of the wall area, the panels will be considered to have passed. Dampness is defined as any area of surface darkening or discoloration due to moisture penetration or accumulation below the observed surface.

Construct additional test panels for each failed test performed until three test panels pass the test. Factors that can affect test performance include materials, mixing, and quality of application and workmanship. Materials, mixing, and methods adjustments may be necessary in order to provide construction that passes the water penetration test. Document and record the test specimen construction materials and application and provide written test report in accordance with ASTM E514/E514M, supplemented by a detailed discussion of the specifics of test panel construction, application methods and processes used, quality of construction, and any variances or deviations that may have occurred between test panels during test panel construction. For failed test panels, identify in the supplemental report the variances, deficiencies or flaws that contributed to test panel failure and itemize the precautions to be taken in field construction of the masonry wall to prevent similar deficiencies and assure the wall construction replicates test panel conditions that pass the water penetration test. Submit the complete, certified test report, including supplemental report, to the Contracting

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Officer prior to start of single-wythe concrete masonry wall construction. Significant changes to materials, proportions, or construction techniques from those used in the passing water penetration test are grounds for performing new tests, at the discretion of the Contracting Officer.

# 3.6.2 Special Inspection

Perform special inspections and testing in accordance with Section 01 45 35 SPECIAL INSPECTIONS.

# 3.7 POINTING AND CLEANING

After mortar joints have attained their initial set, but prior to hardening, completely remove mortar and grout daubs and splashings from masonry-unit surfaces that will be exposed or painted. Before completion of the work, rake out defects in joints of masonry to be exposed or painted, fill with mortar, and tool to match existing joints. Immediately after grout work is completed, remove scum and stains that have percolated through the masonry work using a low pressure stream of water and a stiff bristled brush. Do not clean masonry surfaces, other than removing excess surface mortar, until mortar in joints has hardened. Leave masonry surfaces clean, free of mortar daubs, dirt, stain, and discoloration, including scum from cleaning operations, and with tight mortar joints throughout. Do not use metal tools and metal brushes for cleaning.

3.7.1 Dry-Brushing Concrete Masonry

Dry brush exposed concrete masonry surfaces at the end of each day's work and after any required pointing, using stiff-fiber bristled brushes.

## 3.8 CLOSE-OUT TAKE-BACK PROGRAM

Collect information from manufacturer for take-back program options. Set aside masonry units, full and partial to be returned to manufacturer for recycling into new product. When such a service is not available, seek local recyclers to reclaim the materials. Submit documentation that includes contact information, summary of procedures, and the limitations and conditions applicable to the project. Indicate manufacturer's commitment to reclaim materials for recycling and/or reuse.

# 3.9 PROTECTION

Protect facing materials against staining. Cover top of walls with nonstaining waterproof covering or membrane to protect from moisture intrusion when work is not in progress. Continue covering the top of the unfinished walls until the wall is waterproofed with a complete roof or parapet system. Extend covering a minimum of 2 feet down on each side of the wall and hold securely in place. Before starting or resuming work, clean top surface of masonry in place of loose mortar and foreign material.

-- End of Section --

# SECTION 05 05 23.13 10

# ULTRASONIC INSPECTION OF WELDMENTS 08/18

#### PART 1 GENERAL

#### 1.1 REFERENCES

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

AMERICAN SOCIETY FOR NONDESTRUCTIVE TESTING (ASNT)

ANSI/ASNT CP-189 (2020) ASNT Standard for Qualification and Certification of Nondestructive Testing Personnel

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M	(2020;	Errata	1	2021)	Structural	Welding
	Code -	Steel				

#### 1.2 DEFINITIONS

#### 1.2.1 A Scan

Method of data presentation on a electronic screen using rectangular coordinates in which a horizontal base line indicates elapsed time when reading from left to right. A vertical deflection in the base line indicates reflect signal amplitude.

#### 1.2.2 Acoustically Similar Material

Material the same as that to be inspected; or another material proven to have acoustical velocity within plus or minus 3 percent and an attenuation within plus or minus 0.25 dB/inch of the inspected material for the inspection frequency and wave mode, using the same mode as that to be used for inspection.

# 1.2.3 Amplitude

When referring to an indication in A scan presentation, amplitude is the vertical height of the indication measured from peak-to-peak for radio frequency indications and trace-to-peak for video indications.

#### 1.2.4 Attenuation

Dissipation or loss of energy as ultrasonic vibrations travel through the material. Attenuation is caused almost entirely by scattering of the ultrasonic vibrations generated by the search unit.

# 1.2.5 Back Reflection or End Reflection

Reflection from the opposite side, end, or boundary of the material into which the ultrasonic energy was introduced.

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# 1.2.6 Calibration

Process of comparing an instrument or device with a standard to determine accuracy or produce a scale.

1.2.7 Couplant

Any material, usually a liquid or semiliquid, used between the search unit and the inspection surface to exclude air and to convey the ultrasonic vibrations between the search unit and the material being inspected.

1.2.8 Digital Display

Display capable of presenting multi-function a-scan, b-scan, c-scan or s-scan responses. This also includes instruments settings and parameters.

1.2.9 Decibel (dB)

Units for the logarithmic expression of the ratio of power levels. Power levels can be functions of voltage, current, or impedance, for example. Decibel units having no values of their own are only significant when a reference is stated, as 10 dB above one reference level or 6 dB below another reference level.

# 1.2.10 Discontinuity

Anything within a material that causes a detectable interruption in an ultrasonic beam.

#### 1.2.11 Examination

Within the context of this specification, examination is equivalent to the word "inspection."

1.2.12 Hertz

One complete set of recurrent values of a periodic quantity comprises a cycle. In other words, any one set of periodic variations starting at one condition and returning once to the same condition is a cycle.

## 1.2.13 Immersion Techniques

Test methods in which the part to be tested and the search units are immersed in water or other suitable liquid couplant. A mechanical device is used to firmly hold and direct the wave angle of the search unit. The search unit does not contact the item being inspected.

#### 1.2.14 Indication

Visual presentation on the digital display screen resulting from a sound beam reflection from a boundary surface or discontinuity.

# 1.2.15 Linearity

Property of an instrument revealed by a linear change in reflected signal or displacement. The vertical linearity is determined by plotting the change in ratios of signal amplitude from two adjacent reflections from an area of known size. The horizontal linearity is determined by plotting the distance the signal is displaced along the sweep against the change in

material thickness or by noting the spacing of multiple back reflections.

1.2.16 Longitudinal or Compressional Waves

Simple compression-rare-fraction waves in which particle motion within a material is linear and in the direction of wave propagation. Also called straight beams, or compressional or normal waves.

1.2.17 Longitudinal Wave Inspection

Ultrasonic technique, normally using straight beam methods, in which longitudinal waves are the dominant form.

1.2.18 Mid-Screen Reflection

Reflection whose amplitude is equal to one-half the useable screen height on the digital display.

1.2.19 Megahertz (MHz)

One million hertz per second frequency.

1.2.20 Pulse Repetition Rate

Number of spaced pulses of sound per second sent into the material being inspected.

## 1.2.21 Reflector

Boundary, consisting of an opposite side, crack, or separation, or a distinct change in material such as slag or porosity that reflects the ultrasonic energy the same as a mirror reflects light.

# 1.2.22 Refracted Waves

Waves that have undergone change of velocity and direction by passing from one material to another material with different acoustical properties. Refraction occurs wherever the angle of the incident wave to the interface is other than perpendicular.

# 1.2.23 Resolution

Ability to clearly distinguish signals obtained from two reflective surfaces with a minimum separation distance. Near-surface resolution is the ability to clearly distinguish a signal from a reflector at a minimum distance under the contact or near surface without interference from the initial pulse signal. Far-surface resolution is the ability to clearly distinguish signals from reflectors displaced at minimum distances from the far or back surface when the sound beam is normal to that back surface.

# 1.2.24 Search Unit

Device containing a piezoelectric material used for introducing vibrations into a material to be inspected or for receiving the vibrations reflected from the material. The active element of the search unit is defined as the effective transmitting area. Search units are also called transducers or probes. They may be single or dual and contain one or two piezoelectric elements, respectively, for transmission and reception. The single search unit is sometimes enclosed in a transducer wheel or search

unit wheel. The search unit may be manually handled and placed in direct contact with the material to be inspected or may be held in a fixture for immersion techniques.

1.2.25 Sensitivity

Measure of the ultrasonic equipment's ability to detect discontinuities. Quantitatively, it is the level of amplification of the receiver circuit in the ultrasonic instrument necessary to produce the required indication on the scope from the reference hole in the reference block. Also see "Standard Reference Level."

1.2.26 Shear Waves

Waves in which the particles within the material vibrate perpendicularly to the direction in which the wave travels or propagates. Also called transverse waves.

1.2.27 Standard Reference Level

Mid-screen height reflection when beaming at the 0.06 inch hole in the primary reference block or the reference hole in the secondary standard.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Personnel Qualification; G

Procedure description; G

SD-03 Product Data

Equipment and accessories

SD-06 Test Reports

Equipment Qualifications

Inspection Test Reports

#### 1.4 QUALITY ASSURANCE

# 1.4.1 Personnel Qualification

The three levels of responsibility associated with ultrasonic inspection are defined in ANSI/ASNT CP-189. Personnel performing NDT should be level II or Level I with direct supervision. For qualification to perform ultrasonic inspection, certify personnel in accordance with ANSI/ASNT CP-189 within a period of 1 year before the date of contract. Submit inspector qualifications per ANSI/ASNT CP-189. Other qualification or certification may be accepted at the Contracting Officer's discretion.

Personnel with only an operator or inspector trainee certification will not be considered qualified to pass judgment on the acceptability of inspected items, but may work under the direct supervision of a qualified ultrasonic inspector. Qualified ultrasonic inspectors must be able to judge the acceptability of the item in accordance with paragraph ACCEPTANCE-REJECTION CRITERIA. Only serialized NIST traceable calibration standards are to be used. The procedures to be used for personnel and equipment qualification, equipment calibration, and inspection, at least 30 days prior to their intended use. Approval by the Government will in no way affect the obligation of the Contractor to employ qualified personnel, equipment, and procedures, and to perform the inspection as specified.

# 1.4.2 Examinations

If the Contracting Officer doubts an individual's ability as an operator, inspector, or supervisor, recertify the individual in accordance with ANSI/ASNT CP-189, using the practical exam. At the option of the Government, the Contracting Officer may witness the examination and in evaluating the results.

# 1.4.3 Reference Standards

Use reference standards to calibrate the inspection equipment, test its operating condition, and record the sensitivity or response of the equipment during the inspection in accordance with paragraph EQUIPMENT QUALIFICATIONS. The standards comprise a standard reference block and reference specimens as noted below.

- a. Provide the standard reference block or primary standard consisting of the IIW block in AWS D1.1/D1.1M, Clause 6, Part F. Also use the standard reference block in any reinspection on the same basis as the original inspection, even though the reinspection is to be performed by other ultrasonic instruments and accessories.
- b. As an option, use other recognized working standards detailed with the IIW block in AWS D1.1/D1.1M such as the Sensitivity Calibration (SC) block. However, reference such blocks to the IIW block as noted in paragraph EQUIPMENT CALIBRATION. Include details of their use in the submitted procedure description. These blocks are the secondary standards. They must be of acoustically similar material to the welds to be inspected. The secondary standards must be suited for the applicable tests specified in paragraph EQUIPMENT QUALIFICATIONS and are used as follows, except where the IIW block is specifically required:
  - (1) To assure adequate penetration of the base material.
  - (2) To provide a secondary field standard.
  - (3) To calibrate the equipment and establish the standard reference level.

# 1.4.4 Resolution Test Block

Furnish a resolution test block in accordance with the details shown in AWS D1.1/D1.1M, Clause 6, Part F.

1.4.5 Equipment Qualifications

Calibrate and recalibrate all NDT equipment in accordance with

AWS D1.1/D1.1M requirements.

- PART 2 PRODUCTS
- 2.1 SYSTEM DESCRIPTION
- 2.1.1 Procedures and Methods

Use the pulse echo contact method with an A scan presentation for the ultrasonic inspection of welded joints, except that immersion techniques may be used for some applications when approved by the Contracting Officer. Use the procedures, methods, standards, and description of equipment specified herein for inspection of weldments. Include the following in the submitted procedure description:

- a. Couplant.
- b. Search unit characteristics including angle, size, shape, nominal frequency, type designation.
- c. Method and type of wave.
- d. Equipment and accessories including manufacturer, model number, date of manufacture, last date of calibration, and the manufacturer's electrical, physical, and performance specifications.
- e. Decibel (dB) compensation system for distance-amplitude correction.
- 2.1.2 Wave Types

The types of waves and the conditions under which they are used are specified below. Unless conditions prohibit, use shear waves. A longitudinal wave procedure may be used instead, if approved by the Contracting Officer.

#### 2.1.2.1 Shear Waves

Use refracted waves between 40 degrees and 70 degrees except where different angles are indicated in approved procedures, such as for materials less than 1/2 inch thick, for materials with sound velocities greater than in steel, when the weldments are not readily accessible, or when existing backing rings or backing strips are not removed. For inspection of weldments containing backing rings or backing strips, adjust the instrument and select the refracted angles in a way to separate the weldment and the backing ring reflections. Establish the search unit angle and the resulting shear wave angle in the material to be inspected for each application and include this information in the procedure submitted for approval.

# 2.1.2.2 Longitudinal Waves

Specifically develop the procedure to suit the application and attain the prior approval of the Contracting Officer.

### 2.1.3 Changes in Procedure

Should application of an approved procedure not provide for good resolution or adequate ultrasonic penetration in the items to be inspected (see paragraph EQUIPMENT QUALIFICATIONS), make changes in procedure or

equipment such as frequency, pulse repetition rate, angle of search unit, couplant, or oscilloscope. Demonstrate adequacy of the new procedure to the Contracting Officer. The Government reserves the right to require a change in test equipment during these tests if any of the following test system characteristics fall below the levels listed in paragraph EQUIPMENT QUALIFICATIONS: sensitivity, amplitude and distance linearity, signal-to-noise ratio, entry and back surface resolution and penetration.

# 2.1.4 Ultrasonic Equipment

Provide ultrasonic equipment conforming to the requirements listed in AWS D1.1/D1.1M Clause 6, Part F, with the following exceptions:

- a. The ultrasonic test instruments must be able to generate, receive, and to present pulses in the frequency range from 1 to 10 megahertz (MHz).
- b. Measure the horizontal linearity of the ultrasonic instrument in accordance with paragraph EQUIPMENT QUALIFICATIONS.
- c. In addition to the resolution test specified in AWS D1.1/D1.1M, Clause 6, Part F, conduct both near- and far-surface resolution tests in accordance with the tests specified for these characteristics in the paragraph EQUIPMENT QUALIFICATIONS.

## PART 3 EXECUTION

# 3.1 PREPARATION OF MATERIALS FOR INSPECTION

Surfaces must be free of the following:

3.1.1 Weld Spatter

Remove spattering or any roughness that interferes with free movement of the search unit or impairs transmission of the ultrasonic vibrations.

3.1.2 Irregularities

Those which could mask or be confused with defect indications.

3.1.3 Weld Backing Strips

Remove strips that are not to remain in place and eliminate all sharp edges and valleys by grinding or other mechanical means.

3.1.4 Dirt

Remove all loose scale, rust, paint, and dirt from the coupling surface.

#### 3.2 EQUIPMENT CALIBRATION

Calibrate equipment in accordance with AWS D1.1/D1.1M, Clause 6, Part F.

# 3.3 INSPECTION PROCEDURE

Inspect welds in accordance with AWS D1.1/D1.1M, Clause 6, Part F.

#### 3.4 ACCEPTANCE - REJECTION CRITERIA

In accordance with AWS D1.1/D1.1M, Table 6.2 or 6.3.

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# 3.4.1 Inspection Test Reports

Submit test reports containing the following information:

# 3.4.1.1 Identification and Location of Inspection

Connection identification and location of the inspected item, the person performing the inspection, and the date of inspection.

3.4.1.2 Detail of Inspections

Details of methods, types of waves used, search units, frequencies, inspection equipment identification, and calibration data with enough information to permit duplication of the inspection at a later date.

3.4.1.3 Identification of Unacceptable Areas

Locations, dimensions, types, and area of unacceptable defects and discontinuities giving reflections over 50 percent of the reject/repair line. Note on a sketch or marked-up drawing.

3.4.1.4 Record of Repair Areas

A record of repaired areas must be furnished as well as test results for the repaired areas.

3.4.2 Inspection of Repairs

All repairs undergo the same inspection procedure that originally revealed the discontinuities. Before acceptance, the welds must meet the standards required for the original weld.

-- End of Section --

## SECTION 05 05 23.16

# STRUCTURAL WELDING 08/18

## PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 360 (2016) Specification for Structural Steel Buildings

AMERICAN SOCIETY FOR NONDESTRUCTIVE TESTING (ASNT)

ANSI/ASNT CP-189 (2020) ASNT Standard for Qualification and Certification of Nondestructive Testing Personnel

AMERICAN WELDING SOCIETY (AWS)

AWS	A2.4	(2012) Standard Symbols for Welding, Brazing and Nondestructive Examination
AWS	D1.1/D1.1M	(2020; Errata 1 2021) Structural Welding Code - Steel
AWS	D1.3/D1.3M	(2018) Structural Welding Code - Sheet Steel
AWS	D1.4/D1.4M	(2011) Structural Welding Code - Reinforcing Steel
AWS	D14.4/D14.4M	(2012) Specification for Welded Joints for Machinery and Equipment
AWS	QC1	(2016) Specification for AWS Certification of Welding Inspectors
AWS	Z49.1	(2021) Safety in Welding and Cutting and Allied Processes

#### ASTM INTERNATIONAL (ASTM)

ASTM E165/E165M	(2023) Standard Practice for Liquid
	Penetrant Examination for General Industry
ASTM E709	(2021) Standard Guide for Magnetic
	Particle Testing

1.2 SUBMITTALS

Government approval is required for submittals with a "G" or "S"

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classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Welding Quality Assurance Plan; G

SD-03 Product Data

Welding Procedure Qualifications; G

Welder, Welding Operator, and Tacker Qualification

Previous Qualifications

Pre-Qualified Procedures; G

Welding Electrodes and Rods

SD-06 Test Reports

Nondestructive Testing; G

Weld Inspection Log

SD-07 Certificates

Certified Welding Procedure Specifications (WPS); G Certified Brazing Procedure Specifications (BPS) Certified Procedure Qualification Records (PQR) Certified Welder Performance Qualifications (WPQ) Certified Brazer Performance Qualifications (BPQ) Certified Welding Inspector Nondestructive Testing Personnel

# 1.3 QUALITY ASSURANCE

Except for pre-qualified (in accordance with AWS D1.1/D1.1M) and previously qualified procedures, each Contractor performing welding must record in detail and qualify the welding procedure specification for any welding procedure followed in the fabrication of weldments. Conform welding procedure qualifications to AWS D1.1/D1.1M and to the specifications in this section. Submit for approval copies of the welding procedure specification and the procedure qualification records for each type of welding being performed. Submission of the welder, welding operator, or tacker qualification test records is also required. Approval of any procedure, however, does not relieve the Contractor of the sole responsibility for producing a finished structure meeting all the specified requirements. Submit this information on the forms in Annex M of AWS D1.1/D1.1M. Individually identify and clearly reference on the

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detail drawings and erection drawings all welding procedure specifications, or suitably key them to the contract drawings. In case of conflict between this specification and AWS D1.1/D1.1M, this specification governs.

# 1.3.1 General Requirements

Fabricate work in an AISC Certified Fabrication Plant, Category BU. Erect work by an AISC Certified Erector, Category CSE.

- a. For Structural Projects, provide documentation of the following:
  - (1) Component Thickness 1/8 inch and greater: Qualification documents (WPS, PQR, and WPQ) in accordance with AWS D1.1/D1.1M.
  - (2) Component Thickness Less than 1/8 inch: Qualification documents (WPS, PQR, and WPQ) in accordance with AWS D1.3/D1.3M.
  - (3) Reinforcing Steel: Qualification documents (WPS, PQR, and WPQ) in accordance with AWS D1.4/D1.4M.
- b. For other applications, provide documentation of the following:
  - Submit two copies of the Certified Welding Procedure Specifications (WPS), Certified Brazing Procedure Specifications (BPS) and Certified Procedure Qualification Records (PQR) to the Contracting Officer for approval.
  - (2) Submit two copies of the Certified Welder Performance Qualifications (WPQ) and Certified Brazer Performance Qualifications (BPQ) to the Contracting Officer for approval within fifteen calendar days prior to any employee welding on the project material.
  - (3) Machinery: Qualification documents (WPS, PQR, and WPQ) in accordance with AWS D14.4/D14.4M.

#### 1.3.2 Previous Qualifications

Welding procedures previously qualified by test in accordance with AWS D1.1/D1.1M, may be accepted for this contract without re-qualification, upon receipt of the test results, if the following conditions are met:

- a. Testing was performed by an approved testing laboratory, technical consultant, or the Contractor's approved quality control organization.
- b. The qualified welding procedure conforms to the requirements of this specification and is applicable to welding conditions encountered under this contract.
- c. The welder, welding operator, and tacker qualification tests conform to the requirements of this specification and are applicable to welding conditions encountered under this contract.

#### 1.3.3 Pre-qualified Procedures

Welding procedures which are considered pre-qualified as specified in AWS D1.1/D1.1M will be accepted without further qualification. Submit for

approval a listing or an annotated drawing to indicate the joints not pre-qualified. Procedure qualification is mandatory for these joints.

1.3.4 Welder, Welding Operator, and Tacker Qualification

Each welder, welding operator, and tacker assigned to work on this contract must be qualified in accordance with the applicable requirements of AWS D1.1/D1.1M and as specified in this section. Welders, welding operators, and tackers who make acceptable procedure qualification test welds will be considered qualified for the welding procedure used within the applicable essential variables for welder qualification.

# 1.3.4.1 Previous Personnel Qualifications

At the discretion of the Contracting Officer, welders, welding operators, and tackers qualified by test within the previous 6 months may be accepted for this contract without re-qualification if all the following conditions are met:

- a. Copies of the welding procedure specifications, the procedure qualification test records, and the welder, welding operator, and tacker qualification test records are submitted and approved in accordance with the specified requirements for detail drawings.
- b. Testing was performed by an approved testing laboratory, technical consultant, or the Contractor's approved quality control organization.
- c. The welder, welding operator, and tacker qualification tests conform to the requirements of this specification and are applicable to welding conditions encountered under this contract.

## 1.3.4.2 Certificates

Before assigning any welder, welding operator, or tacker to work under this contract, submit the names and certification that each individual is qualified as specified. State in the certification the type of welding and positions for which the welder, welding operator, or tacker is qualified, the code and procedure under which the individual is qualified, the date qualified, and the name of the firm and person certifying the qualification tests. Keep the certification current, on file, and furnish 3 copies.

# 1.3.4.3 Renewal of Qualification

Re-qualification of a welder or welding operator is required under any of the following conditions:

- a. It has been more than 6 months since the welder or welding operator has used the specific welding process for which he is qualified.
- b. There is specific reason to question the welder or welding operator's ability to make welds that meet the requirements of these specifications.
- c. The welder or welding operator was qualified by an employer other than those firms performing work under this contract, and a qualification test has not been taken within the past 12 months. Submit as evidence of conformance all records showing periods of employment, name of employer where welder, or welding operator, was last employed, and the

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process for which qualified.

d. A tacker who passes the qualification test is considered eligible to perform tack welding indefinitely in the positions and with the processes for which he/she is qualified, unless there is some specific reason to question the tacker's ability or there has been a gap greater than 6 months since he/she last used the process. In such a case, the tacker is required to pass the prescribed tack welding test.

# 1.3.5 Inspector Qualification

Submit certificates indicating that certified welding inspectors meet the requirements of AWS QC1. Submit qualifications for nondestructive testing personnel in accordance with the requirements of ANSI/ASNT CP-189 for Levels I or II in the applicable nondestructive testing method. Level I inspectors must have direct supervision of a Level II inspector.

1.3.6 Symbols and Safety

Use symbols in accordance with AWS A2.4, unless otherwise indicated. Follow safe welding practices and safety precautions during welding in conformance with AWS Z49.1.

#### PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

Conform the design of welded connections to AISC 360, unless otherwise indicated or specified. Material with welds will not be accepted unless the welding is specified or indicated on the drawings or otherwise approved. Perform welding as specified in this section, except where additional requirements are shown on the drawings or are specified in other sections. Do not commence welding until welding procedures, inspectors, nondestructive testing personnel, welders, welding operators, and tackers have been qualified and the submittals approved by the Contracting Officer. Perform all testing at or near the work site. Maintain records of the test results obtained in welding procedure, welder, welding operator, and tacker performance qualifications.

#### 2.1.1 Pre-erection Conference

Hold a pre-erection conference prior to the start of the field welding, to bring all affected parties together and to gain a naturally clear understanding of the project and the Welding Procedure Specifications (WPS) (submitted for all welding, including welding done using pre-qualified procedures). Mandatory attendance is required by all Contractor's welding production and inspection personnel and appropriate Government personnel. Include as items for discussion: responsibilities of various parties; welding procedures and processes to be followed; welding sequence (both within a joint and joint sequence within the building); inspection requirements and procedures, both visual and nondestructive testing; welding schedule; and other items deemed necessary by the attendees.

# 2.2 WELDING EQUIPMENT AND MATERIALS

Provide all welding equipment, welding electrodes and rods, welding wire, and fluxes capable of producing satisfactory welds when used by a qualified welder or welding operator. Provide welding equipment and

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materials that comply with the applicable requirements of AWS D1.1/D1.1M. Submit product data on welding electrodes and rods.

- PART 3 EXECUTION
- 3.1 WELDING OPERATIONS
- 3.1.1 Requirements

Conform workmanship and techniques for welded construction to the requirements of AWS D1.1/D1.1M and AISC 360. When AWS D1.1/D1.1M and the AISC 360 specification conflict, the requirements of AWS D1.1/D1.1M govern.

#### 3.1.2 Identification

Identify all welds in one of the following ways:

- a. Submit written records to indicate the location of welds made by each welder, welding operator, or tacker.
- b. Identify all work performed by each welder, welding operator, or tacker with an assigned number, letter, or symbol to identify welds made by that individual. The Contracting Officer may require welders, welding operators, and tackers to apply their symbol next to the weld by means of rubber stamp, felt-tipped marker with waterproof ink, or other methods that do not cause an indentation in the metal. Place the identification mark for seam welds adjacent to the weld at 3 foot intervals. Identification with die stamps or electric etchers is not allowed.

## 3.2 QUALITY CONTROL

Perform testing using an approved inspection or testing laboratory or technical consultant; or if approved, the Contractor's inspection and testing personnel may be used instead of the commercial inspection or testing laboratory or technical consultant. A Certified Welding Inspector must perform visual inspection on 100 percent of all welds. Document this inspection in the Visual Weld Inspection Log. Test 100% of CJP welds using ultrasonic testing per Table 6.2 or 6.3 of AWS D1.1/D1.1M. Randomly test 50% of all PJP and fillet welds or as indicated by magnetic particle or dye penetrant testing. Verify the welds conform to paragraph STANDARDS OF ACCEPTANCE. Conform procedures and techniques for inspection with applicable requirements of AWS D1.1/D1.1M, ASTM E165/E165M, and ASTM E709. Submit a Welding Quality Assurance Plan and records of tests and inspections.

#### 3.3 STANDARDS OF ACCEPTANCE

Conform dimensional tolerances for welded construction, details of welds, and quality of welds with the applicable requirements of AWS D1.1/D1.1M and the contract drawings. Submit all records of nondestructive testing.

## 3.3.1 Nondestructive Testing

The welding is subject to inspection and tests in the mill, shop, and field. Inspection and tests in the mill or shop do not relieve the Contractor of the responsibility to furnish weldments of satisfactory quality. When materials or workmanship do not conform to the specification requirements, the Government reserves the right to reject

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material or workmanship or both at any time before final acceptance of the structure containing the weldment. Any indication of a defect is regarded as a defect, unless re-evaluation by nondestructive methods or by surface conditioning shows that no unacceptable defect is present. Submit all records of nondestructive testing in accordance with paragraph STANDARDS OF ACCEPTANCE.

# 3.3.2 Destructive Tests

Make all repairs when metallographic specimens are removed from any part of a structure. Employ only qualified welders or welding operators, and use the proper joints and welding procedures, including peening or heat treatment if required, to develop the full strength of the members and joints cut and to relieve residual stress.

# 3.4 GOVERNMENT INSPECTION AND TESTING

In addition to the inspection and tests performed by the Contractor for quality control, the Government will perform inspection and testing for acceptance to the extent determined by the Contracting Officer. The work may be performed by the Government's own forces or under a separate contract for inspection and testing. The Government reserves the right to perform supplemental nondestructive and destructive tests to determine compliance with paragraph STANDARDS OF ACCEPTANCE.

# 3.5 CORRECTIONS AND REPAIRS

If inspection or testing indicates defects in the weld joints, repair defective welds using a qualified welder or welding operator as applicable. Conduct corrections in accordance with the requirements of AWS D1.1/D1.1M and the specifications. Repair all defects in accordance with the approved procedures. Repair defects discovered between passes before additional weld material is deposited. Wherever a defect is removed and repair by welding is not required, blend the affected area into the surrounding surface to eliminate sharp notches, crevices, or corners. After a defect is thought to have been removed, and before re-welding, examine the area by suitable methods to ensure that the defect has been eliminated. Repaired welds must meet the inspection requirements for the original welds.

-- End of Section --

SECTION 05 12 00

# STRUCTURAL STEEL 08/18, CHG 2: 05/21

## PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 207	(2016; R 2017) Certification Standard for Steel Fabrication and Erection, and Manufacturing of Metal Components
AISC 303	(2016) Code of Standard Practice for Steel Buildings and Bridges
AISC 325	(2017) Steel Construction Manual
AISC 326	(2009) Detailing for Steel Construction
AISC 360	(2016) Specification for Structural Steel Buildings
AISC 420	(2010) Certification Standard for Shop Application of Complex Protective Coating Systems
ASSOCIATION FOR IRON ANI	D STEEL TECHNOLOGY (AIST)
AIST TR-13	(2021) AIST Technical Report 13, Guide for the Design and Construction of Mill Buildings
AMERICAN SOCIETY FOR NON	IDESTRUCTIVE TESTING (ASNT)
ANSI/ASNT CP-189	(2020) ASNT Standard for Qualification and Certification of Nondestructive Testing Personnel
AMERICAN SOCIETY OF MECH	HANICAL ENGINEERS (ASME)
ASME B46.1	(2020) Surface Texture, Surface Roughness, Waviness and Lay
AMERICAN WELDING SOCIETY	(AWS)
AWS A2.4	(2012) Standard Symbols for Welding, Brazing and Nondestructive Examination
AWS D1.1/D1.1M	(2020) Structural Welding Code - Steel
AWS QC1	(2016) Specification for AWS Certification

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of Welding Inspectors

ASTM INTERNATIONAL (ASTM)

ASTM	A6/A6M	(2017a) Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling
ASTM	A36/A36M	(2019) Standard Specification for Carbon Structural Steel
ASTM	A53/A53M	(2020) Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM	A108	(2013) Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
ASTM	A123/A123M	(2017) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM	A143/A143M	(2007; R 2020) Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement
ASTM	A307	(2021) Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
ASTM	A500/A500M	(2021) Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM	A563	(2015) Standard Specification for Carbon and Alloy Steel Nuts
ASTM	A780/A780M	(2020) Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
ASTM	A992/A992M	(2020) Standard Specification for Structural Steel Shapes
ASTM	B695	(2004; R 2016) Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel
ASTM	С827/С827М	(2016) Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures
ASTM	С1107/С1107М	(2020) Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
ASTM	F436/F436M	(2019) Standard Specification for Hardened

SECTION 05 12 00 Page 2 Certified Final Submittal Steel, Plain (Flat), Unhardened for

ASTM F959/F959M (2017a) Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners, Inch and Metric Series

General Use

ASTM F1136/F1136M (2011) Standard Specification for Zinc/Aluminum Corrosion Protective Coatings for Fasteners

ASTM F1554 (2020) Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength

ASTM F2329/F2329M (2015) Standard Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners

ASTM F2833 (2011; R 2017) Standard Specification for Corrosion Protective Fastener Coatings with Zinc Rich Base Coat and Aluminum Organic/Inorganic Type

ASTM F3125/F3125M (2019) Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength

CRANE MANUFACTURERS ASSOCIATION OF AMERICA (CMAA)

CMAA 70	(2020) Specification for Top Running Bridge and Gantry Type Multiple Girder Electric Overhead Traveling Cranes
CMAA 74	(2020) Specifications for Single Girder Cranes

SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC PA 1	(2016) Shop, Field, and Maintenance Coating of Metals
SSPC Paint 20	(2019) Zinc-Rich Primers (Type I, Inorganic, and Type II, Organic)
SSPC Paint 29	(2002; E 2004) Zinc Dust Sacrificial Primer, Performance-Based
SSPC SP 3	(2018) Power Tool Cleaning

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SSPC SP 6/NACE No.3 (2007) Commercial Blast Cleaning

U.S. DEPARTMENT OF DEFENSE (DOD)

UFC 3-301-01 (2019) Structural Engineering

U.S. GREEN BUILDING COUNCIL (USGBC)

LEED	v4	BDC	Ref	Guide	(201	3;	R	2020	) (C	JSGBC	LEE	DF	Refei	rence	e G	uide
					for	Bui	lld	ling	Des	sign	and	Cor	ıstrı	uctio	on,	v4

LEED v4.1 BDC Ref Guide (2023) LEED v4.1 Building Design and Construction Reference Guide

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR Part 1926, Subpart R Steel Erection

## 1.2 SUSTAINABILITY REPORTING

Work of this section is intended to contribute to the achievement of, or compliance with, the requirements of the Guiding Principles Validation and LEED Prerequisites and attempted Credits. Refer to Section 01 33 29.00 06 SUSTAINABILITY REPORTING for specific documentation requirements and list of Prerequisites, attempted Credits and LEED version.

Comply with product, material content, performance criteria, activity, documentation, and other technical requirements as described in the LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide as applicable.

Collect, organize, and submit product data, drawings, diagrams, photos and cost information necessary to demonstrate compliance with LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide requirements as applicable.

Data collection shall commence with the notice to proceed and will only be deemed complete upon acceptance of the Final Sustainability Notebook and LEED Online submission by the Contracting Officer, the LEED Project Administrator, and the Green Building Certification Institute.

# 1.3 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Fabrication Drawings Including Details of Connections; G, AE

SD-03 Product Data

Shop Primer

Welding Electrodes and Rods

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P2#: 506474 - Manned/Unmanned Tactical Vehicle Lab (MUMT)
Detroit Arsenal, MI
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Direct Tension Indicator Washers Non-Shrink Grout Tension Control Bolts Recycled Content for Structural Steel; S Recycled Content for Structural Steel Tubing; S Recycled Content for Steel Pipe; S Environmental Product Declarations; S Embodied Carbon Optimization Report/Action Plan; S Extended Producer Responsibility; S Local/Regional Materials; S Material Ingredient Reporting; S SD-06 Test Reports Class B Coating Bolts, Nuts, and Washers Weld Inspection Reports; G Direct Tension Indicator Washer Inspection Reports Bolt Testing Reports Embrittlement Test Reports SD-07 Certificates Steel Bolts, Nuts, and Washers Galvanizing AISC Structural Steel Fabricator Quality Certification; G, AE AISC Structural Steel Erector Quality Certification; G, AE Welding Procedures and Qualifications Welding Electrodes and Rods Certified Welding Inspector NDT Technician Welding Procedure Specifications (WPS) Overhead, Top Running Crane Rail Beam, Supporting Column and Rail Beam Support Bracket

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#### 1.4 SUSTAINABLE DESIGN REQUIREMENTS

# 1.4.1 Environmental Product Declarations

At a minimum, use materials or products with an Environmental Product Declaration in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.4.2 Embodied Carbon Optimization Report/Action Plan

At a minimum, use materials or products with an Embodied Carbon Optimization Report/Action Plan in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.4.3 Sourcing of Raw Materials

Provide products that meet one or more of the following categories:

#### 1.4.3.1 Extended Producer Responsibility

At a minimum, use materials or products from manufacturers that participate in an extended producer responsibility program in accordance with the LEED Implementation Plan. Provide manufacturer letter verifying extended producer responsibility program is in place and that product is eligible. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

# 1.4.3.2 Recycled Content Materials

At a minimum, use materials or products with recycled content in accordance with the LEED Implementation Plan. Provide manufacturers product literature identifying the percentage of recycled material incorporated within each product used.See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan. If recycled content minimum is specified in this section, the greater of the two percentages governs.

1.4.4 Material Ingredient Reporting

At a minimum, use materials or products with chemical inventory to at least 0.1% (1000 ppm) in accordance with the LEED Implementation Plan. Provide Health Product Declaration (HPD), Cradle to Cradle Certificate, Declare label, or other manufacturer's published content inventory in compliance with LEED v4.1 Material Ingredient Reporting credit. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

# 1.4.5 Local/Regional Materials

Use materials or products extracted, harvested, or recovered, as well as manufactured, within a 100 mile radius from the project site, if available from a minimum of three sources. provide a letter from the manufacturer stating the extraction location, manufacturing location, and purchasing location of the products provided, referencing the project name and location specifically and distance to the project site. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials

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requirements and LEED Implementation Plan.

## 1.5 AISC QUALITY CERTIFICATION

Work must be fabricated by an AISC Certified Structural Steel Fabricator, in accordance with AISC 207, Category BU. Submit AISC Structural Steel Fabricator quality certification.

Work must be erected by an AISC Structural Steel Certified Erector, in accordance with AISC 207, Category CSE. Submit AISC Structural Steel erector quality certification.

#### 1.6 QUALITY ASSURANCE

1.6.1 Fabrication Drawing Requirements

Submit fabrication drawings for approval prior to fabrication. Prepare in accordance with AISC 303, AISC 326 and AISC 325. Fabrication drawings must not be reproductions of contract drawings. Include complete information for the fabrication and erection of the structure's components, including the location, type, and size of bolts, welds, member sizes and lengths, connection details, blocks, copes, and cuts. Use AWS A2.4 standard welding symbols. Clearly highlight any deviations from the details shown on the contract drawings highlighted on the fabrication drawings. Explain the reasons for any deviations from the contract drawings.

#### 1.6.2 Certifications

## 1.6.2.1 Welding Procedures and Qualifications

Prior to welding, submit certification for each welder stating the type of welding and positions qualified for, the code and procedure qualified under, date qualified, and the firm and individual certifying the qualification tests. If the qualification date of the welder or welding operator is more than 6 months old, the welding operator's qualification certificate must be accompanied by a current certificate by the welder attesting to the fact that he has been engaged in welding since the date of certification, with no break in welding service greater than 6 months.

Conform to all requirements specified in AWS D1.1/D1.1M.

1.6.2.2 Overhead, Top Running Crane Rail Beam, Supporting Column and Rail Beam Support Bracket

Submit written field survey results for overhead, top running crane rail beams, supporting columns and rail beam support brackets verifying compliance with most stringent tolerance requirements per CMAA 70, CMAA 74 and AIST TR-13.

# PART 2 PRODUCTS

## 2.1 SYSTEM DESCRIPTION

Provide the structural steel system, including shop primer and galvanizing, complete and ready for use. Provide structural steel systems including design, materials, installation, workmanship, fabrication, assembly, erection, inspection, quality control, and testing in accordance with AISC 303, AISC 360, AIST TR-13, and UFC 3-301-01 except as modified in

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this contract.

- 2.2 STEEL
- 2.2.1 Structural Steel

Wide flange and WT shapes, ASTM A992/A992M. Angles, Channels and Plates, ASTM A36/A36M. Provide structural steel containing a minimum of 80 percent recycled content. Submit data identifying percentage of recycled content for structural steel.

2.2.2 Structural Steel Tubing (HSS Shapes)

ASTM A500/A500M, Grade C. Provide structural steel tubing containing a minimum of 25 percent recycled content. Submit data identifying percentage of recycled content for structural steel tubing.

2.2.3 Steel Pipe

ASTM A53/A53M, Type E or S, Grade B, weight class STD (Standard) or as indicated. Provide steel pipe containing a minimum of 50 percent recycled content. Submit data identifying percentage of recycled content for steel pipe.

2.3 BOLTS, NUTS, AND WASHERS

Submit the certified manufacturer's mill reports which clearly show the applicable ASTM mechanical and chemical requirements together with the actual test results for the supplied fasteners.

- 2.3.1 Common Grade Bolts
- 2.3.1.1 Bolts

ASTM A307, Grade A, plain finish. The bolt heads and the nuts of the supplied fasteners must be marked with the manufacturer's identification mark, the strength grade and type specified by ASTM specifications.

2.3.1.2 Nuts

ASTM A563, Grade A, heavy hex style.

2.3.1.3 Self-Locking Nuts

Provide nuts with a locking pin set in the nut. The locking pin must slide along the bolt threads, and by reversing the direction of the locking pin, the nut can be removed without damaging the nut or bolt. Provide stainless steel locking pins.

2.3.1.4 Washers

ASTM F844.

2.3.2 High-Strength Bolts

High strength bolts and nuts must be shipped together in the same shipping container. Fasteners indicated to be galvanized shall be tested by the supplier to show that the galvanized nut with the supplied lubricant provided may be rotated from the snug tight condition well in excess of

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the rotation required for pretentioned installation without stripping. The supplier shall supply nuts that have been lubricated and tested with the supplied bolts.

2.3.2.1 Bolts

ASTM F3125/F3125M, Grade A325M A325, Type 1 Heavy Hex Head Style, plain finish.

2.3.2.2 Nuts

ASTM A563, Grade and Style as specified in the applicable ASTM bolt standard.

2.3.2.3 Direct Tension Indicator Washers

ASTM F959/F959M. Submit product data for direct tension indicator washers.

2.3.2.4 Washers

ASTM F436/F436M, plain carbon steel.

2.3.3 Tension Control Bolts

ASTM F3125/F3125M, Grade F1852 or F2280, Type 1, twistoff style assemblies consisting of steel structural bolts with splined ends, heavy-hex carbon steel nuts, and hardened carbon steel washers. Assembly finish must be plain. Submit product data for tension control bolts.

- 2.3.4 Foundation Anchorage
- 2.3.4.1 Anchor Rods

ASTM F1554 Gr 36, Gr 55, Class 1A with weldability supplement S1 and carbon equivalent formula per ASTM F1554 Section 1.5.2.1, and Gr 105.

2.3.4.2 Anchor Nuts

ASTM A563, Grade A, hex style.

2.3.4.3 Anchor Washers

ASTM F844.

2.3.4.4 Anchor Plate Washers

ASTM A36/A36M.

- 2.4 STRUCTURAL STEEL ACCESSORIES
- 2.4.1 Welding Electrodes and Rods

AWS D1.1/D1.1M. Submit product data for welding electrodes and rods.

2.4.2 Non-Shrink Grout

ASTM C1107/C1107M, with no ASTM C827/C827M shrinkage. Grout must be nonmetallic. Submit product data for non-shrink grout.

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2.4.3 Welded Steel Headed Stud Anchor Shear Connectors

ASTM A108, Type B, Fy = 51 ksi, Fu = 65 ksi. AWS D1.1/D1.1M, Table 7.1, Type B.

#### 2.5 GALVANIZING

ASTM F2329/F2329M, ASTM F1136/F1136M, ASTM F2833 or ASTM B695 for threaded parts or ASTM A123/A123M for structural steel members, as applicable, unless specified otherwise galvanize after fabrication where practicable.

## 2.6 FABRICATION

Fabrication must be in accordance with the applicable provisions of AISC 325. Fabrication and assembly must be done in the shop to the greatest extent possible. Punch, subpunch and ream, or drill bolt holes perpendicular to the surface of the member.

Compression joints depending on contact bearing must have a surface roughness not in excess of 500 micro inch as determined by ASME B46.1, and ends must be square within the tolerances for milled ends specified in ASTM A6/A6M.

Shop splices of members between field splices will be permitted only where indicated on the Contract Drawings. Splices not indicated require the approval of the Contracting Officer.

# 2.6.1 Markings

Prior to erection, identify members by a painted erection mark. Connecting parts assembled in the shop for reaming holes in field connections must be match marked with scratch and notch marks. Do not locate erection markings on areas to be welded. Do not locate match markings in areas that will decrease member strength or cause stress concentrations.

# 2.6.2 Shop Primer

SSPC Paint 20 or SSPC Paint 29, (zinc rich primer). Shop prime structural steel, except as modified herein, in accordance with SSPC PA 1. Do not prime steel surfaces embedded in concrete, galvanized surfaces, surfaces to receive sprayed-on fireproofing, surfaces to receive epoxy coatings, or surfaces within 0.5 inch of the toe of the welds prior to welding (except surfaces on which metal decking and shear studs are to be welded). If flash rusting occurs, re-clean the surface prior to application of primer. Apply primer in accordance with endorsement "SPE-P1""SPE-P3" of AISC 420 or approved equal NACE or SSPC certification to a minimum dry film thickness of 2.0 mil. Submit shop primer product data.

Prime slip critical surfaces with a Class B coating in accordance with AISC 325. Submit test report for Class B coating.

Prior to assembly, prime surfaces which will be concealed or inaccessible after assembly. Do not apply primer in foggy or rainy weather; when the ambient temperature is below 45 degrees F or over 95 degrees F; or when the primer may be exposed to temperatures below 40 degrees F within 48 hours after application, unless approved otherwise by the Contracting Officer. Repair damaged primed surfaces with an additional coat of primer.

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2.6.2.1 Cleaning

SSPC SP 6/NACE No.3, except steel exposed in spaces above ceilings, attic spaces, furred spaces, and chases that will be hidden to view in finished construction may be cleaned to SSPC SP 3 when recommended by the shop primer manufacturer. Maintain steel surfaces free from rust, dirt, oil, grease, and other contaminants through final assembly.

## 2.6.3 Surface Finishes

ASME B46.1 maximum surface roughness of 125 for pin, pinholes, and sliding bearings, unless indicated otherwise.

2.6.4 Crane Support Structure Fabrication Tolerances

The fabrication tolerances for the beams, columns, rail beam support brackets, base plates and framing components that support the crane system shall be in accordance with AIST TR-13.

2.7 DRAINAGE HOLES

Drill adequate drainage holes to eliminate water traps. Hole diameter must be 1/2 inch and location indicated on the detail drawings. Hole size and locations must not affect the structural integrity.

PART 3 EXECUTION

## 3.1 ERECTION

 Erection of structural steel must be in accordance with the applicable provisions of AISC 325, AISC 303, AIST TR-13 and 29 CFR Part 1926, Subpart R.

After final positioning of steel members, provide full bearing under base plates and bearing plates using nonshrink grout. Place nonshrink grout in accordance with the manufacturer's instructions.

#### 3.1.1 STORAGE

Store the material out of contact with the ground in such manner and location as to minimize deterioration.

## 3.2 CONNECTIONS

Except as modified in this section, design connections indicated in accordance with AISC 360. Build connections into existing work. Do not tighten anchor bolts set in concrete with impact torque wrenches. Holes must not be cut or enlarged by burning. Bolts, nuts, and washers must be clean of dirt and rust, and lubricated immediately prior to installation.

# 3.2.1 Common Grade Bolts

Tighten ASTM A307 bolts to a "snug tight" fit. "Snug tight" is the tightness that exists when plies in a joint are in firm contact. If firm contact of joint plies cannot be obtained with a few impacts of an impact wrench, or the full effort of a man using a spud wrench, contact the Contracting Officer for further instructions.

#### 3.2.2 High-Strength Bolts

Provide direct tension indicator washers in all ASTM F3125/F3125M, Grade A325 and Grade A490 bolted connections. Bolts must be installed in connection holes and initially brought to a snug tight fit. After the initial tightening procedure, fully tension bolts, progressing from the most rigid part of a connection to the free edges.

Fastener components shall be protected from dirt and moisture in closed containers at the site of the installation. Fastener components that are not incorporated into the work shall be returned to protected storage at the end of the work shift.

# 3.2.2.1 Installation of Direct Tension Indicator Washers (DTIW)

Where possible, install the DTIW under the bolt head and tighten the nut. If the DTIW is installed adjacent to the turned element, provide a flat washer between the DTIW and nut when the nut is turned for tightening, and between the DTIW and bolt head when the bolt head is turned for tightening. In addition to the LIW, provide flat washers under both the bolt head and nut when ASTM F3125/F3125M, Grade A490 bolts are used.

#### 3.2.3 Tension Control Bolts

Bolts must be installed in connection holes and initially brought to a snug tight fit. After the initial tightening procedure, fully tension bolts, progressing from the most rigid part of a connection to the free edges.

#### 3.3 GAS CUTTING

Use of gas-cutting torch in the field for correcting fabrication errors is not permitted on any major member in the structural framing. Use of a gas cutting torch will be permitted on minor members not under stress only after approval has been obtained from the Contracting Officer.

#### 3.4 WELDING

Welding must be in accordance with AWS D1.1/D1.1M. Grind exposed welds smooth as indicated. Provide AWS D1.1/D1.1M qualified welders, welding operators, and tackers.

Develop and submit the Welding Procedure Specifications (WPS) for all welding, including welding done using prequalified procedures. Submit for approval all WPS, whether prequalified or qualified by testing.

### 3.4.1 Removal of Temporary Welds, Run-Off Plates, and Backing Strips

Remove only from finished areas exposed to view. Remove backing strips from bottom flange of moment connections, backgouge the root pass to sound weld metal and reinforce with a 5/16 inch fillet weld minimum.

# 3.5 SHOP PRIMER REPAIR

Repair shop primer in accordance with the paint manufacturer's recommendation for surfaces damaged by handling, transporting, cutting, welding, or bolting.

## 3.5.1 Field Priming

Field prime steel exposed to the weather, or located in building areas without HVAC for control of relative humidity. After erection, the field bolt heads and nuts, field welds, and any abrasions in the shop coat must be cleaned and primed with paint of the same quality as that used for the shop coat.

# 3.6 GALVANIZING REPAIR

Repair damage to galvanized coatings using ASTM A780/A780M zinc rich paint for galvanizing damaged by handling, transporting, cutting, welding, or bolting. Do not heat surfaces to which repair paint has been applied.

## 3.7 FIELD QUALITY CONTROL

Perform field tests, and provide labor, equipment, and incidentals required for testing, except that electric power for field tests will be furnished as set forth in Division 1. Notify the Contracting Officer in writing of defective welds, bolts, nuts, and washers within 7 working days of the date of the inspection.

#### 3.7.1 Welds

#### 3.7.1.1 Visual Inspection

AWS D1.1/D1.1M. Furnish the services of AWS-certified welding inspectors for fabrication and erection inspection and testing and verification inspections. A Certified Welding Inspector must perform visual inspection on 100 percent of all welds. Document this inspection in the Visual Weld Inspection Log. Submit certificates indicating that certified welding inspectors meet the requirements of AWS QC1.

Inspect proper preparation, size, gaging location, and acceptability of all welds; identification marking; operation and current characteristics of welding sets in use.

#### 3.7.1.2 Nondestructive Testing

Nondestructive testing must be in accordance with AWS D1.1/D1.1M. Ultrasonic testing must be performed in accordance with Table 6.2 or 6.3 of AWS D1.1/D1.1M. Test locations must be as indicated. All personnel performing NDT must be certified in accordance with ANSI/ASNT CP-189 in the method of testing being performed. Submit certificates showing compliance with ANSI/ASNT CP-189 for all NDT technicians. If more than 20 percent of welds made by a welder contain defects identified by testing, then all groove welds made by that welder must be tested by ultrasonic testing, and all fillet welds made by that welder must be inspected by magnetic particle testing (MT) or dye penetrant testing (PT) as approved by the Contracting Officer. When groove welds made by an individual welder are required to be tested, magnetic particle or dye penetrant testing may be used only in areas inaccessible to ultrasonic testing. Retest all repaired areas. Submit weld inspection reports.

Testing frequency: Provide the following types and number of tests:

Test Type	Number of Tests
Ultrasonic	100 percent of CJP Welds
Magnetic Particle	50 percent of PJP and Fillet Welds
Dye Penetrant	50 percent of PJP and Fillet Welds

## 3.7.2 Direct Tension Indicator Washers

3.7.2.1 Direct Tension Indicator Washer Compression

Test direct tension indicator washers in place to verify that they have been compressed sufficiently to provide the 0.015 inch gap, as required by ASTM F959/F959M. Submit direct tension indicator washer inspection reports.

# 3.7.2.2 Direct Tension Indicator Gaps

In addition to the above testing, an independent testing agency as approved by the Contracting Officer, must test in place the direct tension indicator gaps on 20 percent of the installed direct tension indicator washers to verify that the ASTM F959/F959M direct tension indicator gaps have been achieved. If more than 10 percent of the direct tension indicators tested have not been compressed sufficiently to provide the average gaps required by ASTM F959/F959M, test all in place direct tension indicator washers to verify that the ASTM F959/F959M direct tension indicator gaps have been achieved. Test locations must be selected by the Contracting Officer.

## 3.7.3 High-Strength Bolts

#### 3.7.3.1 Testing Bolt, Nut, and Washer Assemblies

Test a minimum of 3 bolt, nut, and washer assemblies from each mill certificate batch in a tension measuring device at the job site prior to the beginning of bolting start-up. Demonstrate that the bolts and nuts, when used together, can develop tension not less than the provisions specified in AISC 360, depending on bolt size and grade. The bolt tension must be developed by tightening the nut. A representative of the manufacturer or supplier must be present to ensure that the fasteners are properly used, and to demonstrate that the fastener assemblies supplied satisfy the specified requirements. Submit bolt testing reports.

#### 3.7.3.2 Inspection

Inspection procedures must be in accordance with AISC 360. Confirm and report to the Contracting Officer that the materials meet the project specification and that they are properly stored. Confirm that the faying surfaces have been properly prepared before the connections are assembled. Observe the specified job site testing and calibration, and confirm that the procedure to be used provides the required tension. Monitor the work to ensure the testing procedures are routinely followed on joints that are specified to be fully tensioned.

Inspect calibration of torque wrenches for high-strength bolts.

# 3.7.3.3 Testing

The Government has the option to perform nondestructive tests on 5 percent of the installed bolts to verify compliance with pre-load bolt tension requirements. Provide the required access for the Government to perform the tests. The nondestructive testing will be done in-place using an ultrasonic measuring device or any other device capable of determining in-place pre-load bolt tension. The test locations must be selected by the Contracting Officer. If more than 10 percent of the bolts tested contain defects identified by testing, then all bolts used from the batch from which the tested bolts were taken, must be tested at the Contractor's expense. Retest new bolts after installation at the Contractor's expense.

3.7.4 Testing for Embrittlement

ASTM A143/A143M for steel products hot-dip galvanized after fabrication. Submit embrittlement test reports.

# 3.7.5 Inspection and Testing of Steel Stud Welding

Perform verification inspection and testing of steel stud welding conforming to the requirements of AWS D1.1/D1.1M, Stud Welding Clause. The Contracting Officer will serve as the verification inspector. Bend test studs that do not show a full 360 degree weld flash or have been repaired by welding as required by AWS D1.1/D1.1M, Stud Welding Clause. Studs that crack under testing in the weld, base metal or shank will be rejected and replaced by the Contractor at no additional cost.

-- End of Section --

### SECTION 05 12 13

# ARCHITECTURALLY EXPOSED STRUCTURAL STEEL 07/24

PART 1 GENERAL

- 1.1 SUMMARY
- 1.1.1 Section Includes

Architecturally exposed structural steel (AESS).

- 1.1.2 Related Requirements
  - a. Section 05 12 00 STRUCTURAL STEEL for requirements that also apply to AESS.
  - b. Section 09 90 00 PAINTS AND COATINGS for surface preparation and priming requirements.
- 1.2 REFERENCES

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

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 303 (2016) Code of Standard Practice for Steel Buildings and Bridges

AISC 360 (2016) Specification for Structural Steel Buildings

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M (2020) Structural Welding Code - Steel

SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC PA 1 (2016) Shop, Field, and Maintenance Coating of Metals

SSPC SP 3 (2018) Power Tool Cleaning

SSPC SP 6/NACE No.3 (2007) Commercial Blast Cleaning

- 1.3 DEFINITIONS
  - a. AESS: Architecturally exposed structural steel.
  - b. Category AESS 1: Structural steel that is categorized by ANSI/AISC 303, Section 10, as AESS 1 and may be designated AESS 1 or Category AESS 1 in the Contract Documents.
  - c. Category AESS 2: Structural steel that is categorized by ANSI/AISC 303, Section 10, as AESS 2 and is designated as AESS 2 or Category AESS 2

SECTION 05 12 13 Page 1 Certified Final Submittal
in the Contract Documents.

## 1.4 COORDINATION

Coordinate surface preparation requirements for shop-primed items.

Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

#### 1.5 ADMINISTRATIVE REQUIREMENTS

#### 1.5.1 Shop Drawings

Show fabrication of AESS components. Shop Drawings for structural steel may be used for AESS.

- a. Identify AESS category for each steel member and connection, including transitions between AESS categories and between AESS and non-AESS.
- b. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
- c. Include embedment Drawings.
- d. Indicate orientation of mill marks and HSS seams.
- e. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain. Indicate grinding, finish, and profile of welds.
- f. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections. Indicate orientation and location of bolt heads.
- g. Indicate exposed surfaces and edges and surface preparation being used.
- h. Indicate special tolerances and erection requirements.
- i. Indicate weep holes for HSS.
- j. Indicate surface preparation, primer, and coating requirements, including systems specified in other Sections.

#### 1.6 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Fabrication of AESS Components; G,AE

SD-03 Product Data

Filler; G,AE

1.7 DELIVERY, STORAGE, AND HANDLING

Use special care in handling AESS to prevent twisting, warping, nicking, and other damage during fabrication, delivery, and erection. Store materials to permit easy access for inspection and identification. Keep AESS members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect AESS members and packaged materials from corrosion and deterioration.

- a. Do not store AESS materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
- 1.8 FIELD CONDITIONS
- 1.8.1 Field Measurements

Where AESS is indicated to fit against other construction, verify actual dimensions by field measurements before fabrication.

## PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

Comply with requirements of ANSI/AISC 303, Sections 1 through 9 and as modified in Section 10, "Architecturally Exposed Structural Steel."

2.2 FILLER

Polyester filler intended for use in repairing dents in automobile bodies.

- 2.3 PRIMER
- 2.3.1 Steel Primer

Comply with Section 05 12 00 STRUCTURAL STEEL.

2.4 FABRICATION

Shop fabricate and assemble AESS to the maximum extent possible. Locate field joints at concealed locations if possible. Detail assemblies to minimize handling and to expedite erection.

a. Use special care handling and fabricating AESS before and after shop painting to minimize damage to shop finish.

Erection marks, painted marks, and other marks are permitted on steel surfaces of completed structure.

- 2.4.1 Category AESS 1
  - a. Comply with overall profile dimensions of AWS D1.1/D1.1M for welded built-up members. Keep appearance and quality of welds consistent.

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Maintain true alignment of members without warp exceeding specified tolerances.

- b. Prepare surfaces according to Part 2 "Shop Priming" Article and SSPC SP 6/NACE No.3.
- c. Grind sheared, punched, and flame-cut edges to remove burrs and provide smooth surfaces and eased edges.
- d. Make intermittent welds appear continuous, using filler or additional welding.
- e. Seal weld open ends of hollow structural sections with 3/8-inch closure plates.
- f. Limit butt and plug weld projections to 1/16 inch.
- g. Install bolt heads on the same side of each connection and maintain orientation consistently from one connection to another.
- h. Remove weld spatter, slivers, and similar surface discontinuities.
- i. Remove blemishes and surface irregularities resulting from temporary braces or fixtures by filling or grinding, before cleaning, treating, and shop priming.
- j. Grind tack welds smooth unless incorporated into final welds.
- k. Remove backing and runoff tabs, and grind welds smooth.
- 2.4.2 Category AESS 2
  - a. Comply with overall profile dimensions of AWS D1.1/D1.1M for welded built-up members. Keep appearance and quality of welds consistent. Maintain true alignment of members without warp exceeding specified tolerances.
  - b. Prepare surfaces according to Part 2 "Shop Priming" Article and SSPC SP 6/NACE No.3.
  - c. Grind sheared, punched, and flame-cut edges to remove burrs and provide smooth surfaces and eased edges.
  - d. Make intermittent welds appear continuous, using filler or additional welding.
  - e. Seal weld open ends of hollow structural sections with 3/8-inch closure plates.
  - f. Limit butt and plug weld projections to 1/16 inch.
  - g. Install bolt heads on the same side of each connection and maintain orientation consistently from one connection to another.
  - h. Remove weld spatter, slivers, and similar surface discontinuities.
  - i. Remove blemishes and surface irregularities resulting from temporary braces or fixtures by filling or grinding, before cleaning, treating, and shop priming.

SECTION 05 12 13 Page 4 Certified Final Submittal

- j. Grind tack welds smooth unless incorporated into final welds.
- k. Remove backing and runoff tabs, and grind welds smooth.
- 1. Limit as-fabricated straightness tolerance to one-half that permitted for structural-steel materials in ANSI/AISC 303.
- m. Limit as-fabricated curved structural steel tolerance to that permitted for structural-steel materials in ANSI/AISC 303.
- n. Limit as-fabricated straightness tolerance of welded built-up members to one-half that permitted by AWS D1.1/D1.1M.
- o. Conceal fabrication and erection markings from view in the completed structure.
- p. Make welds uniform and smooth.
- 2.5 SHOP PRIMING

Shop prime steel surfaces, except the following:

- a. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
- b. Surfaces to be field welded.
- c. Surfaces to be high-strength bolted with slip-critical connections.
- 2.5.1 Surface Preparation

Clean nongalvanized surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

- a. SSPC SP 3 for steel exposed in spaces above ceilings, attic spaces, furred spaces, and chases that will be hidden to view in finished construction when recommended by the shop primer manufacturer.
- b. SSPC SP 6/NACE No.3 for all other areas.

# 2.5.2 Priming

Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 2.0 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

- a. Stripe paint corners, crevices, bolts, welds, and eased edges.
- b. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

## PART 3 EXECUTION

# 3.1 EXAMINATION

- a. Verify, with steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
  - Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments, showing dimensions, locations, angles, and elevations.
- b. Examine AESS for twists, kinks, warping, gouges, and other imperfections before erecting.
- c. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 PREPARATION

Provide temporary shores, guys, braces, and other supports during erection to keep AESS secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

## 3.3 ERECTION

- a. Take special care during erection to avoid marking or distorting the AESS and to minimize damage to shop painting. Set AESS accurately in locations and to elevations indicated and according to ANSI/AISC 303 and ANSI/AISC 360.
  - Remove welded tabs that were used for attaching temporary bracing and safety cabling and that are exposed to view in the completed Work. Take care to avoid any blemishes, holes, or unsightly surfaces resulting from the use or removal of temporary elements.
  - 2. Grind tack welds smooth.
  - 3. Remove backing and runoff tabs, and grind welds smooth.
  - 4. Orient bolt heads on the same side of each connection and maintain orientation consistently from one connection to another.
  - 5. Remove erection bolts in AESS, fill holes with weld metal or filler, and grind or sand smooth to achieve surface quality approved by Architect.
  - Fill weld access holes in AESS with weld metal or filler and grind, or sand smooth to achieve surface quality as approved by Architect.
  - 7. Conceal fabrication and erection markings from view in the completed structure.
- b. In addition to ANSI/AISC 303, Section 10 requirements, comply with the following.

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1. Erection of Category AESS 1 and Category AESS 2:

(a) Erect AESS to the standard frame tolerances specified in ANSI/ AISC 303 for non-AESS.

(b) Comply with AWS D1.1/D1.1M. Keep appearance and quality of welds consistent. Maintain true alignment of members without warp exceeding specified tolerances.

(c) Remove weld spatter, slivers, and similar surface discontinuities.

(d) Grind off butt and plug weld projections larger than 1/16 inch.

(e) Continuous welds are to be of uniform size and profile.

(f) Ream holes that must be enlarged. Use of drift pins or burning is not permitted. Replace misaligned connection plates where holes cannot be aligned with acceptable appearance.

(g) Splice members only where indicated on Drawings.

(h) No torch cutting or field fabrication is permitted.

#### 3.4 REPAIR

3.4.1 Touchup Painting

Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting, to comply with SSPC PA 1 for touching up shop-painted surfaces.

a. Clean and prepare surfaces by SSPC SP 3 power-tool cleaning.

Cleaning and touchup painting are specified in Section 09 90 00 PAINTS AND COATINGS.

3.4.2 Touchup Priming

Cleaning and touchup priming are specified in Section 05 12 00 STRUCTURAL STEEL.

3.5 FIELD QUALITY CONTROL

Contracting Officer's Representative will observe AESS in place to determine acceptability relating to aesthetic effect.

-- End of Section --

SECTION 05 21 00

STEEL JOIST FRAMING 05/15, CHG 1: 08/18

#### PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M (2020; Errata 1 2021) Structural Welding Code - Steel

ASTM INTERNATIONAL (ASTM)

ASTM A36/A36M (2019) Standard Specification for Carbon Structural Steel

INTERNATIONAL CODE COUNCIL (ICC)

ICC IBC (2021) International Building Code

SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC PA 1 (2016) Shop, Field, and Maintenance Coating of Metals

SSPC Paint 15 (1999; E 2004) Steel Joist Shop Primer/Metal Building Primer

SSPC SP 2 (2018) Hand Tool Cleaning

STEEL JOIST INSTITUTE (SJI)

SJI LOAD TABLES (2020) Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders - 45th Edition

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29	CFR	1926	Safety	and	Health	Regulations	for
			Constru	actio	on		

29 CFR 1926.757 Steel Erection; Open Web Steel Joists

# 1.2 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SECTION 05 21 00 Page 1 Certified Final Submittal

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P2#: 506474 - Manned/Unmanned Tactical Vehicle Lab (MUMT) Detroit Arsenal, MI
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SD-01 Preconstruction Submittals

Welder Qualification

SD-02 Shop Drawings

Steel Joist Framing; G, AE

SD-03 Product Data

Recycled Content Of Steel Products; S

SD-05 Design Data

Design Calculations; G, AE

SD-06 Test Reports

Erection Inspection

Welding Inspections

SD-07 Certificates

Certification of Compliance

#### 1.3 QUALITY ASSURANCE

Perform all work in compliance with the requirements set forth in 29 CFR 1926.

1.3.1 Drawing Requirements

Submit drawings of steel joist framing including fabrication, specifications for shop painting, and identification markings of joists . Show joist type and size, layout in plan, all applicable loads, deflection criteria, and erection details including methods of anchoring, framing at openings, type, size, and location and connections for and spacing of bridging, requirements for field welding, and details of accessories as applicable.

# 1.3.2 Certification of Compliance

Prior to construction commencement, submit certification for welder qualification, in compliance with AWS D1.1/D1.1M, welding operation, and tacker, stating the type of welding and positions qualified for, the code and procedure qualified under, date qualified, and the firm and individual certifying the qualification tests. Submit certification of compliance for the following:

- a. Steel Joist Institute Member Fabricator
- b. 29 CFR 1926
- c. 29 CFR 1926.757
- d. Statement from steel joist manufacturer, that work was performed in accordance with approved construction documents and with SJI standard

SECTION 05 21 00 Page 2 Certified Final Submittal

specifications, in accordance with ICC IBC Section 1704.2.5.2.

# 1.4 DELIVERY, STORAGE, AND HANDLING

Handle, transport, and store joists in a manner to prevent damage affecting their structural integrity. Verify piece count of all joist products upon delivery and inspect all joists products for damage. Report any damage to the joist supplier. Store all items off the ground in a well drained location protected from the weather and easily accessible for inspection and handling. Store joists with top chord down and with joists in a vertical position. Store deep joists horizontally if they were shipped on their sides.

## PART 2 PRODUCTS

#### 2.1 SYSTEM DESCRIPTION

Designate steel joists on the drawings in accordance with the standard designations of the Steel Joist Institute. Joists of other standard designations or joists with properties other than those shown may be substituted for the joists designated provided the structural properties are equal to or greater than those of the joists shown and provided all other specified requirements are met.

## 2.2 STEEL JOISTS

Provide steel joists conforming to SJI LOAD TABLES. Design joists designated K to support the loads given in the applicable standard load tables of SJI LOAD TABLES. Submit design calculations for special steel joists, net uplift loads, non-SJI standard details, and field splices. Include cover letter signed and sealed by the joist manufacturer's registered design professional.

# 2.2.1 Steel Joist Camber

Camber joists according to SJI LOAD TABLES

## 2.2.2 Special Steel Joists

Provide special joists and connections capable of withstanding the design loads indicated with a live-load deflection less than L/240 for roof joists.

# 2.2.3 Steel Joist Substitutes and Outriggers

Provide joist substitutes and outriggers conforming to SJI LOAD TABLES with steel angle or channel members.

## 2.3 RECYCLED CONTENT

Provide products with an average recycled content of steel products of postconsumer recycled content plus one half of preconsumer recycled content not less than 25 percent.

#### 2.4 ACCESSORIES AND FITTINGS

# 2.4.1 Bridging

Provide bridging of material, size, and type required by SJI LOAD TABLES for type of joist, chord size, spacing and span. Furnish additional

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erection bridging if required for stability.

## 2.4.2 Bearing Plates

Fabricate steel bearing plats from ASTM A36/A36M steel of size and thickness indicated.

# 2.5 SHOP PAINTING

SSPC Paint 15. Shop prime joists, except as modified herein, in accordance with SSPC PA 1. Clean joists in accordance with SSPC SP 2 before priming. If flash rusting occurs, re-clean the surface prior to application of primer. For joists which require finish painting under Section 09 90 00 PAINTS AND COATINGS, the primer paint must be compatible with the finish paint.

## PART 3 EXECUTION

## 3.1 ERECTION

Install joists in conformance with SJI LOAD TABLES for the joist series indicated, and the requirements of 29 CFR 1926 and 29 CFR 1926.757. Handle and set joists avoiding damage to the members. Place the "tag end" of joists as shown on the joists placement plans. Ensure that square-end joists are erected right side up. Distribute temporary loads so that joist capacity is not exceeded. Remove damaged joists from the site, except when field repair is approved and such repairs are satisfactorily made in accordance with the manufacturer's recommendations. Do not repair, field modify, or alter any joists without specific written instructions from the Designer of Record and/or joist manufacturer.

Install and connect bridging concurrently with joist erection, before construction loads are applied. Do not apply loads to bridging. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams. Do not cut away vertical leg of bridging where bridging makes an elevation transition; weld a separate piece of bridging at the transition. Perform all welding in accordance with AWS D1.1/D1.1M.

# 3.2 PAINTING

#### 3.2.1 Touch-Up Painting

After erection of joists, touch-up connections and areas of abraded shop coat with paint of the same type used for the shop coat.

## 3.2.2 Field Painting

Paint joists requiring a finish coat in conformance with the requirements of Section 09 90 00 PAINTS AND COATINGS.

# 3.3 VISUAL INSPECTIONS

Perform the following visual inspections:

- a. Verify that all joists are spaced properly.
- b. Verify that there is sufficient joist bearing on steel beams, concrete, and masonry.

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- c. Verify all bridging lines are properly spaced and anchored.
- d. Verify that damage has not occurred to the joists during erection.
- e. Verify the joists are aligned vertically and there is no lateral sweep in the joists.
- f. Where concentrated loads are present on the joists verify that they are located in accordance with the joists placement plan.
- g. Verify welding of bridging and joist seats in accordance with AWS D1.1/D1.1M, Section 6. Perform erection inspection and field welding inspections with AWS certified welding inspectors.
- h. Verify proper bolting of diagonal bridging and joist seats where the bolts are snug-tight.

-- End of Section --

SECTION 05 30 00

# STEEL DECKS 05/15, CHG 2: 08/18

## PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN IRON AND STEEL INSTITUTE (AISI)

AISI D100 (2017) Cold-Formed Steel Design Manual

AMERICAN WELDING SOCIETY (AWS)

AWS	D1.1/D1.1M	(2020)	Structural	Welding	Code	-	Steel
AWS	D1.3/D1.3M	(2018) Steel	Structural	Welding	Code	-	Sheet

ASTM INTERNATIONAL (ASTM)

ASTM A780/A780M	(2020) Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
ASTM A792/A792M	(2021a) Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process
ASTM A1008/A1008M	(2021) Standard Specification for Steel,

Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable

ASTM C423 (2009a) Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method

FM GLOBAL (FM)

FM APP GUIDE(updated on-line) Approval Guidehttp://www.approvalguide.com/

FM DS 1-28R (1998) Data Sheet: Roof Systems

SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC Paint 20 (2019) Zinc-Rich Primers (Type I, Inorganic, and Type II, Organic)

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P2#: 506474 - Manned/Unmanned Tactical Vehicle Lab (MUMT) Detroit Arsenal, MI STEEL DECK INSTITUTE (SDI)

(2017) Standard for Composite Steel Floor ANSI/SDI C Deck - Slabs ANSI/SDI QA/QC (2017) Standard for Quality Control and Quality Assurance for Installation of Steel Deck SDI DDM04 (2015; Errata 1-3 2016; Add 1 2015; Add 2 20162006) Diaphragm Design Manual; 4th Edition SDI DDP (1987; R 2000) Deck Damage and Penetrations (2016) Manual of Construction with Steel SDI MOC3 Deck (3rd Edition) U.S. DEPARTMENT OF DEFENSE (DOD) UFC 3-301-01 (2019) Structural Engineering U.S. GREEN BUILDING COUNCIL (USGBC) LEED v4 BDC Ref Guide (2013; R 2020) USGBC LEED Reference Guide for Building Design and Construction, v4

LEED v4.1 BDC Ref Guide (2023) LEED v4.1 Building Design and Construction Reference Guide

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29	CFR	1926	Safety	and	Health	Regulations	for
			Constru	actio	on		

#### UNDERWRITERS LABORATORIES (UL)

UL	580	(2006;	Reprin	nt Ma	r 2019)	UL	Standar	cd f	or
		Safety	Tests	for	Uplift	Resi	stance	of	Roof
		Assembl	ies						

UL Fire Resistance (2014) Fire Resistance Directory

# 1.2 SUSTAINABILITY REPORTING

Work of this section is intended to contribute to the achievement of, or compliance with, the requirements of the Guiding Principles Validation and LEED Prerequisites and attempted Credits. Refer to Section 01 33 29.00 06 SUSTAINABILITY REPORTING for specific documentation requirements and list of Prerequisites, attempted Credits and LEED version.

Comply with product, material content, performance criteria, activity, documentation, and other technical requirements as described in the LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide as applicable.

Collect, organize, and submit product data, drawings, diagrams, photos and cost information necessary to demonstrate compliance with LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide requirements as applicable.

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Data collection shall commence with the notice to proceed and will only be deemed complete upon acceptance of the Final Sustainability Notebook and LEED Online submission by the Contracting Officer, the LEED Project Administrator, and the Green Building Certification Institute.

## 1.3 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Fabrication Drawings; G, AE

SD-03 Product Data

Accessories

Deck Units; G, AE

Galvanizing Repair Paint

Touch-Up Paint

Sound Absorbing Materials

Welding Equipment

Welding Rods and Accessories

Recycled Content of Steel Products

Environmental Product Declarations; S

Embodied Carbon Optimization Report/Action Plan; S

Extended Producer Responsibility; S

Local/Regional Materials; S

Low-Emitting Materials; S

Material Ingredient Reporting; S

SD-04 Samples

Metal Roof Deck Units

SD-05 Design Data

Deck Units; G, AE

SD-07 Certificates

Welder Qualifications

Welding Procedures

Fire Safety

Wind Storm Resistance

Manufacturer's Certificate

#### 1.4 SUSTAINABLE DESIGN REQUIREMENTS

## 1.4.1 Environmental Product Declarations

At a minimum, use materials or products with an Environmental Product Declaration in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.4.2 Embodied Carbon Optimization Report/Action Plan

At a minimum, use materials or products with an Embodied Carbon Optimization Report/Action Plan in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.4.3 Sourcing of Raw Materials

Provide products that meet one or more of the following categories:

1.4.3.1 Extended Producer Responsibility

At a minimum, use materials or products from manufacturers that participate in an extended producer responsibility program in accordance with the LEED Implementation Plan. Provide manufacturer letter verifying extended producer responsibility program is in place and that product is eligible. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.4.3.2 Recycled Content Materials

At a minimum, use materials or products with recycled content in accordance with the LEED Implementation Plan. Provide manufacturers product literature identifying the percentage of recycled material incorporated within each product used.See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan. If recycled content minimum is specified in this section, the greater of the two percentages governs.

## 1.4.4 Material Ingredient Reporting

At a minimum, use materials or products with chemical inventory to at least 0.1% (1000 ppm) in accordance with the LEED Implementation Plan. Provide Health Product Declaration (HPD), Cradle to Cradle Certificate, Declare label, or other manufacturer's published content inventory in compliance with LEED v4.1 Material Ingredient Reporting credit. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

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## 1.4.5 Local/Regional Materials

Use materials or products extracted, harvested, or recovered, as well as manufactured, within a 100 mile radius from the project site, if available from a minimum of three sources. provide a letter from the manufacturer stating the extraction location, manufacturing location, and purchasing location of the products provided, referencing the project name and location specifically and distance to the project site. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

#### 1.4.6 Low-Emitting Materials: XXX

Use only interior paint products used onsite that comply with LEED v4.1 BDC Ref Guide requirements for VOC content and emissions. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for low-emitting material requirements.

#### 1.5 QUALITY ASSURANCE

# 1.5.1 Deck Units

Furnish deck units and accessory products from a manufacturer regularly engaged in manufacture of steel decking. Provide manufacturer's certificate s attesting that the decking material meets the specified requirements.

# 1.5.2 Qualifications for Welding Work

Follow Welding Procedures of AWS D1.3/D1.3M for sheet steel and AWS D1.1/D1.1M for stud welding.

Submit qualified Welder Qualifications in accordance with AWS D1.3/D1.3M for sheet steel and AWS D1.1/D1.1M for stud welding, or under an equivalent approved qualification test. Perform tests on test pieces in positions and with clearances equivalent to those actually encountered. Test specimens shall be made in the presence of Contracting Officer and shall be tested by an approved testing laboratory at the Contractor's expense. If a test weld fails to meet requirements, perform an immediate retest of two test welds until each test weld passes. Failure in the immediate retest will require the welder be retested after further practice or training, performing a complete set of test welds.

Submit manufacturer's catalog data for Welding Equipment and Welding Rods and Accessories.

## 1.5.3 Regulatory Requirements

## 1.5.3.1 Fire Safety

Test roof deck as a part of a roof deck construction assembly of the type used for this project, listing as fire classified in the UL Fire Resistance, or listing as Class I construction in the FM APP GUIDE, and so labeled.

# 1.5.3.2 Wind Storm Resistance

Provide roof construction assembly capable of withstanding a nominal uplift pressure of 90 pounds per square foot when tested in accordance with the uplift pressure test described in the FM DS 1-28R or as described in UL 580 and in general compliance with UFC 3-301-01.

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### 1.5.4 Fabrication Drawings

Show type and location of units, location and sequence of connections, bearing on supports, methods of anchoring, attachment of accessories, adjusting plate details, cant strips, ridge and valley plates, metal closure strips, size and location of holes to be cut and reinforcement to be provided, the manufacturer's erection instructions and other pertinent details.

## 1.6 DELIVERY, STORAGE, AND HANDLING

Deliver deck units to the site in a dry and undamaged condition. Store and handle steel deck in a manner to protect it from corrosion, deformation, and other types of damage. Do not use decking for storage or as working platform until units have been fastened into position. Exercise care not to damage material or overload decking during construction. The maximum uniform distributed storage load must not exceed the design live load. Stack decking on platforms or pallets and cover with weathertight ventilated covering. Elevate one end during storage to provide drainage. Maintain deck finish at all times to prevent formation of rust. Repair deck finish using touch-up paint. Replace damaged material.

#### 1.7 DESIGN REQUIREMENTS FOR ROOF DECKS

1.7.1 Properties of Sections

Properties of metal roof deck sections must comply with engineering design width as limited by the provisions of AISI D100.

# 1.7.2 Allowable Loads

Indicate total uniform dead and live load for detailing purposes.

#### PART 2 PRODUCTS

## 2.1 DECK UNITS

Submit manufacturer's design calculations, or applicable published literature for the structural properties of the proposed deck units.

Provide products with an average recycled content of steel products so postconsumer recycled content plus one half of preconsumer recycled content not less than 25 percent.

# 2.1.1 Roof Deck

Conform to ASTM A792/A792M or ASTM A1008/A1008M for deck used in conjunction with insulation and built-up roofing. Fabricate roof deck units of the steel design thickness required by the design drawings and shop painted. Furnish sample of Metal Roof Deck Units used to illustrate actual cross section dimensions and configurations.

# 2.1.2 Acoustical Roof Deck

Provide a Noise Reduction Coefficient (NRC) rating of not less than 1.15, when tested in accordance with ASTM C423. Provide sound absorbing materials with either glass fiber in roll or premolded form for acoustical steel deck (noncellular) in accordance with manufacturer's standards.

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### 2.1.3 Length of Deck Units

Provide deck units of sufficient length to span three or more spacings where possible.

# 2.1.4 Shop Priming

Shop prime accessories and underside of deck at the factory after coating. Clean surfaces in accordance with the manufacturer's standard procedure followed by a spray, dip or roller coat of rust-inhibitive primer, oven cured.

#### 2.1.5 Touch-Up Paint

Provide a high zinc-dust content paint for regalvanizing welds in galvanized steel conforming to ASTM A780/A780M.

Provide touch-up paint for shop-painted units of the same type used for the shop painting, and touch-up paint for zinc-coated units of an approved galvanizing repair paint with a high-zinc dust content. Touch-up welds with paint conforming to SSPC Paint 20 in accordance with ASTM A780/A780M. Maintain finish of deck units and accessories by using touch-up paint whenever necessary to prevent the formation of rust.

#### 2.2 ACCESSORIES

Provide accessories of same material as deck, unless specified otherwise. Provide manufacturer's standard type accessories, as specified.

# 2.2.1 Adjusting Plates

Provide adjusting plates, or segments of deck units, of same thickness and configuration as deck units in locations too narrow to accommodate full size units. Provide factory cut plates of predetermined size where possible.

## 2.2.2 End Closures

Fabricated of sheet metal by the deck manufacturer. Provide end closures minimum 0.0295 inch thick to close open ends at exposed edges of roofs, parapets, end walls, eaves, and openings through deck.

## 2.2.3 Partition Closures

Provide closures for closing voids above interior walls and partitions that are perpendicular to the direction of the configurations. Provide rubber, plastic, or sheet steel closures above typical partitions. Provide sheet steel closures above fire-resistant interior walls and partitions located on both sides of wall or partition. Provide glass fiber blanket insulation in the space between pairs of closures at acoustical partitions.

## 2.2.4 Sheet Metal Collar

Where deck is cut for passage of pipes, ducts, columns, etc., and deck is to remain exposed, provide a neatly cut sheet metal collar to cover edges of deck. Do not cut deck until after installation of supplemental supports.

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# 2.2.5 Cover Plates

Sheet metal to close panel edge and end conditions, and where panels change direction or butt. Polyethylene-coated, self-adhesive, 2 inch wide joint tape may be provided in lieu of cover plates on flat-surfaced decking butt joints.

Fabricate cover plates for abutting floor deck units from the specified structural-quality steel sheets not less than nominal 18 gagethick before galvanizing. Provide 6 inch wide cover plates and form to match the contour of the floor deck units.

# 2.2.6 Roof Sump Pans

Sump pans must be provided for roof drains and must be minimum 0.075 inch thick steel, flat or recessed type. Refer to Architectural for additional information and requirements. Shape sump pans to meet roof slope by the supplier or by a sheet metal specialist. Provide bearing flanges of sump pans to overlap steel deck a minimum of 3 inch. Shape, size, and reinforce the opening in bottom of the sump pan to receive roof drain.

#### 2.2.7 Column Closures

Sheet metal, minimum 0.0358 inch thick or metal rib lath.

2.2.8 Access Hole Covers

Sheet metal, minimum 0.0474 inch thick.

#### 2.2.9 Miscellaneous Accessories

Furnish the manufacturer's standard accessories to complete the deck installation. Furnish metal accessories of the same material as the deck and with the minimum design thickness as follows: saddles, 0.0598 inch other metal accessories, 0.0358 inch unless otherwise indicated.

#### PART 3 EXECUTION

3.1 EXAMINATION

Prior to installation of decking units and accessories, examine worksite to verify that as-built structure will permit installation of decking system without modification.

## 3.2 INSTALLATION

Install steel deck units in accordance with 29 CFR 1926, Subpart R - Steel Erection, ANSI/SDI QA/QC, ANSI/SDI C and approved shop drawings. Place units on structural supports, properly adjusted, leveled, and aligned at right angles to supports before permanently securing in place. Damaged deck and accessories including material which is permanently stained or contaminated, deformed, or with burned holes shall not be installed. Extend deck units over three or more supports unless absolutely impractical. Report inaccuracies in alignment or leveling to the Contracting Officer and make necessary corrections before permanently anchoring deck units. Locate deck ends over supports only. Deck ends shall be butted over supports. Do not use unanchored deck units as a work or storage platform. Do not fill unanchored deck with concrete. Permanently anchor units placed by the end of each working day. Do not support

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loads by steel deck unless indicated. Distribute loads by appropriate means to prevent damage.

# 3.2.1 Attachment

Immediately after placement and alignment, and after correcting inaccuracies, permanently fasten steel deck units to structural supports and to adjacent deck units by welding with 3/4 inch diameter puddle welds, as indicated on the design drawings and in accordance with manufacturer's recommended procedure. Clamp or weight deck units to provide firm contact between deck units and structural supports while performing welding or fastening. Anchoring the deck to structural supports with powder-actuated fasteners or pneumatically driven fasteners is prohibited. Attachment of adjacent deck units by button-punching is prohibited.

# 3.2.1.1 Welding

Perform welding in accordance with AWS D1.3/D1.3M using methods and electrodes recommended by the manufacturers of the base metal alloys being used. Ensure only operators previously qualified by tests prescribed in AWS D1.3/D1.3M make welds. Immediately recertify, or replace qualified welders, that are producing unsatisfactory welding. Fasten steel deck as indicated on the design drawings. Do not use welding washers at the connections of the deck to supports. Do not use welding washers at sidelaps. Holes and similar defects will not be acceptable. Attach all partial or segments of deck units to structural supports in accordance with Section 2.5 of SDI DDM04. Attach headed stud anchor shear connectors as shown and welded as per AWS D1.1/D1.1M through the steel deck to the steel member. Immediately clean welds by chipping and wire brushing. Heavily coat welds, cut edges and damaged portions of coated finish with zinc-dust paint conforming to ASTM A780/A780M or painted finish with the manufacturer's standard touch-up paint to match finish.

## 3.2.1.2 Sidelap Fastening

Lock sidelaps between adjacent floor deck units together by welding or screws as indicated.

# 3.2.2 Openings

Cut or drill all holes and openings required and be coordinated with the drawings, specifications, and other trades. Frame and reinforce openings through the deck in conformance with SDI DDP. Reinforce holes and openings 6 to 12 inch across by 0.0474 inch thick steel sheet at least 12 inch wider and longer than the opening and be fastened to the steel deck at each corner of the sheet and at a maximum of 6 inch on center. Reinforce holes and openings larger than 12 inch by steel channels installed perpendicular to the steel beams and supported by the adjacent steel beams. Install steel channels perpendicular to the deck ribs and fasten to the channels perpendicular to the steel beams. Deck manufacturer shall approve holes or openings larger than 6 inch in diameter prior to drilling or cutting.

#### 3.2.3 Deck Damage

SDI MOC3, for repair of deck damage.

## 3.2.4 Touch-Up Paint

## 3.2.4.1 Roof Deck

Wire brush, clean, and touchup paint the scarred areas on the top and bottom surfaces of the metal decking and on the surface of supporting steel members. Include welds, weld scars, bruises, and rust spots for scarred areas. Touch up the painted surfaces with paint for the repair of painted surfaces.

- 3.2.5 Accessory Installation
- 3.2.5.1 Adjusting Plates

Provide in locations too narrow to accommodate full-size deck units and install as shown on shop drawings.

3.2.5.2 End Closures

Provide end closure to close open ends of cells at columns, walls, and openings in deck.

3.2.5.3 Closures Above Partitions

Provide for closing voids between cells over partitions that are perpendicular to direction of cells. Provide a one-piece closure strip for partitions 4 inch nominal or less in thickness and two-piece closure strips for wider partitions. Provide sheet metal closures above fire-rated partitions at both sides of partition with space between filled with fiberglass insulation. Provide flexible rubber closures above acoustic-rated partitions at both sides of partition with space between filled with blanket insulation.

# 3.2.5.4 Access Hole Covers

Provide access whole covers to seal holes cut in decking to facilitate welding of the deck to structural supports.

### 3.3 ROOF SUMP PANS

Place sump pans over openings in roof decking and fusion welded to top surface of roof decking. Do not exceed spacing of welds of 12 inch with not less than one weld at each corner. Field cut opening in the bottom of each roof sump pan to receive the roof drain as part of the work of this section.

3.4 CLEANING AND PROTECTION FOR DECKS

Upon completion of the deck, sweep surfaces clean and prepare for installation of the concrete and roofing.

- 3.5 FIELD QUALITY CONTROL
- 3.5.1 Deck Weld Inspection

Visual inspect welds in accordance with AWS D1.3/D1.3M.

-- End of Section --

## SECTION 05 40 00

# COLD-FORMED METAL FRAMING 05/15, CHG 1: 08/18

## PART 1 GENERAL

# 1.1 REFERENCES

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

AMERICAN CONCRETE INSTITUTE (ACI)

(2014; Errata 1-2 2014; Errata 3-5 2015;
Errata 6 2016; Errata 7-9 2017) Building
Code Requirements for Structural Concrete
(ACI 318-14) and Commentary (ACI 318R-14)

AMERICAN IRON AND STEEL INSTITUTE (AISI)

AISI S100	(2012) North American Specification for	
	the Design of Cold-Formed Steel Structura	1
	Members	

- AISI S200 (2007) North American Standard for Cold-Formed Steel Framing - General Provision
- AISI S201 (2007) North American Standard for Cold-Formed Steel Framing - Product Data
- AISI S202 (2011) Code of Standard Practice for Cold-formed Steel Structural Framing
- AISI S211 (2007) North American Standard for Cold-Formed Steel Framing - Wall Stud Design
- AISI S212 (2007) North American Standard for Cold-Formed Steel Framing - Header Design

AMERICAN WELDING SOCIETY (AWS)

AWS	D1.1/D1.1M	(2020)	Structural	Welding	Code	-	Steel
AWS	D1.3/D1.3M	(2018) Steel	Structural	Welding	Code	-	Sheet

#### ASTM INTERNATIONAL (ASTM)

ASTM A123/A123M	(2017) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A153/A153M	(2016a) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel

SECTION 05 40 00 Page 1 Certified Final Submittal P2#: 506474 - Manned/Unmanned Tactical Vehicle Lab (MUMT) Detroit Arsenal, MI Hardware ASTM A307 (2021) Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength ASTM A653/A653M (2020) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process ASTM A1003/A1003M (2015) Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members ASTM C955 (2017) Standard Specification for Cold-Formed Steel Structural Framing Members ASTM C1007 (2020) Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories ASTM C1513 (2018) Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections ASTM E119 (2020) Standard Test Methods for Fire Tests of Building Construction and Materials ASTM E329 (2021) Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection ASTM E488/E488M (2015) Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements ASTM F1554 (2020) Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength ASTM F1941 (2010) Standard Specification for Electrodeposited Coatings on Threaded Fasteners (Unified Inch Screw Threads (UN/UNR)) ASTM F2329/F2329M (2015) Standard Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners

INTERNATIONAL CODE COUNCIL (ICC)

ICC IBC (2018) International Building Code

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U.S. DEPARTMENT OF DEFENSE (DOD)

UFC 3-301-01 (2019) Structural Engineering

U.S. GREEN BUILDING COUNCIL (USGBC)

LEED v4 BDC Ref Guide	(2013; R 2020) USGBC LEED Reference Guide for Building Design and Construction, v4
LEED v4.1 BDC Ref Guide	(2023) LEED v4.1 Building Design and Construction Reference Guide

#### 1.2 SUSTAINABILITY REPORTING

Work of this section is intended to contribute to the achievement of, or compliance with, the requirements of the Guiding Principles Validation and LEED Prerequisites and attempted Credits. Refer to Section 01 33 29.00 06 SUSTAINABILITY REPORTING for specific documentation requirements and list of Prerequisites, attempted Credits and LEED version.

Comply with product, material content, performance criteria, activity, documentation, and other technical requirements as described in the LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide as applicable.

Collect, organize, and submit product data, drawings, diagrams, photos and cost information necessary to demonstrate compliance with LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide requirements as applicable.

Data collection shall commence with the notice to proceed and will only be deemed complete upon acceptance of the Final Sustainability Notebook and LEED Online submission by the Contracting Officer, the LEED Project Administrator, and the Green Building Certification Institute.

#### 1.3 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Framing Components; G, AE

SD-03 Product Data

Steel Studs, Joists, Tracks, Bracing, Bridging and Accessories; G,  $\ensuremath{\mathsf{AE}}$ 

Recycled Content of Steel Products; S

Environmental Product Declarations; S

Embodied Carbon Optimization Report/Action Plan; S

Extended Producer Responsibility; S

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Local/Regional Materials; S

Material Ingredient Reporting; S

SD-05 Design Data

Metal Framing Calculations; G, AE

SD-07 Certificates

Welds

- 1.4 SUSTAINABLE DESIGN REQUIREMENTS
- 1.4.1 Environmental Product Declarations

At a minimum, use materials or products with an Environmental Product Declaration in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.4.2 Embodied Carbon Optimization Report/Action Plan

At a minimum, use materials or products with an Embodied Carbon Optimization Report/Action Plan in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.4.3 Sourcing of Raw Materials

Provide products that meet one or more of the following categories:

1.4.3.1 Extended Producer Responsibility

At a minimum, use materials or products from manufacturers that participate in an extended producer responsibility program in accordance with the LEED Implementation Plan. Provide manufacturer letter verifying extended producer responsibility program is in place and that product is eligible. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.4.3.2 Recycled Content Materials

At a minimum, use materials or products with recycled content in accordance with the LEED Implementation Plan. Provide manufacturers product literature identifying the percentage of recycled material incorporated within each product used.See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan. If recycled content minimum is specified in this section, the greater of the two percentages governs.

1.4.4 Material Ingredient Reporting

At a minimum, use materials or products with chemical inventory to at least 0.1% (1000 ppm) in accordance with the LEED Implementation Plan. Provide Health Product Declaration (HPD), Cradle to Cradle Certificate, Declare label, or other manufacturer's published content inventory in compliance with LEED v4.1 Material Ingredient Reporting credit. See

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Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

# 1.4.5 Local/Regional Materials

Use materials or products extracted, harvested, or recovered, as well as manufactured, within a 100 mile radius from the project site, if available from a minimum of three sources. provide a letter from the manufacturer stating the extraction location, manufacturing location, and purchasing location of the products provided, referencing the project name and location specifically and distance to the project site. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

# 1.5 DELIVERY, STORAGE, AND HANDLING

Steel framing and related accessories shall be stored and handled in accordance with the AISI S202, "Code of Standard Practice for Cold-Formed Steel Structural Framing".

## 1.6 LOAD-BEARING COLD-FORMED METAL FRAMING

Load-bearing cold-formed metal framing not required.

Non-load-bearing metal framing, furring, and ceiling suspension systems are specified in Section 09 22 00 SUPPORTS FOR PLASTER AND GYPSUM BOARD. Metal suspension systems for acoustical ceilings are specified in Section 09 51 00 ACOUSTICAL CEILINGS.

#### 1.7 MAXIMUM DEFLECTION

Deflections of structural members shall not exceed the more restrictive of the limitations of ICC IBC and UFC 3-301-01.

#### 1.8 QUALITY ASSURANCE

- a. The Cold-Formed Metal Framing elements indicated on the Contract Documents shall be provided by the Contractor as a Delegated Engineered System. The Delegated Engineered System shall be designed and detailed by the Contractor's Qualified Delegated Engineer.
- b. Delegated Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data by a registered professional engineer licensed to practice in the state where the project is located.
- c. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E329 for testing indicated.
- d. Product Tests: Mill certificates or data from a qualified independent testing agency indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.
- e. Welding Qualifications: Qualify procedures and personnel according to the following:

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(1) AWS D1.1/D1.1M, "Structural Welding Code - Steel".

(2) AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel".

- f. Fire-Test-Response Characteristics: Where indicated, provide cold-formed metal framing identical to that of assemblies tested for fire resistance per ASTM E119 by, and displaying a classification label from, a testing and inspecting agency acceptable to authorities having jurisdiction.
- g. AISI Specifications and Standards: Comply with:
  - (1) AISI S100, "North American Specification for the Design of Cold-Formed Steel Structural Members".
  - (2) AISI S200, "North American Standard for Cold-Formed Steel Framing General Provision".
  - (3) AISI S201, "North American Standard for Cold-Formed Steel Framing Product Data".
  - (4) AISI S202, "Code of Standard Practice for Cold-Formed Steel Structural Framing".
  - (5) AISI S211, "North American Standard for Cold-Formed Steel Framing - Wall Stud Design".
  - (6) AISI S212, "North American Standard for Cold-Formed Steel Framing Header Design".

### 1.8.1 Drawing Requirements

Submit framing components to show sizes, thicknesses, layout, material designations, methods of installation, and accessories including the following:

- a. Cross sections, plans, and/or elevations showing component types and locations for each framing application; including shop coatings and material thicknesses for each framing component.
- b. Connection details showing fastener type, quantity, location, and other information to assure proper installation.
- c. Drawings depicting panel configuration, dimensions, components, locations, and construction sequence if the Contractor elects to install prefabricated/prefinished frames.

Sign and seal fabrication drawings by a registered professional engineer.

# 1.8.2 Design Data Required

Submit metal framing calculations with design criteria and structural loading to verify sizes, thickness, and spacing of members and connections signed and sealed by a registered professional engineer. Show methods and practices used in installation.

PART 2 PRODUCTS

2.1 STEEL STUDS, JOISTS, TRACKS, BRACING, BRIDGING AND ACCESSORIES

Framing components shall comply with ASTM C955 and the following.

- a. Provide products with an average recycled content of steel products so postconsumer recycled content plus one half of preconsumer recycled content not less than 25 percent.
- b. Steel Sheet: ASTM A1003/A1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
  - (1) Grade: As required by structural performance.
  - (2) Coating: G60 (Z180).
- c. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
  - (1) Minimum Base-Metal Thickness: 0.0329 inch.
  - (2) Flange Width: 1-5/8 inches, unless a greater width is required by design.
- d. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and as follows:
  - (1) Minimum Base-Metal Thickness: Matching steel studs.
  - (2) Flange Width: 1-1/4 inches.
- 2.1.1 Studs and Joists of 54 mils (0.054 Inch) and Heavier

Galvanized steel, ASTM A653/A653M and ASTM A1003/A1003M, SS Grade 50, G60.

2.1.2 Studs and Joists of 43 mils (0.043 Inch) and Lighter

Studs and Joists of 43 mils (0.043 Inch) and Lighter, Track, and Accessories (All thicknesses): Galvanized steel, ASTM A653/A653M and ASTM A1003/A1003M, SS, Grade 33 33,000 psi G60.

2.1.3 Sizes, Thickness, Section Modulus, and Other Structural Properties

Size and thickness as required.

2.2 MARKINGS

Studs and track shall have product markings stamped on the web of the section. The markings shall be repeated throughout the length of the member at a maximum spacing of 4 feet on center and shall be legible and easily read. The product marking shall include the following:

- a. An ICC number.
- b. Manufacturer's identification.
- c. Minimum delivered uncoated steel thickness.

- d. Protective coating designator.
- e. Minimum yield strength.
- 2.3 CONNECTIONS
- 2.3.1 Steel-To-Concrete Connections
  - a. Anchor Rods: ASTM F1554, Grade 36; galvanized per ASTM A153/A153M.
  - b. Post-Installed Concrete Anchors: Adhesive or expansion anchors fabricated from corrosion-resistant materials with allowable load capacities in accordance with ICC-ES AC193 and ACI 318 greater than or equal to the design load as determined by testing per ASTM E488/E488M conducted by a qualified testing agency.
  - c. Power-Actuated Fasteners: Fabricated from corrosion-resistant materials with allowable load capacities in accordance with ICC-ES AC 70 greater than or equal to the design load as determined by testing per ASTM E1190 conducted by a qualified testing agency.
- 2.3.2 Steel-To-Steel Connections
  - a. Screws: ASTM C1513, corrosion-resistant-coated, self-drilling, self-tapping steel screws of the type and size indicated. Provide low-profile head beneath sheathing and manufacturer's standard elsewhere. Electroplated to a minimum of 5 micron zinc coating per ASTM F1941 or hot-dipped galvanized per ASTM A123/A123M or ASTM A153/A153M.
  - b. Bolts: ASTM A307 coated by hot-dip process per ASTM F2329/F2329M or zinc-coated by mechanical-deposition process per ASTM B695, Class 55.
  - c. Welding Electrodes: Comply with AWS standards.
- 2.4 PLASTIC GROMMETS

Supply plastic grommets for stud webs as recommended by stud manufacturer, to protect electrical wires and plumbing piping. Prevent metal-to-metal contact between wiring/piping and studs.

2.5 SEALER GASKET

Closed-cell neoprene foam, 1/4-inch thick, selected from manufacturer's standard widths to match width of bottom track on concrete slab or foundation.

## PART 3 EXECUTION

3.1 FASTENING

Fasten framing members together by welding or by using self-drilling, self-tapping screws. Electrodes and screw connections shall be as required and indicated in the design calculations.

3.1.1 Welds

All welding shall be performed in accordance with AWS D1.3/D1.3M, as modified by AISI S100. All welders, welding operations, and welding

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procedures shall be qualified according to AWS D1.3/D1.3M. Submit certified copies of welder qualifications test records showing qualification in accordance with AWS D1.3/D1.3M. All welds shall be cleaned and coated with rust inhibitive galvanizing paint. Do not field weld materials lighter than 43 mils.

# 3.1.2 Screws

Screws shall be of the self-drilling self-tapping type, size, and location as required. Screw penetration through joined materials shall not be less than three exposed threads. Minimum spacings and edge distances for screws shall be as specified in AISI S100. Screws covered by sheathing materials shall have low profile heads.

## 3.1.3 Anchors

Anchors shall be of the type, size, and location as required.

#### 3.1.4 Powder-Actuated Fasteners

Powder-actuated fasteners shall be of the type, size, and location as required.

3.2 INSTALLATION

Install cold-formed framing in accordance with ASTM C1007 and AISI S200.

Install cold-formed steel framing according to AISI S202 and to manufacturer's written instructions unless more stringent requirements are indicated.

3.2.1 Tracks

Provide accurately aligned runners at top and bottom of studs. Install sealer gasket under bottom of track on concrete slab or foundation. Anchor tracks as indicated in design calculations. Butt weld joints in tracks or splice with stud inserts. Fasteners shall be at least 3 inches from the edge of concrete slabs.

# 3.2.2 Studs

Cut studs square and set with firm bearing against webs of top and bottom tracks. Position studs vertically in tracks and space as indicated in design. Do not splice studs. Provide at least two studs at jambs of doors and other openings 2 feet wide or larger. Provide jack studs over openings, as necessary, to maintain indicated stud spacing. Provide tripled studs at corners, positioned to receive interior and exterior finishes. Fasten studs to top and bottom tracks by welding or screwing both flanges to the tracks. Framed wall openings shall include headers and supporting components as shown on the drawings. Headers shall be installed in all openings that are larger than the stud spacing in a wall. In curtain wall construction, provide for vertical movement where studs connect to the structural frame. Provide horizontal bracing in accordance with the design calculations and AISI S100. Bracing shall be not less than the following:

LOAD	HEIGHT	BRACING
Wind load only	Up to 10 feet	One row at mid-height
	Over 10 feet	Rows 5'-0" o.c. maximum
Axial load	Up to 10 feet	Two rows at 1/3 points
	Over 10 feet	Rows 3'-4" o.c. maximum

#### 3.2.3 Joists

- a. Provide a stud directly under each joist. The maximum spacing of studs as indicated shall be maintained.
- b. Install, bridge, and brace cold-formed steel framing according to AISI S200, AISI's "Code of Standard Practice for Cold-Formed Steel Structural Framing," and manufacturer's written instructions unless more stringent requirements are indicated.
- c. Install temporary bracing and supports. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- d. Do not alter, cut, or remove framing members.
- 3.2.4 Erection Tolerances
  - a. Framing members which will be covered by finishes such as wallboard, plaster, or ceramic tile set in a mortar setting bed, shall be within the following limits:

(1) Layout of walls and partitions: 1/4 inch from intended position;

- (2) Plates and runners: 1/4 inch in 8 feet from a straight line;
- (3) Studs: 1/4 inch in 8 feet out of plumb, not cumulative; and

(4) Face of framing members: 1/4 inch in 8 feet from a true plane.

b. Framing members which will be covered by ceramic tile set in dry-set mortar, latex-portland cement mortar, or organic adhesive shall be within the following limits:

(1) Layout of walls and partitions: 1/4 inch from intended position;

(2) Plates and runners: 1/8 inch in 8 feet from a straight line;

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(3) Studs: 1/8 inch in 8 feet out of plumb, not cumulative; and(4) Face of framing members: 1/8 inch in 8 feet from a true plane.

-- End of Section --

#### SECTION 05 50 13

# MISCELLANEOUS METAL FABRICATIONS 05/17, CHG 1: 08/18

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 303	(2016)	Code	of	Standard	Practice	for	Steel
	Buildi	ngs ai	nd I	Bridges			

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B18.21.1	(2009; R 2016) Washers: Helical
	Spring-Lock, Tooth Lock, and Plain Washer
	(Inch Series)

ASME B18.21.2M (1999; R 2014) Lock Washers (Metric Series)

ASME B18.22M (1981; R 2017) Metric Plain Washers

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M	(2020;	Errata	1	2021)	Structural	Welding
	Code -	Steel				

ASTM INTERNATIONAL (ASTM)

ASTM	A36/A36M	(2019) Structu	Standard Iral Steel	Specification	for	Carbon
ASTM	A53/A53M	(2022) Steel, Welded	Standard Black and and Seaml	Specification d Hot-Dipped, less	for Zinc-	Pipe, -Coated,

ASTM A123/A123M (2017) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

ASTM A153/A153M (2016a) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM A500/A500M (2021a) Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes

ASTM A653/A653M (2022) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by

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the Hot-Dip Process

ASTM A780/A780M (2020) Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings

ASTM A924/A924M (2022a) Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process

ASTM D1187/D1187M (1997; E 2011; R 2011) Asphalt-Base Emulsions for Use as Protective Coatings for Metal

ASTM E488/E488M (2022) Standard Test Methods for Strength of Anchors in Concrete Elements

# ASTM F1554 (2020) Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength

MASTER PAINTERS INSTITUTE (MPI)

MPI 79 (2016) Primer, Alkyd, Anti-Corrosive for Metal

SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC	SP	3 (	(2018)	Power	Tool	Cleaning	
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SSPC SP 6/NACE No.3 (2007) Commercial Blast Cleaning

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1

(2014) Safety -- Safety and Health Requirements Manual

U.S. GREEN BUILDING COUNCIL (USGBC)

LEED v4 BDC Ref Guide	(2013; R 2020) USGBC LEED Reference Guide for Building Design and Construction, v4
LEED v4.1 BDC Ref Guide	(2023) LEED v4.1 Building Design and Construction Reference Guide

# 1.2 SUSTAINABILITY REPORTING

Work of this section is intended to contribute to the achievement of, or compliance with, the requirements of the Guiding Principles Validation and LEED Prerequisites and attempted Credits. Refer to Section 01 33 29.00 06 SUSTAINABILITY REPORTING for specific documentation requirements and list of Prerequisites, attempted Credits and LEED version.

Comply with product, material content, performance criteria, activity, documentation, and other technical requirements as described in the LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide as applicable.

Collect, organize, and submit product data, drawings, diagrams, photos and cost information necessary to demonstrate compliance with

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LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide requirements as applicable.

Data collection shall commence with the notice to proceed and will only be deemed complete upon acceptance of the Final Sustainability Notebook and LEED Online submission by the Contracting Officer, the LEED Project Administrator, and the Green Building Certification Institute.

# 1.3 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Bollards/Pipe Guards;

Roof Hatches, Installation Drawings; G

SD-03 Product Data

Recycled Content; S

Environmental Product Declarations; S

Embodied Carbon Optimization Report/Action Plan; S

Extended Producer Responsibility; S

Local/Regional Materials; S

Material Ingredient Reporting; S

#### 1.4 SUSTAINABLE DESIGN REQUIREMENTS

1.4.1 Environmental Product Declarations

At a minimum, use materials or products with an Environmental Product Declaration in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.4.2 Embodied Carbon Optimization Report/Action Plan

At a minimum, use materials or products with an Embodied Carbon Optimization Report/Action Plan in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.4.3 Sourcing of Raw Materials

Provide products that meet one or more of the following categories:

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# 1.4.3.1 Extended Producer Responsibility

At a minimum, use materials or products from manufacturers that participate in an extended producer responsibility program in accordance with the LEED Implementation Plan. Provide manufacturer letter verifying extended producer responsibility program is in place and that product is eligible. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

# 1.4.3.2 Recycled Content Materials

At a minimum, use materials or products with recycled content in accordance with the LEED Implementation Plan. Provide manufacturers product literature identifying the percentage of recycled material incorporated within each product used. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan. If recycled content minimum is specified in this section, the greater of the two percentages governs.

## 1.4.4 Material Ingredient Reporting

At a minimum, use materials or products with chemical inventory to at least 0.1% (1000 ppm) in accordance with the LEED Implementation Plan. Provide Health Product Declaration (HPD), Cradle to Cradle Certificate, Declare label, or other manufacturer's published content inventory in compliance with LEED v4.1 Material Ingredient Reporting credit. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

## 1.4.5 Local/Regional Materials

Use materials or products extracted, harvested, or recovered, as well as manufactured, within a 100 mile radius from the project site, if available from a minimum of three sources. provide a letter from the manufacturer stating the extraction location, manufacturing location, and purchasing location of the products provided, referencing the project name and location specifically and distance to the project site. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

## 1.5 QUALIFICATION OF WELDERS

Qualify welders in accordance with AWS D1.1/D1.1M. Use procedures, materials, and equipment of the type required for the work.

#### 1.6 DELIVERY, STORAGE, AND PROTECTION

Protect from corrosion, deformation, and other types of damage. Store items in an enclosed area free from contact with soil and weather. Remove and replace damaged items with new items.

#### 1.7 MISCELLANEOUS REQUIREMENTS

#### 1.7.1 Fabrication Drawings

Submit fabrication drawings showing layout(s), connections to structural system, and anchoring details as specified in AISC 303.
## 1.7.2 Installation Drawings

Submit templates, erection, and installation drawings indicating thickness, type, grade, class of metal, and dimensions. Show construction details, reinforcement, anchorage, and installation in relation to the building construction.

# PART 2 PRODUCTS

#### 2.1 RECYCLED CONTENT

Provide products with recycled content.

#### 2.2 MATERIALS

Provide exposed fastenings of compatible materials (avoid contact of dissimilar metals). Coordinate color and finish with the material to which fastenings are applied.

2.2.1 Structural Carbon Steel

Provide in accordance with ASTM A36/A36M.

#### 2.2.2 Structural Tubing

Provide in accordance with ASTM A500/A500M.

2.2.3 Steel Pipe

Provide in accordance with ASTM A53/A53M, Type E or S, Grade B.

2.2.4 Anchor Bolts

Provide in accordance with ASTM F1554. Where exposed, provide anchor bolts of the same material, color, and finish as the metal to which they are applied.

2.2.4.1 Expansion Anchors or Adhesive Anchors

Provide 3/8 in. diameter expansion anchors or adhesive anchors. Exception: Do not use sleeve anchors. Design values listed must be as tested in accordance with ASTM E488/E488M.

2.2.4.2 Washers

Provide plain washers in accordance with ASME B18.22M, ASME B18.21.1. Provide beveled washers for American Standard beams and channels, square or rectangular, tapered in thickness, and smooth. Provide lock washers in accordance with ASME B18.21.2M, ASME B18.21.1.

# 2.3 FABRICATION FINISHES

## 2.3.1 Galvanizing

Hot-dip galvanize items specified to be zinc-coated, after fabrication where practicable. Provide galvanizing in accordance with ASTM A123/A123M, ASTM A153/A153M, ASTM A653/A653M or ASTM A924/A924M, Z275 G90.

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# 2.3.2 Galvanize

Anchor bolts, grating fasteners, washers, and parts or devices necessary for proper installation, unless indicated otherwise.

# 2.3.3 Repair of Zinc-Coated Surfaces

Repair damaged surfaces with galvanizing repair method and paint in accordance with ASTM A780/A780M or by application of stick or thick paste material specifically designed for repair of galvanizing, as approved by Contracting Officer. Clean areas to be repaired and remove slag from welds. Heat, with a torch, surfaces to which stick or paste material will be applied. Heat to a temperature sufficient to melt the metals in the stick or paste. Spread molten material uniformly over surfaces to be coated and wipe off excess material.

2.3.4 Shop Cleaning and Painting

#### 2.3.4.1 Surface Preparation

Blast clean surfaces in accordance with SSPC SP 6/NACE No.3. Surfaces that will be exposed in spaces above ceiling or in attic spaces, crawl spaces, furred spaces, and chases may be cleaned in accordance with SSPC SP 3 in lieu of being blast cleaned. Wash cleaned surfaces which become contaminated with rust, dirt, oil, grease, or other contaminants with solvents until thoroughly clean. Steel to be embedded in concrete must be free of dirt and grease prior to embed. Do not paint or galvanize bearing surfaces, including contact surfaces within slip critical joints. Shop coat these surfaces with rust prevention.

# 2.3.4.2 Pretreatment, Priming and Painting

Apply pre-treatment, primer, and paint in accordance with manufacturer's printed instructions. On surfaces concealed in the finished construction or not accessible for finish painting, apply an additional prime coat to a minimum dry film thickness of 1.0 mil. Tint additional prime coat with a small amount of tinting pigment.

# 2.4 BOLLARDS/PIPE GUARDS

Provide 6-inch prime-coated standard weight steel pipe in accordance with ASTM A53/A53M. Anchor posts in concrete as indicated and fill solidly with concrete with minimum compressive strength of 3000 psi.

a. Exception for Removable and Surface-Mounted Bollards: 4-inch prime-coated standard weight steel pipe without concrete fill.

#### 2.5 ROOF HATCHES (SCUTTLES)

Provide zinc-coated steel sheets not less than 14 gauge with 3 inch beaded flange, welded and ground at corners. Provide a minimum clear opening of 30 by 36 inches. Insulate cover and curb with one inch thick rigid fiberboard insulation, covered and protected by zinc-coated steel liner of not less than 26 gage. Provide with 12 inches high curb, formed with 3 inch mounting flanges with holes for securing to the roof deck.

## PART 3 EXECUTION

#### 3.1 GENERAL INSTALLATION REQUIREMENTS

Install items at locations indicated in accordance with manufacturer's instructions. Verify all field dimensions prior to fabrication. Include materials and parts necessary to complete each assembly, whether indicated or not. Miss-alignment and miss-sizing of holes for fasteners is cause for rejection. Conceal fastenings where practicable. Joints exposed to weather must be watertight.

#### 3.2 WORKMANSHIP

Provide miscellaneous metalwork that is true and accurate in shape, size, and profile. Make angles and lines continuous and straight. Make curves consistent, smooth and unfaceted. Provide continuous welding along the entire area of contact except where tack welding is permitted. Do not tack weld exposed connections. Unless otherwise indicated and approved, provide a smooth finish on exposed surfaces. Provide countersuck rivets where exposed. Provide coped and mitered corner joints aligned flush and without gaps.

#### 3.3 ANCHORAGE, FASTENINGS, AND CONNECTIONS

Provide anchorage as necessary, whether indicated or not, for fastening miscellaneous metal items securely in place. Include slotted inserts, expansion shields, powder-driven fasteners, toggle bolts (when approved for concrete), through bolts for masonry, headed shear studs, machine and carriage bolts for steel, through bolts, lag bolts, and screws for wood. Do not use wood plugs. Provide non-ferrous attachments for non-ferrous metal. Provide exposed fastenings of compatible materials (avoid contact of dissimilar metals), that generally match in color and finish the surfaces to which they are applied. Conceal fastenings where practicable. Provide all fasteners flush with the surfaces they fasten, unless indicated otherwise.

## 3.4 BUILT-IN WORK

Where necessary and not otherwise indicated, form built-in metal work for anchorage with concrete or masonry. Provide built-in metal work in ample time for securing in place as the work progresses.

# 3.5 WELDING

Perform welding, welding inspection, and corrective welding in accordance with AWS D1.1/D1.1M. Use continuous welds on all exposed connections. Grind visible welds smooth in the finished installation. Provide welded headed shear studs in accordance with AWS D1.1/D1.1M, Clause 7, except as otherwise specified. Provide in accordance with the safety requirements of EM 385-1-1.

# 3.6 DISSIMILAR METALS

Where dissimilar metals are in contact, protect surfaces with a coating in accordance with MPI 79 to prevent galvanic or corrosive action. Where aluminum is in contact with concrete, plaster, mortar, masonry, wood, or absorptive materials subject to wetting, protect in accordance with ASTM D1187/D1187M, asphalt-base emulsion. Clean surfaces with metal shavings from installation at the end of each work day.

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# 3.7 ROOF HATCH (SCUTTLES)

Construction and accessories as follows:

- a. Provide insulated cover and curb with mounting flanges for securing to roof deck. Provide curbs with integral metal cap flashing of the same gage and metal as the curb, fully welded and ground at corners for weather tightness.
- b. Provide hatches completely assembled, with pintle hinges, compression spring operators enclosed in telescopic tubes, positive snap latches with turn handles on inside and outside, and neoprene draft seals. Provide fasteners for padlocking from the inside. Provide covers with automatic hold-open arms complete with grip handle to permit one hand release. Cover action must be smooth through its entire range of motion with an operating pressure of approximately 30 pounds.

## 3.8 INSTALLATION OF BOLLARDS/PIPE GUARDS

Set bollards/pipe guards vertically in concrete piers. Fill hollow cores with concrete having a compressive strength of 3000 psi.

-- End of Section --

SECTION 05 51 33

# METAL LADDERS 02/16, CHG 2: 02/18

#### PART 1 GENERAL

1.1 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.

ALUMINUM ASSOCIATION (AA)

AA DAF45 (2003; Reaffirmed 2009) Designation System for Aluminum Finishes

AMERICAN LADDER INSTITUTE (ALI)

ALI A14.3 (2008; R 2018) Ladders - Fixed - Safety Requirements

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

ASSP Z359.16 (2016) Safety Requirements for Climbing Ladder Fall Arrest Systems

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M (2020) Structural Welding Code - Steel

ASTM INTERNATIONAL (ASTM)

- ASTM A36/A36M (2019) Standard Specification for Carbon Structural Steel
- ASTM A47/A47M (1999; R 2018; E 2018) Standard Specification for Ferritic Malleable Iron Castings
- ASTM A53/A53M (2020) Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

ASTM A500/A500M (2021) Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes

ASTM B26/B26M (2018; E 2018) Standard Specification for Aluminum-Alloy Sand Castings

ASTM B108/B108M (2019) Standard Specification for Aluminum-Alloy Permanent Mold Castings

ASTM B209 (2014) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate

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W912QR25R0052 Specs Vol1-0000 P2#: 506474 - Manned/Unmanned Tactical Vehicle Lab (MUMT) Detroit Arsenal, MI ASTM B221 (2020) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (1997; E 2011; R 2011) Asphalt-Base ASTM D1187/D1187M Emulsions for Use as Protective Coatings for Metal MASTER PAINTERS INSTITUTE (MPI) MPI 79 (2016) Primer, Alkyd, Anti-Corrosive for Metal U.S. GREEN BUILDING COUNCIL (USGBC) LEED v4 BDC Ref Guide (2013; R 2020) USGBC LEED Reference Guide for Building Design and Construction, v4 LEED v4.1 BDC Ref Guide (2023) LEED v4.1 Building Design and Construction Reference Guide U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA) 29 CFR 1910.23 (Nov 2016) Ladders 29 CFR 1910.28 (Nov 2016)Duty to Have Fall Protection and Falling Object Protection

29 CFR 1910.29 (Nov 2016) Fall Protection System and Falling Object Protection - Criteria and Practices

# 1.2 SUSTAINABILITY REPORTING

Work of this section is intended to contribute to the achievement of, or compliance with, the requirements of the Guiding Principles Validation and LEED Prerequisites and attempted Credits. Refer to Section 01 33 29.00 06 SUSTAINABILITY REPORTING for specific documentation requirements and list of Prerequisites, attempted Credits and LEED version.

Comply with product, material content, performance criteria, activity, documentation, and other technical requirements as described in the LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide as applicable.

Collect, organize, and submit product data, drawings, diagrams, photos and cost information necessary to demonstrate compliance with LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide requirements as applicable.

Data collection shall commence with the notice to proceed and will only be deemed complete upon acceptance of the Final Sustainability Notebook and LEED Online submission by the Contracting Officer, the LEED Project Administrator, and the Green Building Certification Institute.

## 1.3 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for

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information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Ladders, Installation Drawings

SD-03 Product Data

Ladders

Ladder Safety Devices (Climbing Ladder Fall Arrest Systems)

Environmental Product Declarations; S

Embodied Carbon Optimization Report/Action Plan; S

Extended Producer Responsibility; S

Recycled Content Materials; S

Local/Regional Materials; S

Material Ingredient Reporting; S

SD-07 Certificates

Fabricator Certification for Ships Ladder Assembly

#### 1.4 SUSTAINABLE DESIGN REQUIREMENTS

#### 1.4.1 Environmental Product Declarations

At a minimum, use materials or products with an Environmental Product Declaration in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.4.2 Embodied Carbon Optimization Report/Action Plan

At a minimum, use materials or products with an Embodied Carbon Optimization Report/Action Plan in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.4.3 Sourcing of Raw Materials

Provide products that meet one or more of the following categories:

# 1.4.3.1 Extended Producer Responsibility

At a minimum, use materials or products from manufacturers that participate in an extended producer responsibility program in accordance with the LEED Implementation Plan. Provide manufacturer letter verifying extended producer responsibility program is in place and that product is eligible. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

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## 1.4.3.2 Recycled Content Materials

At a minimum, use materials or products with recycled content in accordance with the LEED Implementation Plan. Provide manufacturers product literature identifying the percentage of recycled material incorporated within each product used. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan. If recycled content minimum is specified in this section, the greater of the two percentages governs.

#### 1.4.4 Material Ingredient Reporting

At a minimum, use materials or products with chemical inventory to at least 0.1% (1000 ppm) in accordance with the LEED Implementation Plan. Provide Health Product Declaration (HPD), Cradle to Cradle Certificate, Declare label, or other manufacturer's published content inventory in compliance with LEED v4.1 Material Ingredient Reporting credit. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

## 1.4.5 Local/Regional Materials

Use materials or products extracted, harvested, or recovered, as well as manufactured, within a 100 mile radius from the project site, if available from a minimum of three sources. provide a letter from the manufacturer stating the extraction location, manufacturing location, and purchasing location of the products provided, referencing the project name and location specifically and distance to the project site. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

# 1.5 CERTIFICATES

Provide fabricator certification for ships ladder assembly stating that the ships ladder and associated components have been fabricated according to the requirements of 29 CFR 1910.23.

## 1.6 QUALIFICATION OF WELDERS

Qualify welders in accordance with AWS D1.1/D1.1M. Use procedures, materials, and equipment of the type required for the work.

## 1.7 DELIVERY, STORAGE, AND PROTECTION

Protect from corrosion, deformation, and other types of damage. Store items in an enclosed area free from contact with soil and weather. Remove and replace damaged items with new items.

# PART 2 PRODUCTS

#### 2.1 MATERIALS

2.1.1 Structural Carbon Steel

ASTM A36/A36M.

2.1.2 Structural Tubing

ASTM A500/A500M.

2.1.3 Steel Pipe

ASTM A53/A53M, Type E or S, Grade B.

2.1.4 Fittings for Steel Pipe

Standard malleable iron fittings ASTM A47/A47M.

2.1.5 Aluminum Alloy Products

Conform to ASTM B209 for sheet plate, ASTM B221 for extrusions and ASTM B26/B26M or ASTM B108/B108M for castings, as applicable. Provide aluminum extrusions at least 1/8-inch thick and aluminum plate or sheet at least 0.050-inch thick.

- 2.2 FABRICATION FINISHES
- 2.2.1 Aluminum Surfaces
- 2.2.1.1 Surface Condition

Before finishes are applied, remove roll marks, scratches, rolled-in scratches, kinks, stains, pits, orange peel, die marks, structural streaks, and other defects which will affect uniform appearance of finished surfaces.

# 2.2.1.2 Aluminum Finishes

Unexposed plate and extrusions may have mill finish as fabricated. Sandblast castings' finish, medium, AA DAF45. Unless otherwise specified, provide all other aluminum items with standard mill finish. Provide a coating thickness not less than that specified for protective and decorative type finishes for items used in interior locations or architectural Class I type finish for items used in exterior locations in AA DAF45.

2.3 LADDERS

Fabricate vertical ladders conforming to 29 CFR 1910.23 and Section 5 of ALI A14.3. Ladders shall be capable of supporting their maximum intended load. Use 2-1/2" x 3/8" steel plate for stringers and 3/4 inch diameter steel rods for rungs or aluminum shapes as required. Ladder rungs, step, and cleats must be spaced not less than 10 inches and not more than 16 inches wide (measured before installation of ladder safety system), spaced no more than 14 inches apart, plug welded or shouldered and headed into stringers. Install ladders so that the maximum perpendicular distance from the centerline of the steps or rungs, or grab bars, or both, to the nearest permanent object in the back of the ladder or to the finished wall surface will not be less than 7 inches. Provide heavy clip angles riveted or bolted to the stringer and drilled for not less than two 1/2-inch diameter expansion bolts as indicated. Provide intermediate clip angles not over 48 inches on centers. The top rung of the ladder must be level with the top of the access level, parapet or landing served by the ladder except for hatches. Extend the side rails of through or side step ladders 42 inches above the access level. Provide ladder access protective swing

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gates at the top of access/egress level. The drawings must indicate ladder locations and details of critical dimensions and materials.

2.3.1 Phasing out of Ladder Cages and Wells (29 CFR 1910.28, Nov 2016)

Conform to 29 CFR 1910.28 (Nov 2016).

Each newly installed ladder over 20 feet in length shall only be equipped with a personal fall arrest system or climbing ladder fall arrest system (ladder safety device). Cages are prohibited. On and after November 18, 2036, all fixed ladders shall only be equipped with a personal fall arrest system or a ladder safety device (climbing ladder Fall Arrest System).

2.3.2 Ladder Safety Devices (Climbing Ladder Fall Arrest Systems)

Conform to 29 CFR 1910.29, Section 7 of ALI A14.3 and ASSP Z359.16. Install ladder safety devices on ladders over 20 feet long or more. The ladder safety systems must meet the design requirement of the ladders which they serve. The ladder safety system must be capable of sustaining a minimum static load of 1,000 pounds. The applied loads transferred to the climbing ladder mounting locations as a result of a fall shall be specified by the manufacturer of the climbing ladder fall arrest system. Each ladder safety system must allow the worker to climb up and down using both hands and does not require the employee continuously, hold, push, or pull any part of the system while climbing. The connection between the carrier or lifeline and the point of attachment to the body harness does not exceed 9 inches. The ladder safety system consists of a rigid or flexible carrier. Mountings for the rigid carries are attached at each end of the carrier, with intermediate mountings spaced as necessary, along the entire length of the carrier. Mountings for flexible carrier are attached at each end of the carrier and cable guides for flexible carriers are installed at least 25 feet apart but not more than 40 feet apart along the entire length of the carrier. The design and installation of mountings and cable guides does not reduce the design strength of the ladder.

## PART 3 EXECUTION

#### 3.1 GENERAL INSTALLATION REQUIREMENTS

Install items at locations indicated, according to manufacturer's instructions. Verify all measurements and take all field measurements necessary before fabrication. Provide exposed fastenings of compatible materials, generally matching in color and finish, and harmonize with the material to which fastenings are applied. Include materials and parts necessary to complete each item, even though such work is not definitely shown or specified. Poor matching of holes for fasteners will be cause for rejection. Conceal fastenings where practicable. Thickness of metal and details of assembly and supports must provide strength and stiffness. Formed joints exposed to the weather to exclude water. Items listed below require additional procedures.

## 3.2 WORKMANSHIP

Metalwork must be well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching must produce clean true lines and surfaces. Continuously weld along the entire area of contact. Do not tack-weld exposed connections of work in place. Grind exposed welds

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smooth. Provide smooth finish on exposed surfaces of work in place, unless otherwise approved. Where tight fits are required, mill joints. Cope or miter corner joints, well formed, and in true alignment. Install in accordance with manufacturer's installation instructions and approved drawings, cuts, and details.

# 3.3 ANCHORAGE, FASTENINGS, AND CONNECTIONS

Provide anchorage where necessary for fastening metal items securely in place. Include for anchorage not otherwise specified or indicated, slotted inserts, expansion anchors, and powder-actuated fasteners, when approved for concrete; toggle bolts and through bolts for masonry; machine bolts, carriage bolts and powder-actuated threaded studs for steel; through bolts, lag bolts, and screws for wood. Do not use wood plugs in any material. Provide non-ferrous attachments for non-ferrous metal. Make exposed fastenings of compatible materials, generally matching in color and finish, to which fastenings are applied. Conceal fastenings where practicable.

# 3.4 WELDING

Perform welding, welding inspection, and corrective welding, in accordance with AWS D1.1/D1.1M. Use continuous welds on all exposed connections. Grind visible welds smooth in the finished installation.

#### 3.5 FINISHES

## 3.5.1 Dissimilar Materials

Where dissimilar metals are in contact, protect surfaces with a coat conforming to MPI 79 to prevent galvanic or corrosive action. Where aluminum is in contact with concrete, plaster, mortar, masonry, wood, or absorptive materials subject to wetting, protect with ASTM D1187/D1187M, asphalt-base emulsion.

#### 3.6 LADDERS

Secure to the adjacent construction with the clip angles attached to the stringer. Secure to masonry or concrete with not less than two 1/2-inch diameter expansion bolts. Install intermediate clip angles not over 48 inches on center. Install brackets as required for securing of ladders welded or bolted to structural steel or built into the masonry or concrete. Ends of ladders must not rest upon finished roof.

-- End of Section --

SECTION 06 10 00

# ROUGH CARPENTRY 08/16, CHG 2: 11/18

## PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN INSTITUTE OF TIMBER CONSTRUCTION (AITC)

AITC TCM (2012) Timber Construction Manual, 5th Edition

AMERICAN LUMBER STANDARDS COMMITTEE (ALSC)

ALSC PS 20 (2015) American Softwood Lumber Standard

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

- ASME B18.2.1 (2012; Errata 2013) Square and Hex Bolts and Screws (Inch Series)
- ASME B18.2.2 (2022) Nuts for General Applications: Machine Screw Nuts, and Hex, Square, Hex Flange, and Coupling Nuts (Inch Series)
- ASME B18.5.2.1M (2006; R 2011) Metric Round Head Short Square Neck Bolts
- ASME B18.5.2.2M (1982; R 2010) Metric Round Head Square Neck Bolts
- ASME B18.6.1 (2016) Wood Screws (Inch Series)

AMERICAN WOOD COUNCIL (AWC)

AWC NDS (2015) National Design Specification (NDS) for Wood Construction

AWC WFCM (2012) Wood Frame Construction Manual for One- and Two-Family Dwellings

## AMERICAN WOOD PROTECTION ASSOCIATION (AWPA)

AWPA M2	(2019) Standard for the Inspection of
	Preservative Treated Wood Products for
	Industrial Use
AWPA M6	(2013) Brands Used on Preservative Treated Materials

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W912QR25R0052 Specs Vol1-0000 P2#: 506474 - Manned/Unmanned Tactical Vehicle Lab (MUMT) Detroit Arsenal, MI APA - THE ENGINEERED WOOD ASSOCIATION (APA) APA EWS T300 (2007) Technical Note: Glulam Connection Details APA L870 (2010) Voluntary Product Standard, PS 1-09, Structural Plywood ASTM INTERNATIONAL (ASTM) ASTM A153/A153M (2016a) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware ASTM A307 (2021) Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength (202) Standard Terminology of Nails for ASTM F547 Use with Wood and Wood-Base Materials CALIFORNIA AIR RESOURCES BOARD (CARB) CARB 93120 (2007) Airborne Toxic Control Measure (ATCM) to Reduce Formaldehyde Emissions from Composite Wood Products CALIFORNIA DEPARTMENT OF PUBLIC HEALTH (CDPH) CDPH SECTION 01350 (2017; Version 1.2) Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources using Environmental Chambers FM GLOBAL (FM) FM 4435 (2017) Roof Perimeter Flashing FOREST STEWARDSHIP COUNCIL (FSC) FSC STD 01 001 (2015) Principles and Criteria for Forest Stewardship GREEN SEAL (GS) GS-36 (2013) Adhesives for Commercial Use INTERNATIONAL CODE COUNCIL (ICC) ICC IBC (2021) International Building Code NORTHEASTERN LUMBER MANUFACTURERS ASSOCIATION (NELMA) NELMA Grading Rules (2013) Standard Grading Rules for Northeastern Lumber SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD) SCAQMD Rule 1168 (2017) Adhesive and Sealant Applications

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P2#: 506474 - Manned/Unmanned Tactical Vehicle Lab (MUMT) Detroit Arsenal, MI SOUTHERN PINE INSPECTION BUREAU (SPIB) SPIB 1003 (2014) Standard Grading Rules for Southern Pine Lumber TRUSS PLATE INSTITUTE (TPI) TPI 1 (2014) National Design Standard for Metal Plate Connected Wood Truss Construction, Including Commentary and Appendices U.S. GENERAL SERVICES ADMINISTRATION (GSA) CID A-A-1923 (Rev A; Notice 3) Shield, Expansion (Lag, Machine and Externally Threaded Wedge Bolt Anchors) (Rev A; Notice 3) Shield, Expansion (Self CID A-A-1924 Drilling Tubular Expansion Shell Bolt Anchors (Rev A; Notice 3) Shield Expansion (Nail CID A-A-1925 Anchors) U.S. GREEN BUILDING COUNCIL (USGBC) (2013; R 2020) USGBC LEED Reference Guide LEED v4 BDC Ref Guide for Building Design and Construction, v4 (2023) LEED v4.1 Building Design and LEED v4.1 BDC Ref Guide Construction Reference Guide U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA) 40 CFR 770 Formaldehyde Standards for Composite Wood Products UNDERWRITERS LABORATORIES (UL) UL 2818 (2013) GREENGUARD Certification Program For Chemical Emissions For Building Materials, Finishes And Furnishings WEST COAST LUMBER INSPECTION BUREAU (WCLIB) WCLIB 17 (2015) Standard Grading Rules WESTERN WOOD PRODUCTS ASSOCIATION (WWPA) WWPA G-5 (2017) Western Lumber Grading Rules 1.2 SUSTAINABILITY REPORTING Work of this section is intended to contribute to the achievement of, or

compliance with, the requirements of the Guiding Principles Validation and LEED Prerequisites and attempted Credits. Refer to Section 01 33 29.00 06 SUSTAINABILITY REPORTING for specific documentation requirements and list of Prerequisites, attempted Credits and LEED version.

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Comply with product, material content, performance criteria, activity, documentation, and other technical requirements as described in the LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide as applicable.

Collect, organize, and submit product data, drawings, diagrams, photos and cost information necessary to demonstrate compliance with LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide requirements as applicable.

Data collection shall commence with the notice to proceed and will only be deemed complete upon acceptance of the Final Sustainability Notebook and LEED Online submission by the Contracting Officer, the LEED Project Administrator, and the Green Building Certification Institute.

## 1.3 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Fire-retardant Treatment; G, AE

Adhesives; G, AE

Environmental Product Declarations; S

Embodied Carbon Optimization Report/Action Plan; S

Extended Producer Responsibility; S

Recycled Content Materials; S

Local/Regional Materials; S

Material Ingredient Reporting; S

SD-06 Test Reports

Preservative-treated Lumber and Plywood

SD-07 Certificates

Certified Sustainably Harvested Framing Lumber; S Certified Sustainably Harvested Plywood for Other Uses; S Preservative Treatment Indoor Air Quality for Aerosol Adhesives; S Indoor Air Quality for Non-aerosol Adhesives; S Indoor Air Quality For Plywood; S

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#### 1.4 SUSTAINABLE DESIGN REQUIREMENTS

# 1.4.1 Environmental Product Declarations

At a minimum, use materials or products with an Environmental Product Declaration in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.4.2 Embodied Carbon Optimization Report/Action Plan

At a minimum, use materials or products with an Embodied Carbon Optimization Report/Action Plan in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.4.3 Sourcing of Raw Materials

Provide products that meet one or more of the following categories:

#### 1.4.3.1 Extended Producer Responsibility

At a minimum, use materials or products from manufacturers that participate in an extended producer responsibility program in accordance with the LEED Implementation Plan. Provide manufacturer letter verifying extended producer responsibility program is in place and that product is eligible. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

# 1.4.3.2 Certified Wood

Use FSC-certified wood. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan. Indicate compliance with FSC STD 01 001 and identify certifying organization. Submit FSC certification numbers; identify each certified products on a line-item basis. Submit copies of invoices for all wood products bearing the FSC certification numbers for certified wood products as part of the closeout submittal.

1.4.3.3 Recycled Content Materials

At a minimum, use materials or products with recycled content in accordance with the LEED Implementation Plan. Provide manufacturers product literature identifying the percentage of recycled material incorporated within each product used. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan. If recycled content minimum is specified in this section, the greater of the two percentages governs.

# 1.4.4 Material Ingredient Reporting

At a minimum, use materials or products with chemical inventory to at least 0.1% (1000 ppm) in accordance with the LEED Implementation Plan. Provide Health Product Declaration (HPD), Cradle to Cradle Certificate, Declare label, or other manufacturer's published content inventory in compliance with LEED v4.1 Material Ingredient Reporting credit. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

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#### 1.4.5 Local/Regional Materials

Use materials or products extracted, harvested, or recovered, as well as manufactured, within a 100 mile radius from the project site, if available from a minimum of three sources. provide a letter from the manufacturer stating the extraction location, manufacturing location, and purchasing location of the products provided, referencing the project name and location specifically and distance to the project site. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

#### 1.5 DELIVERY AND STORAGE

Deliver materials to the Project site in an undamaged condition. Store materials off the ground to provide proper ventilation, with drainage to avoid standing water, and protection against ground moisture and dampness. Store materials with a moisture barrier at both the ground level and as a cover forming a well ventilated enclosure. Adhere to requirements for stacking, lifting, bracing, cutting, notching, and special fastening requirements. Do not use materials that have visible moisture or biological growth. Remove defective and damaged materials and provide new materials. Store separated reusable wood waste convenient to cutting station and area of work.

# 1.6 GRADING AND MARKING

## 1.6.1 Lumber

Mark each piece of framing and board lumber or each bundle of small pieces of lumber with the grade mark of a recognized association or independent inspection agency. Such association or agency must be certified by the Board of Review, American Lumber Standards Committee, to grade the species used.

#### 1.6.2 Plywood

Mark each sheet with the mark of a recognized association or independent inspection agency that maintains continuing control over the quality of the plywood. The mark must identify the plywood by species group or span rating, exposure durability classification, grade, and compliance with APA L870.

## 1.6.3 Preservative-Treated Lumber and Plywood

The Contractor is responsible for the quality of treated wood products. Each treated piece must be inspected in accordance with AWPA M2 and permanently marked or branded, by the producer, in accordance with AWPA M6. The Contractor must provide Contracting Officer's Representative (COR) with the inspection report of an approved independent inspection agency that offered products comply with applicable AWPA Standards. The appropriate Quality Mark on each piece will be accepted, in lieu of inspection reports, as evidence of compliance with applicable AWPA treatment standards.

# 1.6.4 Fire-Retardant Treated Lumber

Mark each piece in accordance with AWPA M6. In addition, exterior fire-retardant lumber must be distinguished by a permanent penetrating

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blue stain. Labels of a nationally recognized independent testing agency will be accepted as evidence of conformance to the fire-retardant requirements of AWPA M6.

#### 1.6.5 Hardboard, Gypsum Board, and Fiberboard

Mark each sheet or bundle to identify the standard under which the material is produced and the producer.

# 1.7 SIZES AND SURFACING

ALSC PS 20 for dressed sizes of yard and structural lumber. Lumber must be surfaced four sides. Size references, unless otherwise specified, are nominal sizes, and actual sizes must be within manufacturing tolerances allowed by the standard under which the product is produced. Other measurements are IP or SI standard.

## 1.8 MOISTURE CONTENT

Air-dry or kiln-dry lumber. Kiln-dry treated lumber after treatment. Maximum moisture content of wood products must be as follows at the time of delivery to the job site:

- a. Framing lumber and board, 19 percent maximum
- b. Materials other than lumber; moisture content must be in accordance with standard under which the product is produced

# 1.9 PRESERVATIVE TREATMENT

- a. 0.25 pcf intended for above ground use.
- b. All wood must be air or kiln dried after treatment. Specific treatments must be verified by the report of an approved independent inspection agency, or the AWPA Quality Mark on each piece. Brush coat areas that are cut or drilled after treatment with either the same preservative used in the treatment or with a two-percent coppernaphthenate solution. The following items must be preservative treated:
  - (1) Wood members that are in contact with weather, masonry, or concrete..
  - (2) Nailers, edge strips, crickets, and curbs for roofing.

## 1.10 FIRE-RETARDANT TREATMENT

Fire-retardant treated wood must be pressure-treated. Treatment and performance inspection must be by an independent and qualified testing agency that establishes performance ratings. Each piece or bundle of treated material must bear identification of the testing agency to indicate performance in accordance with such rating. Such items which will not be inside a building, and such items which will be exposed to heat or high humidity, must receive exterior fire-retardant treatment. Fire-retardant-treated wood products must be free of halogens, sulfates, ammonium phosphate, and formaldehyde. Items to be treated include the following:

a. Wood members in contact with weather, masonry, or concrete.

- b. Wood blocking.
- 1.11 CERTIFICATIONS
- 1.11.1 Certified Sustainably Harvested Wood

Provide wood certified as sustainably harvested by FSC STD 01 001. Provide a letter of Certification of Sustainably Harvested Wood signed by the wood supplier. Identify certifying organization and their third-party program name and indicate compliance with chain-of-custody program requirements. Submit sustainable wood certification data; identify each certified product on a line item basis. Submit copies of invoices bearing certification numbers.

1.11.2 Indoor Air Quality Certifications

Submit required indoor air quality certifications in one submittal package.

1.11.2.1 Composite Wood Products

For purposes of this specification, composite wood products include hardwood plywood, particleboard, medium density fiberboard (MDF), panel substrates, and door cores. Provide products certified to meet requirements of both 40 CFR 770 and CARB 93120. Provide current product certification documentation from certification body.1.7.1.3.2

1.11.2.2 Adhesives and Sealants

Provide products certified to meet indoor air quality requirements by UL 2818 (Greenguard) Gold or SCS Global Services Indoor Advantage Gold, or provide certification or validation by other third-party programs that products meet the requirements of this Section. Provide current product certification documentation from certification body. When product does not have certification, provide validation that product meets the indoor air quality product requirements cited herein.

PART 2 PRODUCTS

## 2.1 MATERIALS

## 2.1.1 Virgin Lumber

Lumber fabricated from old-growth timber is not permitted. Avoid companies who buy, sell, or use old-growth timber in their operations, when possible.

- 2.2 LUMBER
- 2.2.1 Framing Lumber

Framing lumber such as nailers must be one of the species listed in the table below. Minimum grade of species must be as listed. Provide certified sustainably harvested framing lumber.

Table of Grades for Framing and Board Lumber									
Grading Rules	<u>Species</u>	Framing	Board Lumber						
WWPA G-5 standard grading rules	Aspen, Douglas Fir-Larch, Douglas Fir South, Engelmann Spruce-Lodgepole Pine, Engelmann Spruce, Hem-Fir, Idaho White Pine, Lodgepole Pine, Mountain Hemlock, Mountain Hemlock-Hem-Fir, Ponderosa Pine-Sugar Pine, Ponderosa Pine-Lodgepole Pine, Subalpine Fir, White Woods, Western Woods, Western Cedars, Western Hemlock	All Species: Standard Light Framing or No. 3 Structural Light Framing (Stud Grade for 2x4 nominal size, 10 feet and shorter)	All Species: No. 3 Common						
WCLIB 17 standard grading rules	Douglas Fir-Larch, Hem-Fir, Mountain Hemlock, Sitka Spruce, Western Cedars, Western Hemlock	All Species: Standard Light Framing or No. 3 Structural Light Framing (Stud Grade for 2x4 nominal size, 10 feet and shorter)	All Species: Standard						

Table of Grades for Framing and Board Lumber									
Grading Rules	Species	Framing	Board Lumber						
SPIB 1003 standard grading rules	Southern Pine	All Species: Standard Light Framing or No. 3 Structural Light Framing (Stud Grade for 2x4 nominal size, 10 feet and shorter)	No. 2 Boards						
NELMA Grading Rules standard grading rules	Balsam Fir, Eastern Hemlock-Tamarack, Eastern Spruce, Eastern White Pine, Northern Pine, Northern Pine-Cedar	All Species: Standard Light Framing or No. 3 Structural Light Framing (Stud Grade for 2x4 nominal size, 10 feet and shorter)	All Species: No. 3 Common except Standard for Eastern White and Northern Pine						

## 2.3 PLYWOOD

# 2.3.1 Non-Structural Uses

# 2.3.1.1 Plywood

Plywood for roof blocking. C-D Grade, Exposure 1. Provide certified sustainably harvested plywood for other uses. When located on the interior of buildings, provide products with no added urea-formaldehyde resins. For products located on the interior of the building (inside of the weatherproofing system), provide certification of indoor air quality for plywood.

# 2.4 OTHER MATERIALS

# 2.4.1 Miscellaneous Wood Members

## 2.4.1.1 Blocking

Blocking must be Standard or Number 2 Grade.

# 2.4.2 Adhesives

Comply with applicable regulations regarding toxic and hazardous materials and as specified. Provide non-aerosol adhesive products used on the interior of the building (defined as inside of the weatherproofing system) meeting both emissions requirements of CDPH SECTION 01350 (limit requirements for either office or classroom spaces regardless of space type) and VOC content requirements of SCAQMD Rule 1168. Provide aerosol adhesives used on the interior of the building meeting both emissions requirements of CDPH SECTION 01350 (limit requirements for either office or classroom spaces regardless of space type) and VOC content requirements of GS-36. Provide certification or validation of indoor air quality for non-aerosol adhesives applied on the interior of the building (inside of the weatherproofing system). Provide certification or validation of indoor air quality for aerosol adhesives used on the interior of the building (inside of the weatherproofing system).

### 2.5 ROUGH HARDWARE

Unless otherwise indicated or specified, rough hardware must be of the type and size necessary for the project requirements. Sizes, types, and spacing of fastenings of manufactured building materials must be as recommended by the product manufacturer unless otherwise indicated or specified. Rough hardware exposed to the weather or embedded in or in contact with preservative-treated wood or concrete walls or slabs must be hot-dip zinc-coated in accordance with ASTM A153/A153M. Nails and fastenings for fire-retardant treated lumber and woodwork exposed to the weather must be copper alloy or hot-dipped galvanized fasteners as recommended by the treated wood manufacturer.

2.5.1 Bolts, Nuts, Studs, and Rivets

ASME B18.2.1, ASME B18.5.2.1M, ASME B18.5.2.2M and ASME B18.2.2.

2.5.2 Anchor Bolts

ASTM A307, size as indicated, complete with nuts and washers.

2.5.3 Expansion Shields

CID A-A-1923, CID A-A-1924, and CID A-A-1925. Except as shown otherwise, maximum size of devices must be 3/8 inch.

2.5.4 Lag Screws and Lag Bolts

ASME B18.2.1.

2.5.5 Wood Screws

ASME B18.6.1.

2.5.6 Nails

ASTM F547, size and type best suited for purpose. For sheathing and subflooring, length of nails must be sufficient to extend 1 inch into supports. In general, 8-penny or larger nails must be used for nailing through 1-inch-thick lumber and for toe nailing 2-inch-thick lumber; 16-penny or larger nails must be used for nailing through 2-inch-thick lumber. Nails used with treated lumber and sheathing must be hot-dipped

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galvanized in accordance with ASTM A153/A153M. Nailing must be in accordance with the recommended nailing schedule contained in AWC WFCM. Where detailed nailing requirements are not specified, nail size and spacing must be sufficient to develop an adequate strength for the connection. The connection's strength must be verified against the nail capacity tables in AWC NDS. Reasonable judgment backed by experience must ensure that the designed connection will not cause the wood to split. If a load situation exceeds a reasonable limit for nails, a specialized connector must be used.

#### 2.5.7 Timber Connectors

Unless otherwise specified, timber connectors must be in accordance with TPI 1, APA EWS T300 or AITC TCM.

#### 2.5.8 Clip Angles

Steel, 3/16-inch thick, size best suited for intended use; or zinc-coated steel or iron commercial clips designed for connecting wood members.

## PART 3 EXECUTION

#### 3.1 INSTALLATION

Do not install building construction materials that show visual evidence of biological growth.

Conform to AWC WFCM unless otherwise indicated or specified. Select lumber sizes to minimize waste. Fit rough carpentry, set accurately to the required lines and levels, and secure in place in a rigid manner. Provide as necessary for the proper completion of the work all framing members not indicated or specified. Spiking and nailing not indicated or specified otherwise must be in accordance with the Nailing Schedule contained in ICC IBC; perform bolting in an approved manner. Spikes, nails, and bolts must be drawn up tight. Timber connections and fastenings must conform to AWC NDS.

#### 3.2 MISCELLANEOUS

3.2.1 Wood Roof Nailers, Edge Strips, Crickets, and Curbs

Provide sizes and configurations indicated or specified and anchored securely to continuous construction.

3.2.1.1 Roof Edge Strips and Nailers

Provide at perimeter of roof, around openings through roof, and where roofs abut walls, curbs, and other vertical surfaces. Except where indicated otherwise, nailers must be 6 inches wide and the same thickness as the insulation. Anchor nailers securely to underlying construction. Anchor perimeter nailers in accordance with FM 4435.

# 3.2.1.2 Crickets and Curbs

Provide wood saddles or crickets, curbs for scuttles and ventilators, wood nailers bolted to tops of curbs, and at expansion joints, as indicated, specified, or necessary and of lumber or 3/4-inch-thick exterior plywood.

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# 3.2.2 Wood Blocking

Provide proper sizes and shapes at proper locations for the installation and attachment of wood and other finish materials, fixtures, equipment, and items indicated or specified.

# 3.2.3 Temporary Closures

Provide with hinged doors and padlocks and install during construction at exterior doorways and other ground level openings that are not otherwise closed. Cover windows and other unprotected openings with polyethylene sheeting or other approved material, stretched on wood frames. Provide dustproof barrier partitions to isolate areas as directed.

## 3.3 INSTALLATION OF TIMBER CONNECTORS

Install timber connectors in conformance with requirements of AWC NDS.

## 3.4 WASTE MANAGEMENT OF WOOD PRODUCTS

In accordance with the Waste Management Plan and as specified. Separate and reuse scrap sheet materials larger than 2 square feet, framing members larger than 16 inches, and multiple offcuts of any size larger than 12 inches. Clearly separate damaged wood and other scrap lumber for acceptable alternative uses on Project site, including bracing, blocking, cripples, ties, and shims.

Separate treated, stained, painted, and contaminated wood and place in designated area for hazardous materials. Dispose of according to local regulations. Do not leave any wood, shavings, sawdust, or other wood waste buried in fill or on the ground. Prevent sawdust and wood shavings from entering the storm drainage system. Compost sawdust. Do not burn scrap lumber that has been pressure-preservative-treated or fire-retardanttreated, or lumber that is less than one-year old.

-- End of Section --

# SECTION 06 41 16.00 10

# PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS 08/10, CHG 1: 11/18

# PART 1 GENERAL

#### 1.1 REFERENCES

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

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A161.2	(1998) Decorative Laminate Countertops,								
	Performance	Standards	for	Fabricated	High				
	Pressure								

ASTM INTERNATIONAL (ASTM)

- ASTM D1037 (2012) Evaluating Properties of Wood-Base Fiber and Particle Panel Materials ASTM D6866 (2022) Standard Test Methods for
  - Determining the Biobased Content of Solid, Liquid, and Gaseous Samples Using Radiocarbon Analysis
- ASTM F547 (2017) Standard Terminology of Nails for Use with Wood and Wood-Base Materials

BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)

ANSI/BHMA A156.9 (2020) Cabinet Hardware

CALIFORNIA AIR RESOURCES BOARD (CARB)

CARB 93120	(2007)	Airborne	Toxic	Control	Measure
	(ATCM)	to Reduce	Forma	ldehyde	Emissions
	from C	omposite W	ood Pr	oducts	

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH (CDPH)

CDPH SECTION 01350	(2017; Version 1.2) Standard Method for
	the Testing and Evaluation of Volatile
	Organic Chemical Emissions from Indoor
	Sources using Environmental Chambers

COMPOSITE PANEL ASSOCIATION (CPA)

CPA .	A208.1	. (	( 2	20	1	6	)	Parti	C.	Le	bo	ar	ď
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CPA A208.2 (2016) Medium Density Fiberboard (MDF) for Interior Applications

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P2#: 506474 - Manned/Unmanned Tactical Vehicle Lab (MUMT) Detroit Arsenal, MI FOREST STEWARDSHIP COUNCIL (FSC) FSC STD 01 001 (2015) Principles and Criteria for Forest Stewardship GREEN SEAL (GS) GS-36 (2013) Adhesives for Commercial Use NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA) ANSI/NEMA LD 3 (2005) Standard for High-Pressure Decorative Laminates SCIENTIFIC CERTIFICATION SYSTEMS (SCS) SCS SCS Global Services (SCS) Indoor Advantage SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD) SCAQMD Rule 1168 (2017) Adhesive and Sealant Applications U.S. GREEN BUILDING COUNCIL (USGBC) LEED v4 BDC Ref Guide (2013; R 2020) USGBC LEED Reference Guide for Building Design and Construction, v4 (2023) LEED v4.1 Building Design and LEED v4.1 BDC Ref Guide Construction Reference Guide U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA) 40 CFR 770 Formaldehyde Standards for Composite Wood Products UNDERWRITERS LABORATORIES (UL) UL 2818 (2013) GREENGUARD Certification Program For Chemical Emissions For Building Materials, Finishes And Furnishings WINDOW AND DOOR MANUFACTURERS ASSOCIATION (WDMA) ANSI/WDMA I.S.1A (2013) Interior Architectural Wood Flush Doors WOODWORK INSTITUTE (WI) (2017; 2018 Errata Edition) North American NAAWS 3.1 Architectural Woodwork Standards 1.2 SYSTEM DESCRIPTION

W912QR25R0052 Specs Vol1-0000

Work in this section includes laminate clad custom casework cabinets as shown on the drawings and as described in this specification. This Section includes high-pressure laminate surfacing and cabinet hardware. Comply with EPA requirements in accordance with Section 01 33 29.00 06 SUSTAINABILITY REPORTING. All exposed and semi-exposed surfaces, whose finish is not otherwise noted on the drawings or finish schedule, shall be

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sanded smooth and shall receive a clear finish of polyurethane. Wood finish may be shop finished or field applied in accordance with Section 09 90 00 PAINTS AND COATINGS.

### 1.3 SUSTAINABILITY REPORTING

Work of this section is intended to contribute to the achievement of, or compliance with, the requirements of the Guiding Principles Validation and LEED Prerequisites and attempted Credits. Refer to Section 01 33 29.00 06 SUSTAINABILITY REPORTING for specific documentation requirements and list of Prerequisites, attempted Credits and LEED version.

Comply with product, material content, performance criteria, activity, documentation, and other technical requirements as described in the LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide as applicable.

Collect, organize, and submit product data, drawings, diagrams, photos and cost information necessary to demonstrate compliance with LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide requirements as applicable.

Data collection shall commence with the notice to proceed and will only be deemed complete upon acceptance of the Final Sustainability Notebook and LEED Online submission by the Contracting Officer, the LEED Project Administrator, and the Green Building Certification Institute.

## 1.4 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Shop Drawings

Installation

SD-03 Product Data

Wood Materials

Finish Schedule

Environmental Product Declarations; S

Embodied Carbon Optimization Report/Action Plan; S

Extended Producer Responsibility; S

Bio-Based Materials; S

Recycled Content Materials; S

Local/Regional Materials; S

Material Ingredient Reporting; S

SD-04 Samples

Plastic Laminates

Cabinet Hardware

SD-07 Certificates

Quality Assurance Laminate Clad Casework Certified Sustainably Harvested Lumber; S Certified Sustainably Harvested Plywood; S Indoor Air Quality For Plywood; S Indoor Air Quality For Particleboard; S Indoor Air Quality For Medium Density Fiberboard; S Indoor Air Quality For Medium Density Fiberboard; S Indoor Air Quality For Non-Aerosol Adhesives; S Indoor Air Quality For Aerosol Adhesives; S

#### 1.5 SUSTAINABLE DESIGN REQUIREMENTS

1.5.1 Environmental Product Declarations

At a minimum, use materials or products with an Environmental Product Declaration in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.5.2 Embodied Carbon Optimization Report/Action Plan

At a minimum, use materials or products with an Embodied Carbon Optimization Report/Action Plan in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.5.3 Sourcing of Raw Materials

Provide products that meet one or more of the following categories:

1.5.3.1 Extended Producer Responsibility

At a minimum, use materials or products from manufacturers that participate in an extended producer responsibility program in accordance with the LEED Implementation Plan. Provide manufacturer letter verifying extended producer responsibility program is in place and that product is eligible. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

# 1.5.3.2 Bio-Based Materials

At a minimum, use materials or products with bio-based content in accordance with the LEED Implementation Plan. Provide manufacturer signed letter confirming ASTM D6866 test method was conducted validating bio-based material weight within product, type of bio-based material used within product, and confirmation raw material was legally harvested. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan. If bio-based content minimum is specified in this section, the greater of the two percentages governs.

#### 1.5.3.3 Recycled Content Materials

At a minimum, use materials or products with recycled content in accordance with the LEED Implementation Plan. Provide manufacturers product literature identifying the percentage of recycled material incorporated within each product used. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan. If recycled content minimum is specified in this section, the greater of the two percentages governs.

## 1.5.4 Material Ingredient Reporting

At a minimum, use materials or products with chemical inventory to at least 0.1% (1000 ppm) in accordance with the LEED Implementation Plan. Provide Health Product Declaration (HPD), Cradle to Cradle Certificate, Declare label, or other manufacturer's published content inventory in compliance with LEED v4.1 Material Ingredient Reporting credit. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

#### 1.5.5 Local/Regional Materials

Use materials or products extracted, harvested, or recovered, as well as manufactured, within a 100 mile radius from the project site, if available from a minimum of three sources. provide a letter from the manufacturer stating the extraction location, manufacturing location, and purchasing location of the products provided, referencing the project name and location specifically and distance to the project site. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

## CERTIFICATIONS

# 1.6 Certified Sustainably Harvested Wood

Provide wood certified as sustainably harvested by FSC STD 01 001. Provide a letter of Certification of Sustainably Harvested Wood signed by the wood supplier. Identify certifying organization and their third-party program name and indicate compliance with chain-of-custody program requirements. Submit sustainable wood certification data; identify each certified product on a line item basis. Submit copies of invoices bearing certification numbers.

# Indoor Air Quality Certifications

Submit required indoor air quality certifications in one submittal package.

## 1.7 Composite Wood Products

For purposes of this specification, composite wood products include hardwood plywood, particleboard, medium density fiberboard (MDF), panel substrates, and door cores. Provide products certified to meet requirements of both 40 CFR 770 and CARB 93120. Provide current product certification documentation from certification body.1.7.1.3.2

# 1.8 Adhesives and Sealants

Provide products certified to meet indoor air quality requirements by UL 2818 (Greenguard) Gold or SCS Global Services Indoor Advantage Gold, or provide certification or validation by other third-party programs that products meet the requirements of this Section. Provide current product certification documentation from certification body. When product does not have certification, provide validation that product meets the indoor air quality product requirements cited herein.

# 1.9 QUALITY ASSURANCE

# 1.9.1 General Requirements

Unless otherwise noted on the drawings, all materials, construction methods, and fabrication shall conform to and comply with the premium grade quality standards as outlined in NAAWS 3.1, Section for laminate clad cabinets. These standards shall apply in lieu of omissions or specific requirements in this specification. Contractors and their personnel engaged in the work shall be able to demonstrate successful experience with work of comparable extent, complexity and quality to that shown and specified. Submit a quality control statement which illustrates compliance with and understanding of NAAWS 3.1 requirements, in general, and the specific NAAWS 3.1 requirements provided in this specification. The quality control statement shall also certify a minimum of ten years Contractor's experience in laminate clad casework fabrication and construction. The quality control statement shall provide a list of a minimum of five successfully completed projects of a similar scope, size, and complexity.

# 1.9.2 Mock-ups

Prior to final approval of shop drawings, provide a full-size mock-up of a typical vanity floor cabinet & wall cabinet, including all components and hardware necessary to illustrate a completed unit with a minimum of one door and one drawer assembly. The completed mock-up shall include countertops and back splashes where specified. The mock-up shall utilize specified finishes in the patterns and colors as indicated . Upon disapproval, rework or remake the mock-up until approval is secured. Remove rejected units from the jobsite. Approved mock-up may remain as part of the finished work. Submit shop drawings showing all fabricated casework items in plan view, elevations and cross-sections to accurately indicate materials used, details of construction, dimensions, methods of fastening and erection, and installation methods proposed. Shop drawing casework items shall be clearly cross-referenced to casework items located on the project drawings. Shop drawings shall include a color schedule of all casework items to include all countertop, exposed, and semi-exposed cabinet finishes to include finish material manufacturer, pattern, and color.

# 1.10 DELIVERY, STORAGE, AND HANDLING

Casework may be delivered knockdown or fully assembled. Deliver all units to the site in undamaged condition, stored off the ground in fully enclosed areas, and protected from damage. The storage area shall be well ventilated and not subject to extreme changes in temperature or humidity.

#### 1.11 SEQUENCING AND SCHEDULING

Coordinate work with other trades. Units shall not be installed in any room or space until painting, and ceiling installation are complete within the room where the units are located. Floor cabinets shall be installed before finished flooring materials are installed.

#### PART 2 PRODUCTS

2.1 WOOD MATERIALS

# 2.1.1 Lumber

Provide certified sustainably harvested lumber.

- a. All framing lumber shall be kiln-dried Grade III to dimensions as shown on the drawings. Frame front, where indicated on the drawings, shall be nominal 3/4 inch hardwood.
- b. Standing or running trim casework components, which are specified to receive a transparent finish, shall be oak hardwood species, plain sawn. AWI grade shall be premium . Location, shape, and dimensions shall be as indicated on the drawings.

## 2.1.2 Panel Products

# 2.1.2.1 Plywood

All plywood panels used for framing purposes shall be veneer core hardwood plywood, NAAWS 3.1 Grade AA. Provide certified sustainably harvested plywood. Nominal thickness of plywood panels shall be as indicated in this specification and on the drawings. When located on the interior of buildings, provide products with no added urea-formaldehyde resins. For products located on the interior of the building (inside of the weatherproofing system), provide certification of indoor air quality for plywood.

# 2.1.2.2 Particleboard

All particleboard shall be industrial grade, medium density ( 40 to 50 pounds per cubic foot), 3/4 inch thick. A moisture-resistant particleboard in grade Type 2-M-2 or 2-M-3 shall be used as the substrate for plastic laminate covered components as located on the drawings and other areas subjected to moisture. Particleboard shall meet the minimum standards listed in ASTM D1037 and CPA A208.1. When located on the interior of buildings, provide products with no added urea-formaldehyde resins. For products located on the interior of the building (inside of the weatherproofing system), provide certification of indoor air quality for particleboard.

2.1.2.3 Medium Density Fiberboard

Medium density fiberboard (MDF) shall be an acceptable panel substrate where noted on the drawings. Medium density fiberboard shall meet the minimum standards listed in CPA A208.2. When located on the interior of buildings, provide products with no added urea-formaldehyde resins. For products located on the interior of the building (inside of the weatherproofing system), provide certification of indoor air quality for medium density fiberboard.

2.2 SOLID POLYMER MATERIAL

Solid surfacing casework components shall conform to the requirements of Section 06 61 16 SOLID SURFACING FABRICATIONS.

2.3 HIGH PRESSURE DECORATIVE LAMINATE (HPDL)

All plastic laminates shall meet the requirements of ANSI/NEMA LD 3 and ANSI A161.2 for high-pressure decorative laminates. Design, colors, surface finish and texture, and locations shall be as indicated on the drawings. Submit two samples of each plastic laminate pattern and color. Samples shall be a minimum of 5 by 7 inches in size. Plastic laminate types and nominal minimum thicknesses for casework components shall be as indicated in the following paragraphs.

2.3.1 Horizontal General Purpose Standard (HGS) Grade

Horizontal general purpose standard grade plastic laminate shall be 0.048 inches (plus or minus 0.005 inches) in thickness. This laminate grade is intended for horizontal surfaces where postforming is not required.

2.3.2 Vertical General Purpose Standard (VGS) Grade

Vertical general purpose standard grade plastic laminate shall be 0.028 inches (plus or minus 0.004 inches) in thickness. This laminate grade is intended for exposed exterior vertical surfaces of casework components where postforming is not required.

2.3.3 Cabinet Liner Standard (CLS) Grade

Cabinet liner standard grade plastic laminate shall be 0.020 inches in thickness. This laminate grade is intended for light duty semi-exposed interior surfaces of casework components.

2.3.4 Backing Sheet (BK) Grade

Undecorated backing sheet grade laminate is formulated specifically to be used on the backside of plastic laminated panel substrates to enhance dimensional stability of the substrate. Backing sheet thickness shall be 0.020 inches. Backing sheets shall be provided for all laminated casework components where plastic laminate finish is applied to only one surface of the component substrate.

2.4 THERMOSET DECORATIVE OVERLAYS (MELAMINE)

Thermoset decorative overlays (melamine panels) shall be used for all semi-exposed surfaces.

# 2.5 EDGE BANDING

Edge banding for casework doors and drawer fronts shall be PVC vinyl and shall be 0.020 inch thick. Material width shall be 15/16 inches . Color and pattern shall match exposed door and drawer front laminate pattern and color.

## 2.6 VINYL COUNTERTOP EDGE

Where located on the drawings, vinyl edging for countertops shall be a tee-mould anchor type with a flat edge profile. Finished width shall be as indicated on the drawings. Color shall be as indicated on the drawings.

# 2.7 CABINET HARDWARE

Submit one sample of each cabinet hardware item specified to include hinges, pulls, drawer glides. All hardware shall conform to ANSI/BHMA A156.9, unless otherwise noted, and shall consist of the following components:

#### 2.7.1 Door Hinges

Blum 71B3550, 110 degree soft close or equivalent.

#### 2.7.2 Cabinet Pulls

Dynasty P-1001-SN, Satin Nickel, 5-3/4 inch or equivalent.

## 2.7.3 Drawer Slide

Concealed undermount type, Blum "TANDEM" #563.4570B, 18 inch with full extension and a minimum 100 pound load capacity. Slides shall include an integral stop to avoid accidental drawer removal.

## 2.7.4 Adjustable Shelf Support System

Recessed (mortised) metal standards, BHMA No. BO4071, finish: Zinc. Support clips for the standards shall be closed type, BHMA No. B04081, finish: Zinc.

# 2.8 FASTENERS

Nails, screws, and other suitable fasteners shall be the size and type best suited for the purpose and shall conform to ASTM F547 where applicable.

#### 2.9 ADHESIVES, CAULKS, AND SEALANTS

#### 2.9.1 Adhesives

Adhesives shall be of a formula and type recommended by AWI. Adhesives shall be selected for their ability to provide a durable, permanent bond and shall take into consideration such factors as materials to be bonded, expansion and contraction, bond strength, fire rating, and moisture resistance. Comply with applicable regulations regarding toxic and hazardous materials and as specified. Provide non-aerosol adhesive products used on the interior of the building (defined as inside of the weatherproofing system) meeting both emissions requirements of CDPH SECTION 01350 (limit requirements for either office or classroom spaces regardless of space type) and VOC content requirements of

SCAQMD Rule 1168. Provide aerosol adhesives used on the interior of the building meeting both emissions requirements of CDPH SECTION 01350 (limit requirements for either office or classroom spaces regardless of space type) and VOC content requirements of GS-36. Provide certification or validation of indoor air quality for non-aerosol adhesives applied on the interior of the building (inside of the weatherproofing system). Provide certification or validation or validation of indoor air quality for aerosol adhesives used on the interior of the building (inside of the weatherproofing system).

## 2.9.1.1 Wood Joinery

Adhesives used to bond wood members shall be a Type II for interior use urea-formaldehyde resin formula. Adhesives shall withstand a bond test as described in ANSI/WDMA I.S.1A.

# 2.9.1.2 Laminate Adhesive

Adhesive used to join high-pressure decorative laminate to wood shall be a water-based contact adhesive. PVC edgebanding shall be adhered using a polymer-based hot melt glue.

2.9.2 Caulk

Caulk used to fill voids and joints between laminated components and between laminated components and adjacent surfaces shall be clear, 100 percent silicone.

# 2.9.3 Sealant

Sealant shall be of a type and composition recommended by the substrate manufacturer to provide a moisture barrier at sink cutouts and all other locations where unfinished substrate edges may be subjected to moisture.

#### 2.10 ACCESSORIES

## 2.10.1 Grommets

Grommets shall be plastic material for cutouts with a diameter of as noted on drawings inches. Locations shall be as indicated on the drawings.

## 2.11 FABRICATION

Verify field measurements as indicated in the shop drawings before fabrication. Fabrication and assembly of components shall be accomplished at the shop site to the maximum extent possible. Construction and fabrication of cabinets and their components shall meet or exceed the requirements for AWI premium grade unless otherwise indicated in this specification. Cabinet style, in accordance with NAAWS 3.1, Section 400-G descriptions, shall be flush overlay.

## 2.11.1 Base and Wall Cabinet Case Body

## 2.11.1.1 Cabinet Components

Frame members shall be glued-together, kiln-dried hardwood lumber. Top corners, bottom corners, and cabinet bottoms shall be braced with either hardwood blocks or water-resistant glue and nailed in place metal or plastic corner braces. Cabinet components shall be constructed from the

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following materials and thicknesses:

2.11.1.1.1 Body Members (Ends, Divisions, Bottoms, and Tops)

3/4 inch particleboard or medium density fiberboard (MDF) panel product

2.11.1.1.2 Face Frames and Rails

3/4 inch hardwood lumber

- 2.11.1.1.3 Shelving
  - 3/4 inch veneer core plywood panel product
- 2.11.1.1.4 Cabinet Backs
  - 1/4 inch veneer core plywood panel product
- 2.11.1.1.5 Drawer Sides, Backs, and Subfronts

1/2 inch panel product

2.11.1.1.6 Drawer Bottoms

1/4 inch veneer core plywood panel product

2.11.1.1.7 Door and Drawer Fronts

3/4-inch medium density fiberboard (MDF) panel product

2.11.1.2 Joinery Method for Case Body Members

2.11.1.2.1 Tops, Exposed Ends, and Bottoms

- a. Steel "European" assembly screws ( 1-1/2 inch from end, 5 inch on center, fasteners will not be visible on exposed parts).
- b. Doweled, glued under pressure (approx. 4 dowels per 12 inches of joint).
- c. Stop dado, glued under pressure, and either nailed, stapled or screwed (fasteners will not be visible on exposed parts).
- d. Spline or biscuit, glued under pressure.

2.11.1.2.2 Exposed End Corner and Face Frame Attachment

2.11.1.2.2.1 Mitered Joint

lock miter or spline or biscuit, glued under pressure (no visible fasteners)

2.11.1.2.2.2 Non-Mitered Joint (90 degree)

butt joint glued under pressure (no visible fasteners)

2.11.1.2.2.3 Butt Joint

glued and nailed

#### 2.11.1.2.3 Cabinet Backs (Wall Hung Cabinets)

Wall hung cabinet backs must not be relied upon to support the full weight of the cabinet and its anticipated load for hanging/mounting purposes. Method of back joinery and hanging/mounting mechanisms should transfer the load to case body members. Fabrication method shall be:

#### 2.11.1.2.3.1 Full Bound

Full bound, captured in grooves on cabinet sides, top, and bottom. Cabinet backs for floor standing cabinets shall be side bound, captured in grooves; glued and fastened to top and bottom.

#### 2.11.1.2.3.2 Full Overlay

Full overlay, plant-on backs with minimum back thickness of 1/2 inchand minimum No. 12 plated (no case hardened) screws spaced a minimum 3 inches on center. Edge of back shall not be exposed on finished sides. Anchor strips are not required when so attached.

#### 2.11.1.2.3.3 Side Bound

Side bound, captured in groove or rabbetts; glued and fastened.

- 2.11.1.2.4 Cabinet Backs (Floor Standing Cabinets)
- 2.11.1.2.4.1 Side Bound

Side bound, captured in grooves; glued and fastened to top and bottom.

2.11.1.2.4.2 Full Overlay

Full overlay, plant-on backs with minimum back thickness of 1/2 inch and minimum No. 12 plated (no case hardened) screws spaced a minimum 3 inches on center. Edge of back shall not be exposed on finished sides. Anchor strips are not required when so attached.

2.11.1.2.4.3 Side Bound with Rabbetts

Side bound, placed in rabbetts; glued and fastened in rabbetts.

2.11.1.2.5 Wall Anchor Strips

Wall Anchor Strips shall be required for all cabinets with backs less than 1/2 inch thick. Strips shall consist of minimum 1/2 inch thick lumber, minimum 2-1/2 inches width; securely attached to wall side of cabinet back - top and bottom for wall hung cabinets, top only for floor standing cabinets.

2.11.2 Cabinet Floor Base

Floor cabinets shall be mounted on a base constructed of 3/4 inch particleboard . Base assembly components shall be treated lumber . Finished height for each cabinet base shall be as indicated on the drawings. Bottom edge of the cabinet door or drawer face shall be flush with top of base.
2.11.3 Cabinet Door and Drawer Fronts

Door and drawer fronts shall be fabricated from 3/4 inch medium density fiberboard (MDF. All door and drawer front edges shall be surfaced with high pressure plastic laminate , color and pattern to match exterior face laminate as indicated on the drawings.

2.11.4 Drawer Assembly

2.11.4.1 Drawer Components

Drawer components shall consist of a removable drawer front, sides, backs, and bottom. Drawer components shall be constructed of the following materials and thicknesses:

2.11.4.1.1 Drawer Sides and Backs For Laminate Finish

1/2 inch thick 7-ply hardwood veneer core substrate

2.11.4.1.2 Drawer Sides and Back For Thermoset Decorative Overlay (Melamine) Finish

1/2 inch thick medium density particleboard or MDF fiberboard substrate

2.11.4.1.3 Drawer Bottom

1/4 inch thick thermoset decorative overlay melamine panel product

2.11.4.2 Drawer Assembly Joinery Method

a. Multiple dovetail (all corners) or French dovetail front/dadoed back, glued under pressure.

b. Doweled, glued under pressure.

- c. Lock shoulder, glued and pin nailed.
- d. Bottoms shall be set into sides, front, and back, 1/4 inch deep groove with a minimum 3/8 inch standing shoulder.

2.11.5 Shelving

2.11.5.1 General Requirements

Shelving shall be fabricated from 3/4 inch veneer core plywood. All shelving top and bottom surfaces shall be finished with thermoset decorative overlay (melamine). Shelf edges shall be finished in a thermoset decorative overlay (melamine) .

2.11.5.2 Shelf Support System

The shelf support system shall be:

2.11.5.2.1 Recessed (Mortised) Metal Shelf Standards

Mortise standards flush with the finishes surface of the cabinet interior side walls, two per side. Pposition and space standards on the side walls to provide a stable shelf surface that eliminates tipping when shelf front is weighted. Install and adjust standards vertically to provide a level,

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stable shelf surface when clips are in place.

## 2.11.6 Laminate Application

Laminate application to substrates shall follow the recommended procedures and instructions of the laminate manufacturer and ANSI/NEMA LD 3, using tools and devices specifically designed for laminate fabrication and application. Provide a balanced backer sheet (Grade BK) wherever only one surface of the component substrate requires a plastic laminate finish. Apply required grade of laminate in full uninterrupted sheets consistent with manufactured sizes using one piece for full length only, using adhesives specified herein or as recommended by the manufacturer. Fit corners and joints hairline. All laminate edges shall be machined flush, filed, sanded, or buffed to remove machine marks and eased (sharp corners removed). Clean up at easing shall be such that no overlap of the member eased is visible. Fabrication shall conform to ANSI A161.2. Laminate types and grades for component surfaces shall be as follows unless otherwise indicated on the drawings:

2.11.6.1 Base/Wall Cabinet Case Body

- a. Exterior (exposed) surfaces to include exposed and semi-exposed face frame surfaces: HPDL Grade VGS .
- b. Interior (semi-exposed) surfaces to include interior back wall, bottom, and side walls: HPDL Grade CLS .
- 2.11.6.2 Adjustable Shelving
- 2.11.6.2.1 Top and Bottom Surfaces

Thermoset Decorative Overlay (melamine)

2.11.6.2.2 All Edges

Thermoset Decorative Overlay (melamine)

- 2.11.6.3 Fixed Shelving
- 2.11.6.3.1 Top and Bottom Surfaces

Thermoset Decorative Overlay (melamine)

2.11.6.3.2 Exposed Edges

HPDL Grade VGS

- 2.11.6.4 Door, Drawer Fronts, Access Panels
- 2.11.6.4.1 Exterior (Exposed) and Interior (Semi-Exposed) Faces

HPDL Grade VGS

2.11.6.4.2 Edges

HPDL Grade VGS

2.11.6.5 Drawer Assembly

All interior and exterior surfaces: HPDL Grade CLS .

#### 2.11.6.6 Countertops and Splashes

All exposed and semi-exposed surfaces: HPDL Grade HGS

## 2.11.6.7 Tolerances

Flushness, flatness, and joint tolerances of laminated surfaces shall meet the NAAWS 3.1 premium grade requirements.

## 2.11.7 Finishing

## 2.11.7.1 Filling

No fasteners shall be exposed on laminated surfaces. All nails, screws, and other fasteners in non-laminated cabinet components shall be countersunk and the holes filled with wood filler consistent in color with the wood species.

## 2.11.7.2 Sanding

All surfaces requiring coatings shall be prepared by sanding with a grit and in a manner that scratches will not show in the final system.

# 2.11.7.3 Coatings

Types, method of application and location of casework finishes shall be in accordance with the finish schedule, drawings and Section 09 90 00 PAINTS AND COATINGS. All cabinet reveals shall be painted. Submit descriptive data which provides narrative written verification of all types of construction materials and finishes, methods of construction, etc. not clearly illustrated on the submitted shop drawings. Data shall provide written verification of conformance with NAAWS 3.1 for the quality indicated to include materials, tolerances, and types of construction. Both the manufacturer of materials and the fabricator shall submit available literature which describes re-cycled product content, operations and processes in place that support efficient use of natural resources, energy efficiency, emissions of ozone depleting chemicals, management of water and operational waste, indoor environmental quality, and other production techniques supporting sustainable design and products.

#### PART 3 EXECUTION

#### 3.1 INSTALLATION

Installation shall comply with applicable requirements for NAAWS 3.1 premium quality standards. Countertops and fabricated assemblies shall be installed level, plumb, and true to line, in locations shown on the drawings. Cabinets and other laminate clad casework assemblies shall be attached and anchored securely to the floor and walls with mechanical fasteners that are appropriate for the wall and floor construction.

## 3.1.1 Anchoring Systems

# 3.1.1.1 Floor

Base cabinets shall utilize a floor anchoring system as detailed on the drawings. Anchoring and mechanical fasteners shall not be visible from the finished side of the casework assembly. Cabinet assemblies shall be attached to anchored bases without visible fasteners as indicated in the drawings. Where assembly abuts a wall surface, anchoring shall include a minimum 1/2 inch thick lumber or panel product hanging strip, minimum 2-1/2 inch width; securely attached to the top of the wall side of the cabinet back.

# 3.1.1.2 Wall

Cabinet vanity to be wall mounted shall utilize minimum 1/2 inch thick lumber or panel product hanging strips, minimum 2-1/2 inch width; securely attached to the wall side of the cabinet back, both top and bottom.

# 3.1.2 Hardware

Casework hardware shall be installed in types and locations as indicated on the drawings. Where fully concealed European-style hinges are specified to be used with particleboard or fiberboard doors, the use of plastic or synthetic insertion dowels shall be used to receive 3/16 inch "Euroscrews". The use of wood screws without insertion dowels is prohibited.

## 3.1.3 Doors, Drawers and Removable Panels

The fitting of doors, drawers and removable panels shall be accomplished within target fitting tolerances for gaps and flushness in accordance with NAAWS 3.1 premium grade requirements.

#### 3.1.4 Plumbing Fixtures

Install sinks, sink hardware, and other plumbing fixtures in locations as indicated on the drawings and in accordance with Section 22 00 00 PLUMBING, GENERAL PURPOSE .

-- End of Section --

# SECTION 06 61 16

# SOLID SURFACING FABRICATIONS 08/20

# PART 1 GENERAL

## 1.1 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 C9	20	(2018) Standard Specification for Elastomeric Joint Sealants
ASTM D5	70	(1998; E 2010; R 2010) Standard Test Method for Water Absorption of Plastics
ASTM D6	38	(2014) Standard Test Method for Tensile Properties of Plastics
ASTM D6	96	(2016) Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30 degrees C and 30 degrees C With a Vitreous Silica Dilatometer
ASTM D7	90	(2017) Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
ASTM D2	583	(2013a) Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor
ASTM E8	4	(2020) Standard Test Method for Surface Burning Characteristics of Building Materials
ASTM G2	1	(2015; R 2021; E 2021) Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi

# CALIFORNIA DEPARTMENT OF PUBLIC HEALTH (CDPH)

01350	(2017; Version 1.2) Standard Method for
	the Testing and Evaluation of Volatile
	Organic Chemical Emissions from Indoor
	Sources using Environmental Chambers
	01350

# INTERNATIONAL CAST POLYMER ASSOCIATION (ICPA)

ICPA SS-1 (2001) Performance Standard for Solid Surface Materials

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NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

ANSI/NEMA LD 3 (2005) Standard for High-Pressure Decorative Laminates

NSF INTERNATIONAL (NSF)

NSF/ANSI	51			(201	2) Food	Equipment	Materials	
	U.S.	GREEN	BUILDING	COUNCIL	(USGBC)			

LEED v4 BDC Ref Guide (2013; R 2020) USGBC LEED Reference Guide for Building Design and Construction, v4 LEED v4.1 BDC Ref Guide (2023) LEED v4.1 Building Design and Construction Reference Guide

# 1.2 SYSTEM DESCRIPTION

- a. Work under this section includes countertops and window sills and other items utilizing solid surfacing material fabrications as indicated on the drawings and as described in this specification. Do not change source of supply for materials after work has started, if the appearance of finished work would be affected.
- b. In most instances, installation of solid surfacing material fabricated components and assemblies requires strong correctly located structural support provided by other trades. To provide a stable, sound, secure installation, close coordination is required between the solid surfacing material fabricator/installer and other trades to ensure that necessary structural wall support, cabinet counter top structural support, proper clearances, and other supporting components are provided for the installation of wall panels, counter tops, shelving, and all other solid surfacing material fabrications to the degree and extent recommended by the solid surfacing material manufacturer.
- c. Provide appropriate staging areas for solid surfacing material fabrications. Allow variation in component size and location of openings of plus or minus 1/8 inch.

## 1.3 SUSTAINABILITY REPORTING

Work of this section is intended to contribute to the achievement of, or compliance with, the requirements of the Guiding Principles Validation and LEED Prerequisites and attempted Credits. Refer to Section 01 33 29.00 06 SUSTAINABILITY REPORTING for specific documentation requirements and list of Prerequisites, attempted Credits and LEED version.

Comply with product, material content, performance criteria, activity, documentation, and other technical requirements as described in the LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide as applicable.

Collect, organize, and submit product data, drawings, diagrams, photos and cost information necessary to demonstrate compliance with LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide requirements as applicable.

Data collection shall commence with the notice to proceed and will only be

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deemed complete upon acceptance of the Final Sustainability Notebook and LEED Online submission by the Contracting Officer, the LEED Project Administrator, and the Green Building Certification Institute.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Detail Fabrication Drawings; G

Installation; G

SD-03 Product Data

Solid Polymer; G

Indoor air quality for solid surface seam and sealant products; S

Environmental Product Declarations; S

Embodied Carbon Optimization Report/Action Plan; S

Extended Producer Responsibility; S

Recycled Content Materials; S

Local/Regional Materials; S

Material Ingredient Reporting; S

SD-04 Samples

Material; G

Counter Tops; G

SD-06 Test Reports

Test Report Results

SD-07 Certificates

Qualifications

Indoor Air Quality for solid surface fabrication products; S

SD-10 Operation and Maintenance Data

Solid Polymer, Data Package 1; G

# 1.5 QUALITY ASSURANCE

# 1.5.1 Qualifications

To ensure warranty coverage, provide manufacturer certified solid surfacing fabricators to fabricate the solid surfacing material being utilized. Mark all fabrications with the fabricator's certification label affixed in an inconspicuous location. Minimum of 5 years of experience working with solid surfacing materials is required of fabricators. Submit solid surfacing material manufacturer's certification attesting to fabricator qualification approval.

# 1.5.2 Mock-ups

Submit Detail Fabrication Drawings indicating locations, dimensions, component sizes, fabrication and joint details, attachment provisions, installation details, and coordination requirements with adjacent work. Prior to final approval of shop drawings, provide a full-size mock-up of a typical counter top , vanities, and window sills where multiple units are required. Include all solid surfacing material components required to provide a completed unit. Utilize finishes in patterns and colors as indicated; colors listed are not intended to limit the selection of equal colors from other manufacturers. in the mock-up. Should the mock-up not be approved, re-work or remake it until approval is secured. Remove rejected units from the jobsite. Approved mock-up may remain as part of the finished work.

#### 1.6 SUSTAINABLE DESIGN REQUIREMENTS

#### 1.6.1 Environmental Product Declarations

At a minimum, use materials or products with an Environmental Product Declaration in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.6.2 Embodied Carbon Optimization Report/Action Plan

At a minimum, use materials or products with an Embodied Carbon Optimization Report/Action Plan in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

# 1.6.3 Sourcing of Raw Materials

Provide products that meet one or more of the following categories:

## 1.6.3.1 Extended Producer Responsibility

At a minimum, use materials or products from manufacturers that participate in an extended producer responsibility program in accordance with the LEED Implementation Plan. Provide manufacturer letter verifying extended producer responsibility program is in place and that product is eligible. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

## 1.6.3.2 Recycled Content Materials

At a minimum, use materials or products with recycled content in

accordance with the LEED Implementation Plan. Provide manufacturers product literature identifying the percentage of recycled material incorporated within each product used. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan. If recycled content minimum is specified in this section, the greater of the two percentages governs.

## 1.6.4 Material Ingredient Reporting

At a minimum, use materials or products with chemical inventory to at least 0.1% (1000 ppm) in accordance with the LEED Implementation Plan. Provide Health Product Declaration (HPD), Cradle to Cradle Certificate, Declare label, or other manufacturer's published content inventory in compliance with LEED v4.1 Material Ingredient Reporting credit. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

## 1.6.5 Local/Regional Materials

Use materials or products extracted, harvested, or recovered, as well as manufactured, within a 100 mile radius from the project site, if available from a minimum of three sources. provide a letter from the manufacturer stating the extraction location, manufacturing location, and purchasing location of the products provided, referencing the project name and location specifically and distance to the project site. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

Do not deliver materials to project site until areas are ready for installation. Deliver components and materials to the site undamaged, in containers clearly marked and labeled with manufacturer's name. Store materials indoors and take adequate precautions to prevent damage to finished surfaces. Provide protective coverings to prevent physical damage or staining following installation, for duration of project.

## 1.8 WARRANTY

Provide manufacturer's warranty to repair or replace defective materials, excluding damages caused by physical or chemical abuse or excessive heat, and workmanship for a period of 10 years from date of final acceptance of the work.

# PART 2 PRODUCTS

## 2.1 MATERIAL

Submit detail fabrication drawings and installation drawings of each solid surfacing fabrication indicated. Include elevations, dimensions, clearances, details of construction and anchorage, and details of joints and connections.

Submit manufacturers' descriptive product data for each type of solid polymer fabrication indicated. Include manufacturers' literature, finishes, profiles and thicknesses of materials.

Submit manufacturers' operations and maintenance data for each type of solid polymer fabrication in accordance with Section 01 78 23 OPERATIONS

AND MAINTENANCE DATA.

# 2.1.1 Solid Surfacing Material

Provide solid polymer that is a homogeneous filled solid polymer; not coated, laminated or of a composite construction, complying with ICPA SS-1. Provide material that meets or exceeds the minimum physical and performance properties specified. Superficial damage to a depth of 0.01 inch must be repairable by sanding or polishing. Material thickness is as indicated on the drawings; required minimum thickness is 1/4 inch. Submit a minimum 4 inch by 4 inch sample of each color and pattern for approval; include full range of color and pattern variation. Retain approved samples as a standard for this work. Submit test report results from an independent testing laboratory attesting that the submitted solid surfacing materials meet or exceed each of the specified performance requirements.

- a. Horizontal Surfaces: 1/2 inch thick material
- b. Vertical Surfaces: 1/4 inch thick material
- c. Provide materials that meet the emissions requirements of CDPH SECTION 01350 (limit requirements for either office or classroom spaces regardless of space type). Provide certification or validation of indoor air quality for solid surface fabrication products.

2.1.2 Cast, 100 Percent Acrylic Polymer Solid Surfacing Material

Cast, 100 percent acrylic solid polymer material composed of acrylic polymer, mineral fillers, and pigments. Provide acrylic polymer that meets or exceeds the following minimum performance requirements:

PROPERTY	REQUIREMENT (min. or max.)	TEST PROCEDURE
Tensile Strength	4000 psi (max.)	ASTM D638
Hardness	55-Barcol Impressor (min.)	ASTM D2583
Thermal Expansion	.000023 in/in/F (max.)	ASTM D696
Boiling Water Surface Resistance	No Change	ANSI/NEMA LD 3-3.05
High Temperature Resistance	No Change	ANSI/NEMA LD 3-3.06
Impact Resistance (Ball	l drop)	ANSI/NEMA LD 3-303
1/4 inch sheet	36-inches, 1/2 lb ball, no failure	
1/2 inch sheet	140-inches, 1/2 lb ball, no failure	

PROPERTY	REQUIREMENT (min. or max.)	TEST PROCEDURE
3/4 inch sheet	200-inches, 1/2 lb ball, no failure	
Mold & Mildew Growth	No growth	ASTM G21
Bacteria Growth	No growth	ASTM G21
Liquid Absorption (Weight in 24 hrs.)	0.1 percent max.	ASTM D570
Flammability		ASTM E84
Flame Spread	25 max.	
Smoke Developed	30 max.	
Sanitation	"Food Contact" approval	NSF/ANSI 51
Flexural Strength	6,800 psi (min.)	ASTM D790

# 2.1.3 Acrylic-modified Polymer Solid Surfacing Material

Cast, solid polymer material composed of a formulation containing acrylic and polyester polymers, mineral fillers, and pigments. Provide acrylic polymer content not less than 5 percent and not more than 10 percent in order to meet the following minimum performance requirements:

PROPERTY REQUIREMENT (min. or max.)		TEST PROCEDURE
Tensile Strength	4100 psi (max.)	ASTM D638
Hardness	50-Barcol Impressor (min.)	ASTM D2583
Thermal Expansion	.000023 in/in/F (max.)	ASTM D696
Boiling Water Surface Resistance	No Change	ANSI/NEMA LD 3-3.05
High Temperature Resistance	No Change	ANSI/NEMA LD 3-3.06
Impact Resistance (Ball	l drop)	ANSI/NEMA LD 3-303
1/4 inch sheet	36 inches, 1/2 lb ball, no failure	
1/2 inch sheet	140 inches, 1/2 lb ball, no failure	

PROPERTY	REQUIREMENT (min. or max.)	TEST PROCEDURE
3/4 inch sheet	200 inches, 1/2 lb ball, no failure	
Mold & Mildew Growth	No growth	ASTM G21
Bacteria Growth	No growth	ASTM G21
Liquid Absorption (Weight in 24 hrs.)	0.6 percent max.	ASTM D570
Flammability		ASTM E84
Flame Spread	25 max.	
Smoke Developed	100 max.	
Sanitation	"Food Contact" approval	NSF/ANSI 51
Flexural Strength	6,800 psi (min.)	ASTM D790

# 2.1.4 Material Patterns and Colors

Provide pattern and color for all solid surfacing material components and fabrications as indicated; colors listed are not intended to limit the selection of equal colors from other manufacturers. Provide products with consistent patterned color throughout thickness of the product.

#### 2.1.5 Surface Finish

Provide a uniform appearance on exposed finished surfaces and edges. Exposed surface finish is matte; gloss rating of 5-20.

# 2.2 ACCESSORY PRODUCTS

Provide accessory products, as specified below, as manufactured by the solid surfacing material manufacturer or as approved by the solid surfacing material manufacturer for use with the solid surfacing materials being specified.

# 2.2.1 Adhesives

Provide a two-part seam adhesive kit to create permanent, inconspicuous, non-porous, hard seams and joints by chemical bond between solid surfacing materials and components to create a monolithic appearance of the fabrication. Provide adhesive approved by the solid surfacing material manufacturer. Color-match adhesive to the surfaces being bonded where solid-colored, solid surfacing materials are being bonded together. Provide clear or color matched seam adhesive where particulate patterned, solid surfacing materials are being bonded together.

# 2.2.2 Seam and Sealant Emissions

Provide seam and other accessory materials that meet the emissions requirements of CDPH SECTION 01350 (limit requirements for either office or classroom spaces regardless of space type). Provide validation of indoor air quality for solid surface seam and sealant products.

## 2.2.3 Silicone Sealant

Provide silicone sealant, mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, acid-curing; ASTM C920, Type S, Grade NS, Class 25, Use NT; clear formulation; approved for use by the solid surfacing material manufacturer.

# 2.2.4 Conductive Tape

Provide manufacturer's standard conductive foil tape, 4 mils thick, applied around the edges of cut outs containing hot or cold appliances.

## 2.2.5 Insulating Tape

Provide manufacturer's standard insulating tape for use with drop-in food wells used in commercial food service applications to insulate solid surfacing material from hot or cold appliances.

# 2.2.6 Heat Reflective Tape

Provide heat reflective tape as recommended by the solid surfacing material manufacturer for use with cutouts for heat sources.

# 2.2.7 Mounting Hardware

Provide mounting hardware, including sink/bowl clips, inserts and fasteners for attachment of undermount sinks and lavatories.

# 2.3 FABRICATIONS

Provide factory or shop fabricate components to sizes and shapes indicated, to the greatest extent practical, in accordance with approved Shop Drawings and manufacturer's requirements. Provide factory cutouts for sinks, lavatories, and plumbing fixtures where indicated on the drawings. Contours and radii must be routed to template, with edges smooth. Defective and inaccurate work will be rejected. Submit product data indicating product description, fabrication information, and compliance with specified performance requirements for solid surfacing material, joint adhesive, sealants, and heat reflective tape.

## 2.3.1 Joints and Seams

Form joints and seams between solid surfacing material components using manufacturer's approved seam adhesive. Provide inconspicuous joints in appearance without voids to create a monolithic appearance.

# 2.3.2 Edge Finishing

Rout and finish component edges to a smooth, uniform appearance and finish. Provide edge shapes and treatments, including any inserts, as detailed on the drawings. Rout all cutouts, then sand all edges smooth. Repair or reject defective or inaccurate work.

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## 2.3.3 Counter Top Splashes

Fabricate backsplashes and end splashes from 1/2 inch thick solid surfacing material to be in conformance with dimensions and shapes as indicated. Provide backsplashes and end splashes at locations indicated. Shop fabricate backsplashes and provide loose, to be field attached.

# 2.3.3.1 End Splashes

Provide end splashes loose for installation at the jobsite after horizontal surfaces to which they are to be attached have been installed.

# 2.3.4 Window Stools

Fabricate window stools from 1/2 inch thick solid surfacing material; dimensions, edge shape, and other details as indicated .

# 2.3.5 Counter Tops

Fabricate all solid surfacing material, counter top components from 1/2 inch thick material. Indicate details, dimensions, locations, and quantities on the drawings. Provide counter tops with 4 inch high loose as indicated. Attach 2 inch wide reinforcing strip of solid surfacing material under each horizontal counter top seam. Submit a minimum 1 foot wide by 6 inch deep, full size sample for each type of counter top shown on the project drawings; include the edge profile and backsplash as detailed on the drawings and at least one seam. Retain approved sample as standard for this work.

# 2.3.5.1 Counter Tops with Sinks

- a. Provide stainless steel sink in breakroom; include cutouts to template for counter tops with sinks as furnished by the sink manufacturer. Provide manufacturer's standard sink mounting hardware for stainless steel rimless installation. Seal between sink and counter top with specified silicone sealant. Provide sink, faucet, and plumbing requirements in accordance with Section 22 00 00 PLUMBING, GENERAL PURPOSE.
- b. Provide manufacturer's standard solid polymer sinks, pre-molded product specifically designed for attachment to solid surfacing material counter tops.

## PART 3 EXECUTION

#### 3.1 INSTALLATION

## 3.1.1 Components

Install all components and fabricated units plumb, level, and rigid. Make field joints between solid surfacing material components using solid surfacing material manufacturer's approved seam adhesives, to provide a monolithic appearance with joints inconspicuous in the finished work. Attach metal or vitreous china sinks and lavatory bowls to counter tops using solid surfacing material manufacturer's recommended clear silicone sealant and mounting hardware. Install solid polymer sinks and bowls using a color-matched seam adhesive.

# 3.1.1.1 Loose Counter Top Splashes

Mount loose splashes in the locations noted on the drawings. Adhere loose splashes to the counter top with a color matched silicone sealant when the solid surfacing material components are solid colors. Use a clear silicone sealant to provide adhesion of particulate patterned solid surfacing material splashes to counter tops.

# 3.1.2 Silicone Sealant

Use specified silicone sealant to seal all expansion joints between solid surfacing material components and all joints between solid surfacing material components and other adjacent surfaces such as walls, floors, ceiling, and plumbing fixtures. Provide sealant bead smooth and uniform in appearance and minimum size necessary to bridge any gaps between the solid surfacing material and the adjacent surface. Provide continuous bead and run the entire length of the joint being sealed.

# 3.1.3 Plumbing

Make plumbing connections to sinks and lavatories in accordance with Section 22 00 00 PLUMBING, GENERAL PURPOSE .

#### 3.2 CLEAN-UP

Components must be cleaned after installation and covered to protect against damage during completion of the remaining project items. Damaged components must be repaired or replaced at the Contractor's sole expense.

-- End of Section --

# SECTION 07 05 23

# PRESSURE TESTING AN AIR BARRIER SYSTEM FOR AIR TIGHTNESS 08/19

# PART 1 GENERAL

1.1 SUMMARY

Employ an independent agency to conduct the pressure test on the building envelope in accordance with this specification section and ASTM E779.

1.2 REFERENCES

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

AMERICAN SOCIETY FOR NONDESTRUCTIVE TESTING (ASNT)

ANSI/ASNT CP-105	(2020) ASNT Standard Topical Outlines for Qualification of Nondestructive Testing Personnel
ANSI/ASNT CP-189	(2020) ASNT Standard for Qualification and Certification of Nondestructive Testing Personnel
ASNT SNT-TC-1A	(2020) Recommended Practice for Personnel Qualification and Certification in Nondestructive Testing
AMERICAN SOCIETY OF HEA' ENGINEERS (ASHRAE)	FING, REFRIGERATING AND AIR-CONDITIONING
ASHRAE RP-935	(1998) Protocol for Field Testing of Tall Buildings to Determine Envelope Air Leakage Rate
ASTM INTERNATIONAL (AST	М)
ASTM E779	(2019) Standard Test Method for Determining Air Leakage Rate by Fan Pressurization
ASTM E1186	(2017) Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems
ASTM E1258	(1988; R 2018) Standard Test Method for Airflow Calibration of Fan Pressurization Devices
ASTM E1827	(2011; R 2017) Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door

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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO 6781	(1983) Thermal Insulation - Qualitative Detection of Thermal Irregularities in Building Envelopes - Infrared Method
ISO 6781-2	(2010) Performance of Buildings - Detection of Heat, Air, and Moisture Irregularities in Buildings by Infrared Methods - Part2: Equipment Requirements
ISO 6781-3	(2015) Performance of Buildings - Detection of Heat, Air, and Moisture Irregularities in Buildings by Infrared Methods - Part 3: Qualifications of Equipment Operators, Data Analysts, and Report Writers

## 1.3 DEFINITIONS

The following terms as they apply to this Section:

# 1.3.1 Air Barrier Envelope

The surface that separates the inside air from the outside air. The combination of air barrier assemblies and air barrier components, connected by air barrier accessories are designed to provide a continuous barrier to the movement of air through an environmental separator. A single building may have more than one air barrier envelope. The air barrier surface includes the top, bottom, and sides of the envelope. The term "air barrier envelope" is also known as "air barrier system" or simply "air barrier".

## 1.3.2 Air Leakage Rate

How leaky, or conversely how air-tight a building envelope is. The air leakage is normally described in terms of air flow rate for the surface area of the envelope at a defined differential pressure.

# 1.3.3 Bias Pressure

Also known as zero-flow pressure, baseline pressure, offset pressure or background pressure. With the envelope not artificially pressurized, bias is the differential pressure that always exists between the envelope that has been prepared (sealed) for the pressure test and the outdoors. Bias pressure is made up of two components, fixed static offset (usually due to stack effect or the HVAC system) and fluctuating pressure (usually due to wind or a moving elevator). Because of pressure fluctuations many bias pressure readings are recorded and averaged for use in the calculations.

# 1.3.4 Blower Door

Commonly used term for an apparatus used to pressurize and depressurize the space within the building envelope and quantify air leakage through the envelope. The blower door typically includes a door fan and an air resistant fabric or a series of hard panels that extends to cover and seal the door opening between the fan shroud and door frame. The door fan is a calibrated fan capable of measuring air flow and is usually placed in the opening of an exterior door. With the air barrier otherwise sealed, air

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produced by the door fan pressurizes or de-pressurizes the envelope, depending on the fan's orientation.

1.3.5 Environmental Separator

The parts of a building that separate the controlled interior environment from the uncontrolled exterior environment, or that separate spaces within a building that have dissimilar environments. The term "environmental separator" is also known as the "control layer."

1.3.6 Pressure Test

A generic term for a test in which the envelope is either pressurized or de-pressurized with respect to the outdoors.

1.3.6.1 Negative Pressure Test (Depressurization Test)

A test wherein air inside the envelope is drawn to the outdoors. This places the envelope at a lower (negative) pressure with respect to the outdoors.

1.3.6.2 Positive Pressure Test (Pressurization Test)

A test wherein outdoor air is pushed into the envelope. This air movement places the envelope at a higher (positive) pressure with respect to the outdoors.

1.4 WORK PLAN

Submit the following not later than 120 calendar days after contract award, but before start of pressure testing work, steps to be taken by the lead pressure test technician to accomplish the required testing.

- a. Memorandum of test procedure.
  - Proposed dates for conducting the pressure, thermographic, and fog tests.
  - (2) Submit detailed pressure test procedures prior to the test. Provide a plan view showing proposed locations (personnel doors or other similar openings) to install blower doors or flexible ducts (for trailer-mounted fans), if used.
- b. Test equipment to be used.
- c. Scaffolding, scissor lifts, power, electrical extension cords, duct tape, plastic sheeting, and other Contractor's support equipment required to perform all tests.
- d. Other Contractor's support personnel who will be on site for testing.
- 1.5 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

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P2#: 506474 - Manned/Unmanned Tactical Vehicle Lab (MUMT)
Detroit Arsenal, MI
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SD-01 Preconstruction Submittals

Work Plan; G

SD-03 Product Data

Thermal Imaging Camera; G

SD-05 Design Data

Envelope Surface Area Calculations; G

SD-07 Certificates

Pressure Test Agency

Thermographer Qualifications

Test Instruments

Date Of Last Calibration

SD-06 Test Reports

Pressure Test Procedures; G

Air Leakage Test Report; G, AE

Diagnostic Test Report; G, AE

## 1.6 QUALITY ASSURANCE

#### 1.6.1 Modification of References

Perform all pressure and diagnostic tests according to the referenced publications listed in paragraph REFERENCES and as modified by this section. Consider the advisory or recommended provisions, of the referred references, as mandatory.

## 1.6.2 Qualifications

#### 1.6.2.1 Pressure Test Agency

Submit, no later than 15 calendar days after contract award, information certifying that the pressure test agency is not affiliated with any other company participating in work on this contract. The work of the test agency is limited to pressure testing the building envelope, performing a thermography test and fog test, and investigating, through various methods, the location of air leaks through the air barrier. See paragraph PRESSURE TEST AGENCY for additional requirements. For thermographer qualifications, see paragraph entitled "THERMOGRAPHER QUALIFICATIONS."

Use the sample TEST AGENCY QUALIFICATIONS SHEET form (Appendix C), to submit the following information.

a. Verification of 2 years of experience as an agency in pressure testing commercial and/or industrial buildings.

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- b. List of at least ten commercial/industrial facilities with building envelopes that the agency has tested within the past two years. Include building name, address, and name of prime construction contractor and contractor's point-of-contact information.
- c. Confirmation of two years of commercial and or industrial building pressure test experience for the lead pressure-test technician and the thermographer in using the specified ASTM E779 testing standard. References from five Contracting Officers for facilities where the lead test technician has supervised commercial and or industrial building pressure tests in the last two years.
- d. Verification that the lead pressure-test technician has been employed by a building pressure testing agency in the capacity of a lead pressure-test technician for not less than one year.

## 1.6.2.2 Thermographer Qualifications

To perform an infrared diagnostic evaluation, use a lead thermographer who has at least an active Level II Certification that is based on the requirements in ANSI/ASNT CP-105 or ANSI/ASNT CP-189 and is in accordance with ASNT SNT-TC-1A. The course of study must be specifically focused on infrared thermography for building science. The thermographer must have at least two years of building science thermography experience in IR testing commercial or industrial buildings. The thermographer must also have experience in building envelopes and building science in order to make effective recommendations to the Contractor should the envelope require additional sealing. Thermographic equipment operators, data analysists, and report writers must comply with the requirements of ISO 6781-3. Submit the thermographer's certificate for approval. Submit a list of at least ten commercial/industrial buildings on which the thermographer has performed IR thermography in the past two years. The thermographer must have a current active certification. Submit certification at least 60 days prior to thermography testing.

## 1.6.3 Test Instruments and Date of Last Calibration

Submit a signed and dated list of test instruments, their application, manufacturer, model, serial number, range of operation, accuracy, and date of most recent calibration. Calibration data applicable to fan systems must be in accordance with ASTM E1258.

# 1.6.4 Test Reports

No later than 14 days after completion of the pressure test, submit electronic copies of an organized report. The report must contain a table of contents, an executive summary, an introduction, a results section, and a discussion of the results. Submit the air leakage test report as described in the paragraph entitled "AIR LEAKAGE TEST REPORT." Submit a diagnostic test report as described in the paragraph entitled "LOCATING LEAKS BY DIAGNOSTIC TESTING." The diagnostic test report must include the Thermographic Investigation Report and the Fog Test Report (if performed).

Submit field data and completed report forms found in the appendices. Use the sample forms, Test Agency Qualification Sheet, Air Leakage Test Form, and Air Leakage Test Results Form to summarize the tests for the appropriate building envelope. Submit both electronically populated and field-hand-filled-in forms.

Report Data. Include in the report the following information for all tests:

- a. Date of issue
- b. Project title and number
- c. Name, address, and telephone number of testing agency
- d. Dates and locations of samples and tests or inspections
- e. Names of individuals making the inspection or test
- f. Designation of the work and test method
- g. Identification of product and specification section
- h. Complete inspection or test data
- i. Test results and an interpretation of test results
- j. Comments or professional opinion on whether inspected or tested work complies with contract document requirements
- k. Recommendations on retesting
- 1.7 CLIMATE CONDITIONS SUITABLE FOR A PRESSURE TEST

As the test date approaches, monitor the weather forecast for the test site. Avoid testing on days forecast to experience high winds, rain, or snow. Monitor weather forecasts prior to shipping pressure test equipment to the Project site. Based on current and forecast weather conditions, the Contracting Officer's representative must grant final approval for testing to occur.

1.7.1 Rain

For safety reasons, avoid testing during rain or if rain is anticipated during testing. If pneumatic hoses are installed and exposed to rain inspect the hose to insure rainwater has not migrated into the hose ends. Orient all exposed hose ends to keep them out of water puddles. Success in temporarily sealing outdoor ventilation components such as louvers and exhaust fans may also be compromised by rain. Don't seal roof-mounted ventilation components during times of potential lightning.

1.7.2 Wind

Because wind can skew pressure test results, test only on days and at times when winds are anticipated to be the calmest. Avoid pressure testing during gusty or high-wind conditions. Avoid installing test fans on the windward side of the building if wind gusts during the test are anticipated to be greater than 10 miles per hour.

## PART 2 PRODUCTS

## 2.1 PRESSURE TEST EQUIPMENT

Depending on conditions at the Project site and the size of the envelope, the test may be conducted using blower door equipment and/or

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trailer-mounted fans. The testing agency must supply sufficient quantity of blower equipment that will produce a minimum of 75 Pa differential pressure between the envelope and outdoors using the test methods described herein. Supplying additional blower test equipment to provide additional airflow capacity or to act as a backup is highly recommended.

# 2.1.1 Blower Door Fans and Trailer-Mounted Fans

Each air-flow measuring system, including blower door fans and trailer mounted fans, are to be calibrated within the last five years. Calibrated blower door fans and trailer-mounted fans must measure accurately to within plus-or-minus five percent of the flow reading. Blower door equipment and trailer-mounted fans must be specifically designed to pressurize building envelopes. Each set of blower door equipment must include fan(s), digital gage(s), door frame, and door fabric or hard panels.

# 2.1.2 Digital Gages as Test Instruments

Use only digital gages as measuring instruments in the pressure test; analog gages are not acceptable. The gauges must be accurate to within 1.0 percent of the pressure reading or 0.15 Pa, whichever is greater. Each gage must have been calibrated within two years of the test. The calibration must be checked against a National Institute of Standards and Technology (NIST, formerly National Bureau of Standards) traceable standard.

# 2.2 THERMAL IMAGING CAMERA REQUIREMENTS

The thermal imaging camera used in the thermography test must have a thermal sensitivity (Noise Equivalent Temperature Difference.) of +/- 0.18 degrees F at 86 degrees F or less. Ensure the camera's operating spectral range falls between 2 and 15 micrometers. Ensure the camera's IR image viewing screen resolution measures at least 320x240 pixels. Ensure the camera has a means of recording thermal images seen on the camera viewing screen. The camera must display output as individual still-frame images that also can be downloaded and inserted into an electronic Thermographic Investigation Report. All thermographic equipment must comply with the requirements of ISO 6781-2. Submit camera make and model, and catalog information that defines the camera thermal sensitivity for approval.

### PART 3 EXECUTION

## 3.1 PRESSURE TEST AGENCY

The test agency must be an independent third-party subcontractor, not an affiliated or subsidiary of the prime contractor, subcontractors, or A/E firm. The agency must be regularly engaged in pressure testing of commercial/industrial building envelopes. If using blower door or trailer-mounted fans, the lead test technician must have at least two years of experience in using such equipment in building envelope pressurization tests. Formal training using pressure-test equipment is highly recommended.

# 3.1.1 Field Work

The lead pressure-test technician and thermographer must be present at the Project site while testing is performed and must be responsible for conducting, supervising, and managing of their respective test work.

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Management includes health and safety of test-agency employees.

# 3.1.2 Reporting Work

The lead pressure-test technician must prepare, sign, and date the test agenda, equipment list, and submit a certified Air Leakage Test Report. The thermographer must prepare, sign, and date the test agenda, and equipment list, and submit a certified Thermographic Investigation Report. The Contractor must prepare a final report that identifies improvements that were made to the envelope to reduce air leaks, mitigate thermal bridging, eliminate moisture migration, and repair insulation voids discovered during diagnostic tests. Jointly submit all reports.

# 3.2 ENVELOPE SURFACE AREA CALCULATION

The architectural air barrier boundary includes the floor, walls, and ceiling. After construction of the air barrier envelope is complete, field -measure the envelope to ensure the physical measurements match the design Drawings and the air barrier envelope surface area calculations are generated. If the calculation result is not within ten percent of the defined air barrier boundary calculation result as indicated, submit the envelope surface area calculation and results for review. If the air barrier was defined during design but the surface area of the air-barrier envelope was not calculated, calculate it during construction and submit the envelope surface area calculations and result for review.

# 3.3 PREPARING THE BUILDING ENVELOPE FOR THE PRESSURE TEST

#### 3.3.1 Testing During Construction

The pressure test cannot be conducted until all components of the air barrier system have been installed. After all sealing as described herein has been completed, inspect the envelope to ensure it has been adequately prepared. During the pressure test, stop all ongoing construction within and neighboring the envelope which may impact the test or the air barrier integrity. The pressure test may be conducted before finishes that are not part of the air barrier envelope have been installed. For example, if suspended ceiling tile, interior gypsum board, or cladding systems are not part of the air barrier, the test can be conducted before they are installed. Testing prior to installing the finished ceilings within the envelope and immediately surrounding it is recommended. The absence of finished ceilings allows for inspection and diagnostic testing of the roof/wall interface and for implementation of repairs to the air barrier, if necessary to comply with the maximum allowed leakage.

# 3.3.2 Sealing the Air Barrier Envelope

Seal all penetrations through the air barrier. Unavoidable penetrations due to electrical boxes or conduit, plumbing, and other assemblies that are not air tight are to be made so by sealing the assembly and the interface between the assembly and the air barrier or by extending the air barrier over the assembly. Support the air barrier so as to withstand the maximum positive and negative air pressure to be placed on the building without displacement or damage, and transfer the load to the structure. Durably construct the air barrier to last the anticipated service life of the assembly and to withstand the maximum positive and negative pressures placed on it during pressure testing. Do not install lighting fixtures that are equipped with ventilation holes through the air barrier.

## 3.3.3 Sealing Plumbing

Prime all plumbing traps located within the envelope full of water.

3.3.4 Close and Lock Doors

Close and lock all doors and windows in the envelope perimeter. For doors not equipped with latching hardware, temporarily secure them in the closed position. Secure the doors in such a way that they remain fully closed, even when the maximum anticipated differential air pressure produced during the test acts on them.

3.3.5 Hold Excluded Building Areas at the Outdoor Pressure Level

Keep building areas immediately surrounding -- but excluded from -- the test envelope at the outdoor pressure level during the pressure test. Maintain these areas at the outdoor pressure level by propping exterior doors open, opening windows, and de-energizing all air moving devices in or serving these areas.

# 3.3.6 Maintain an Even Pressure within the Envelope

Ensure the pressure differences within the envelope are minimized by opening all internal air pathways including propping open all interior doors. Distribute test fans throughout the envelope as necessary to ensure the internal pressures are uniform (within ten percent of the average differential pressure). Ideally, do not install suspended ceilings until after all pressure tests have been completed. If, however the envelope includes finished suspended ceiling spaces, temporarily remove approximately five percent of all ceiling tiles or a minimum of one tile from each isolated suspended ceiling space, whichever comprises the greatest surface area. Temporarily remove additional ceiling tiles during testing to allow for inspection and diagnostic testing of the ceiling/wall interface. An alternative to removing ceiling tiles is to measure the differential pressure between each isolated suspended ceiling space and the outdoors when the area below the suspended ceiling is maintained at a differential pressure of 75 Pa with respect to the outdoors. If the suspended ceiling differential pressure measurement is within ten percent of the 75 Pa pressure below the suspended ceiling no ceiling tiles need to be removed.

## 3.3.7 Maintain Access to Mechanical and Electrical Rooms

Maintain access to mechanical rooms and electrical rooms associated with the envelope to allow for de-energizing ventilation equipment and resetting circuit breakers tripped by blower door equipment, if used.

## 3.3.8 Minimize Potential for Blowing Dust and Debris

Because high-velocity air will be blown into and out of the envelope during the test, debris, including dust and litter, may become airborne. Airborne debris may become trapped or entangled in test equipment, thereby skewing test results. Ensure areas within and surrounding the envelope are free of dust, litter, and construction materials that are easily airborne.

# 3.3.9 De-Energize Air Moving Devices

De-energize all air moving devices serving the envelope to keep air within

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the envelope as still as reasonably achievable. De-energize all fans that deliver air to, exhaust air from, or recirculate air within the envelope. Also de-energize all fans serving areas adjacent to but excluded from the envelope.

# 3.3.10 Installing Blower Door Equipment in a Door Opening

Where blower door fans are used, before installing blower door equipment, select a door opening that does not restrict air flow into and out of the envelope and has at least 5 feet of clear distance in front of and behind the door opening. Disconnect the door actuator and secure the door open to prevent it from being drawn into the fan by fan pressure. Avoid installing blower door equipment on the windward side of the building.

# 3.4 BUILDING ENVELOPE AIR TIGHTNESS REQUIREMENT

For each building envelope, perform the Architectural Only test. The purpose of the pressure (air leakage) test is to determine final compliance with the airtightness requirement by demonstrating the performance of the continuous air barrier. An effective air barrier envelope minimizes infiltration and exfiltration through unintended air paths (leaks). The tests may be performed in any desired order.

## 3.4.1 Architectural Only Test

The test envelope is the architectural air barrier boundary as defined on the Contract Drawings. This boundary includes connecting walls, roof and floor which comprise a complete, whole, and continuous three-dimensional envelope. Perform both a positive pressure test and a negative pressure test on this envelope, unless otherwise directed.

## 3.4.1.1 Test Goal

Input data from the test into the Air Leakage Rate by Fan Pressurization spreadsheet as described in paragraph CALCULATION PROGRAM via the Air Leakage Test Form. Compare output from the spreadsheet against the maximum allowable leakage defined in Section 07 27 10.00 10 BUILDING AIR BARRIER SYSTEM. The envelope passes the test if the leakage rate, as calculated using the spreadsheet, is equal to or lower than the Architectural Only leakage rate goal.

3.4.1.2 Preparing the Envelope for the Pressure Test - Seal All Openings through the Air Barrier

Temporarily close all perimeter windows, roof hatches, and doors in the envelope perimeter except for those doors that are to remain open to accommodate blower door or trailer-mounted fan test equipment installation. Seal or isolate all other intentional openings, pathways, and fenestrations through the architectural envelope prior to pressure testing. Follow the Recommended Test Envelope Conditions identified in ASTM E1827, Table 1, for the Closed Envelope condition. These openings may include boiler flues, fuel-burning water heater flues, wall or ceiling grilles, diffusers and the like. Before sealing flues, close their associated fuel valves and verify that the associated pilot lights are extinguished. Prime all plumbing traps located within the envelope full of water. Typical temporary sealing materials include tape and sheet plastic or a self-adhesive grille wrap. Use and apply tape and plastic in a manner that does not deface or remove paint or mar the finish of permanent surfaces. Be especially aware of residue that remains from tape

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applied to stainless steel surfaces such as rollup doors. For painted surfaces, use tape types that do not remove finish paint when the tape is removed. If paint is removed from the finished surface, repaint to match existing surfaces. Secure dampers closed -- either manually or by using the building's HVAC system controls. Use the table below for further guidance in building preparation.

Building Component	Envelope Condition
Air handling units, duct fans	As found (open) or temporarily sealed as necessary
Dampers – intake, exhaust	Physically closed or closed using control power or temporarily sealed
Diffusers, registers, grilles within the envelope	Temporarily sealed
Doors, personnel type, at the envelope perimeter	Secured closed
Doors, personnel type, within the envelope	Secured (propped) open
Doors, roll-up type, at the envelope perimeter	Closed (no additional sealing)
Exhaust hoods	Closed* and temporarily sealed
Pilot light and associated fuel valve	Extinguished and closed, respectively
Vented combustion appliance	Temporarily sealed *
Vented combustion appliance exhaust flue	Off
Windows	Secured closed
* If the building component has an associat	ed manual or automatic damper, consider
becurring the damper crosed in fred of tempo	rarrry bearring.

3.5 CONDUCTING THE PRESSURE TEST

Notify the Contracting Officer at least ten working days before conducting the pressure tests to provide the Government the opportunity to witness the tests and to monitor weather forecasts for conditions favorable for testing. Do not pressure test until verifying that the continuous air barrier is in place and installed without failures in accordance with installation instructions. During the pressure test periodically inspect temporarily sealed items to ensure they are still sealed. Seals on temporarily sealed items tend to release more readily at higher pressures. Test data obtained after temporarily sealed items become unsealed cannot be used as input into the calculation program. Follow the Envelope Pressure Test Procedures in the paragraphs below. Submit detailed pressure test procedures indicating the test apparatus, the test methods and procedures, and the analysis methods to be employed for the building envelope pressure (air tightness) test. Submit these procedures not later than 60 days after Notice to Proceed.

3.5.1 Extend Pneumatic Tubes and Establish a Reference Differential Pressure

Confirm the various zones within the envelope have a relatively uniform interior pressure distribution by establishing a representative differential pressure between the envelope and the outdoors with blower door or trailer-mounted fans operating. The number of indoor pressure difference measurements (pneumatic hoses) required depends on the number of interior zones separated by bottle necks that could create significant pressure drops (e.g. doorways and stairwells). Extend at least four pneumatic hoses (differential pressure monitoring ports) to locations within the envelope that are physically opposite of each other. Locate the hose ends away from the effects of air discharge from blower test equipment. Select one of the four (or more) interior hoses, one judged by the test agency to be the most unaffected by air velocity produced by blower test equipment, to serve as the interior reference pressure port. Extend at least one additional pneumatic hose to the outdoors (outdoor pressure port). To the end of this hose manifold at least four hoses together and terminate each hose on a different side of the building. With the envelope sealed and the blowers energized, measure the differential pressure using the interior reference pressure port and the four outdoor pressure ports. Then measure and record the differential pressure by individually using each of the remaining three interior hoses. Ensure each reading is within plus-or-minus ten percent of the reference reading. Thus at an average 75 Pa maximum pressure difference across the envelope, the difference between the highest and lowest interior pressure difference measurements should be 15 Pa or less. If this condition cannot be met, attempt to create additional air pathways within the envelope to minimize pressure differences within the envelope. If necessary, move the interior hose ends. See Step 2.13 of the Air Leakage Test Form in Appendix A.

# 3.5.2 Bias Pressure Readings

With the fan pressurization equipment de-energized and the envelope sealed, obtain the differential pressure between the outdoors and the envelope. Record twelve bias pressure readings before the pressure test and twelve bias pressure readings after the pressure test. Each reading is the average of ten or more one-second measurements. Include positive and negative signs for each reading. To help dampen bias pressures that significantly contribute to test pressure, reduce temperature differences between indoor and outdoor air. Temperature differences can be reduced by operating test fan equipment for a few minutes to replace most of the indoor air with outdoor air.

# 3.5.3 Testing in Both Positive and Negative Directions

The preferred method for testing a building envelope is to test in both the pressurized and depressurized directions. Testing in one direction is only allowed if opposite direction testing cannot logistically be performed due to test equipment limitations or restrictions. After obtaining the pre-test bias differential pressure readings, conduct the pressure test. Record the envelope pressures (in units of Pascals) from one interior pneumatic hose (monitoring port) and the outdoor pneumatic hose(s), averaged or manifolded, with corresponding flows (in units of cfm ) for each fan. Record the flow rates at at least ten to twelve positive and ten to twelve negative building pressure readings. If conducting both positive and negative pressure tests, the lowest allowable test pressure is 40 Pa and the highest test pressure is 85 Pa. Keep at least 25 Pa

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difference between the lowest and highest test pressure readings. Include the 75 Pa pressure value between the lowest and highest readings. The ten to twelvereadings in each direction are to be roughly evenly spaced along the range of pressures and flows. After testing is complete de-energize the equipment used to provide pressurization and obtain an additional ten to twelve post-test bias pressure readings. None of the bias pressure readings are allowed to exceed 30 percent of the minimum test pressure. If these limits are exceeded the test fails and must be repeated.

# 3.5.4 Single Direction Testing

After obtaining the twelve aforementioned bias pressure readings, conduct a positive or negative pressure test. Obtain flow rates at tento twelve roughly evenly spaced pressure readings over a pressure range of 50 to 85 Pa. After the data is recorded, de-energize the blower equipment and obtain an additional ten to twelve bias pressure readings. None of the bias pressure readings may exceed ten percent of the minimum test pressure. If these limits are exceeded, the test fails.

3.5.5 Pressure Testing - Special Cases

3.5.5.1 Pressure Testing a Large Building Envelope

Pressure testing the envelope of a large building may be unworkable and unrealistic using blower door or trailer-mounted equipment. In this case, the test agency may define and pressure test separate zones within the envelope and sum the leakage of all of the zones to create an overall envelope leakage rate. Using this method, the test agency must comply with the requirements of ASHRAE RP-935.

# 3.5.5.2 Pressure Testing a Multiple Isolated Zoned Building

Pressure test each exterior corner zone plus at least an additional 20 percent (as measured by floor area) of remaining zones. The Contracting Officer is responsible for selecting which of these additional zones to test. If all zones pass the pressure test it is assumed that all untested zones also pass and no further testing is required. If, however, any zone fails to pass the test's leakage requirements, re-seal and re-test that zone until it passes in accordance with paragraph FAILED PRESSURE TEST. Test an additional 20 percent of previously untested zones. If all tested zones pass, no further testing is needed. If any zone in this group fails the test, re-seal and re-test that zone until it passes. Continue this process until all the tested zones pass. When testing a zone, the doors to all adjacent zones that share a common surface with the tested zone are to have their doors opened to the outdoors. The resulting leakage from the test zoned is that through all 6 sufaces (4 walls, roof and floor, for a rectangular-shaped zone).

## 3.5.6 Failed Pressure Test

If the pressure test fails to meet the established criteria, use diagnostic test methods described in the paragraph entitled "LOCATING LEAKS BY DIAGNOSTIC TESTING" to discover the leak locations. Provide additional permanent sealing measures to reduce or eliminate leak sources discovered during diagnostic testing. Retest (perform another pressure test) after sealing has been completed. Repeat this sequence of documenting test results in the test report, performing diagnostic tests, documenting recommendations for additional sealing measures in the test report, sealing leak locations per recommendations, and re-testing as

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necessary until the building envelope passes the pressure test and is in compliance with the performance requirements.

# 3.5.7 Air Leakage Test Report

Report volumetric flow rates and corresponding differential pressures in cubic feet per minute (cfm) and Pascals (Pa), respectively, on the Air Leakage Test Form sample form found in Appendix A. Populate the accompanying spreadsheet file entitled Pressure Test Data Analysis with information obtained during the test. The spreadsheet uses equations found in ASTM E779 as a basis for calculating the envelope leakage rate. Other similar leakage rate calculation programs cannot be used or submitted for review. Submit a printout of the data input and output in the report. Should any air tightness (pressure) test fail, the pressure test report must include data and results from all previous failed tests along with the final successful test data and results. Indicate if the resulting leakage rate did or did not meet the goal leakage requirement. Identify and document deficiencies in the building construction upon failure of a test to meet the specified maximum leakage rate.

Include the Test Agency Qualification Sheet, Air Leakage Test Form, and Air Leakage Test Results Form in the written report. Document every test set-up condition with diagrams and photos to ensure the tests can be made repeatable. Document all pneumatic hose termination locations. Record in detail how the building envelope was prepared for the tests. Also describe in detail which building items were temporarily sealed. Include photos of test equipment and sealing measures in the report. Include an electronic (pdf) version of all test reports on a CD. If the building envelope fails to meet the leakage rate goal, provide recommendations to further seal the envelope and document these recommendations in the test report.

# 3.6 LOCATING LEAKS BY DIAGNOSTIC TESTING

Use diagnostic test methods described herein to discover obvious leaks through the envelope. Perform diagnostic tests on the building envelope regardless of the envelope meeting or failing to meet the designated leakage rate goal. Use diagnostic test methods in accordance with ASTM E1186 and in conjunction with pressurization equipment as necessary. Use the thermography diagnostic test to establish a baseline for envelope leakage. Apply additional diagnostic tests (find, feel, fog, or other tests) as necessary to further define leak locations and pathways discovered using thermography or to find additional leaks not readily detected by thermography. Using a variety of diagnostic tests may help locate leaks that would otherwise go undetected if only a single diagnostic test were used. Pay special attention to locating leaks at interfaces where there is a change in materials or a change in direction of like materials. These interfaces, at a minimum, include roof/wall, wall/wall, floor/wall, wall/window, wall/door, wall/louver, roof-mounted equipment/roof curb interfaces, and all utility penetrations (ducts, pipes, conduit, and the like) through the envelope's architecture. Also use diagnostic tests to check for leakage between the air duct and duct damper, when the damper, under normal control power, is placed in the closed position. Should leaks be discovered during diagnostic tests, thoroughly document their exact locations on a floor plan so that sealing can be later applied, if required or as directed. If the envelope passes the leakage test, use the diagnostic test procedure described above to identify obvious leakage locations. Seal the leaks at the discretion of the COR based on the magnitude, location, potential for liquid moisture

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penetration or retention, potential for condensation, presence of daylight through an architectural surface, or if the leakage location could potentially cause rapid deterioration of -- or mold growth in -- the building envelope materials and assemblies. Apply sealing measures after diagnostic testing is complete and all pressurization blowers are off. To verify that the applied sealing measures that are effective, re-test for leaks using the same diagnostic methods that discovered the leak. Reseal and retest until the envelope meets the leakage rate goal and all obvious leaks through the envelope are sealed.

#### 3.6.1 Find Test

Use visual observation to locate daylight and/or artificial light streaming from the opposite side of the envelope. Observe all interfaces identified above.

# 3.6.2 Feel Test

Use the blower door equipment to negatively pressurize the building envelope, to at least 25 Pa but no greater than 85 Pa, with respect to the outdoors. The larger the pressure difference, the easier discovering leaks by feeling them becomes. While inside the envelope, hand feel roof/wall, wall/wall, and floor/wall interfaces and utility penetrations (ducts, pipes, conduit, and the like) for leaks and note the leak locations on a floor plan. The "Feel" test may also be used to check for leaks between the ductwork and ductwork damper. To do this, positively pressurize the envelope and check for air movement from the envelope exterior.

# 3.6.3 Infrared Thermography Test

Avoid performing thermography tests just after pressure-testing the building envelope (pressurizing and/or depressurizing the building envelope) as thermography readings may be inaccurate due to excessive air-wash. Perform thermography either before the pressure test or wait an appropriate amount of time after pressure test completion for the temperatures within the building envelope to stabilize before starting the thermography tests. Coordinate thermography examination with the pressure test agency and the test agency's pressurization equipment. The pressure test agency must allow adequate time for the thermographer to perform a complete thermographic examination, as described hereinafter, of the envelope interior and exterior.

# 3.6.3.1 Thermography Test Methods

Before thermographic testing, remove furniture, construction equipment, and all other obstructions both inside and outside the building as necessary to gain a clear field of view. In the Thermographic Investigation Report, document all areas where obstructions remain. For exterior thermal examination of the envelope, verify that no direct solar radiation has heated the envelope surfaces to be examined for a period of approximately three hours for frame construction and for approximately eight hours for concrete construction. Conduct exterior investigations after sunset, before sunrise, or on an overcast day when the influence of solar radiation can be determined to be minimal. Limit exterior examinations to times when the influence of solar radiation is minimal, such as after sunset or before sunrise or during an overcast day. Conduct thermal imaging tests only when wind speeds are less than eight mph at the time of analysis and at the end of analysis. Document any variations in

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wind during the test. Document all variations of test conditions in the Thermographic Investigation Report. Test only when exterior surfaces are dry. Monitor and document ongoing test parameters, such as the temperatures inside and outside the air barrier envelope, wind speed, and differential pressure.

# 3.6.3.1.1 Thermography Testing of the Air Barrier

Test the building envelope in accordance with ISO 6781, and ASTM E1186. Perform a complete thermographic inspection consisting of the full inspection of the interior and exterior of the complete air barrier envelope. Document envelope areas that are inaccessible for testing. Use infrared thermography technology in concert with standard pressurization methods (blower doors and trailer-mounted fans) to locate leaks through the air barrier. Because thermography works best with at least a 18 degree F temperature difference between the envelope interior and the exterior, adjust the HVAC system, if possible, to create or enhance this temperature difference. The minimum allowable temperature difference is 3 degrees F. Maintain this temperature difference for at least three hours prior to the test. Use pressurization methods to establish a minimum of +20 Pa pressure difference with respect to the outdoors while using an infrared camera to view the envelope from outdoors. When viewing with the camera from inside the envelope, keep the envelope at a pressure differential of -20 Pa with respect to the outdoors using pressure testing equipment or the building's own air handling system.

# 3.6.3.2 Thermography Test Results

Document the location of all leaks, anomalies, and unusual thermal features on a floor plan and/or elevation view and catalog them with a visible light picture for locating the defect for correction. The thermographer must recommend corrective actions to eliminate the leaks, anomalies, and unusual thermal features. Where leaks are found perform corrective sealing as necessary to achieve the whole envelope air leakage rate specified. After sealing, again use thermography in concert with standard pressurization methods to verify that the air leakage has been reduced. After these leaks have been permanently sealed, note all actions taken on the drawings or in the Thermographic Investigation Report. Submit the drawings for approval as part of the Thermographic Investigation Report. Also include thermographic photos that show where leaks were discovered. Include thermograms using an imaging palette that clearly shows the observed thermal patterns indicating air leakage. The Contracting Officer's Representative must witness all testing.

# 3.6.4 Fog Test

Before using a theatrical fog generator, disable all building smoke detectors as they may alarm when fog is issued. Coordinate fog tests and the disabling of all smoke detectors with the Contracting Officer's representative and the local fire department as necessary. Use pressure test equipment to positively pressurize the building envelope to at least 25 Pa but not greater than 85 Pa over the outdoors. Using a theatrical fog generator within the envelope, direct fog at suspected leakage points such as at building interfaces. Test the following interfaces: roof/wall, wall/wall, floor/wall, wall/window, roof/roof-mounted mechanical equipment. From the vantage point immediately outside the envelope and opposite that of the interface being tested, observe the effect as the fog is issued. Detection may also be further enhanced by using a scented fog liquid or a fog liquid that produces a colored fog. Look for fog and

smell for associated odor percolating through the interface. Also use smoke puffers and smoke sticks as necessary to locate leaks at these and other interface locations. After fog testing has ended, reactivate the building smoke detectors and notify the Contracting Officer and local fire department that the test has ended. After sealing has been completed retest these areas using fog. Seal additional leaks that are found.

## 3.6.5 Diagnostic Test Report

Once the diagnostic tests have been completed and the leakage locations identified and sealed, document these procedures, locations, and recommendations in the diagnostic test report. Submit plan and/or profile drawings that thoroughly identify leak locations. Describe in detail all leak locations so that the seal-up crew knows where to apply sealing measures. After sealing measures have been applied, describe the methods used along with applicable photos of the final sealed condition.

#### 3.6.5.1 Thermographic Investigation Report

Submit a report of each thermographic investigation identifying the thermal discontinuities in the thermal control layer. Indicate in the final report locations to which improvements for both the air control layer and the thermal control layer were made to reduce air leaks and correct discontinuities in the thermal control layer. Include in the report some selected radiometric images of suspected failure points in the air barrier envelope that indicate before and after conditions. Devote a chapter of the Thermographic Investigation Report to identifying suspected points of thermal bridging, moisture migration through roofs and walls, and insulation voids. Indicate in the final report improvements that were made to the envelope to reduce air leaks. Include the following items in the report:

- a. Brief description of the building construction
- b. Types of interior and exterior surface materials used in the building.
- c. Geographical orientation of the building with a description of the exterior surroundings including other buildings, vegetation, landscaping, and surface water drainage.
- d. Camera brand, model, and serial number, and date of most recent calibration date; optional lenses with serial numbers (if applicable)
- e. Thermographer's and Government Inspector's names
- f. Date and time of tests
- g. Air temperature and humidity inside the air barrier envelope
- h. Outdoor air temperature and humidity
- i. General information for the last twelve hours on the solar radiation conditions in the geographic area where the test is being performed.
- j. Ambient conditions such as precipitation and wind direction and speed occurring within the last 24 hours, as applicable. Refer to specific requirements in each section of each thermographic inspection type for requirements in each specific area.

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- k. Documentation of those portions of the building envelop which were not within test conditions when the scan was performed and which portions were obstructed by adjacent structures, interior furnishings, intervening cavities, or reflective surfaces.
- 1. Other relevant information, which may have influenced test results.
- m. Drawings, sketches, floor plans, and/or photographs detailing the locations in the buildings where thermograms were taken detailing possible irregularities in the components being tested.
- n. Thermal images taken during the inspection with their relative locations and written or voiced recorded explanations of the anomalies listed along with visual and reference images.
- o. An identification of the aspects or components of the building being examined.
- p. Explanations for the type and the extent of each construction defect observed during the inspection.
- q. Any results from additional measurements and investigations. Identify additional equipment used and support with type, model number, serial number, and date of most recent calibrated.

## 3.6.5.2 Fog Test Report

Document all turbulent air flow and dead air spaces within the envelope. Report fog behavior as it exits from and/or is entrained within the building. Include a floor plan in the report that documents the locations where fog passed through the envelope.

# 3.7 CALCULATION PROGRAM

To calculate the envelope leakage rate and other required outputs, input the data obtained during the pressure tests as documented in the Air Leakage Test Form (Appendix A) into the Air Leakage Rate by Fan Pressurization Excel spreadsheet. This spreadsheet can be found at the following web site: http://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/forms-graphic

#### 3.8 AFTER COMPLETION OF THE PRESSURE AND/OR DIAGNOSTIC TEST

After all pressure and/or diagnostic testing has been completed unseal all temporarily sealed items. Unless otherwise directed by the Contracting Officer, return all dampers, doors, and windows to their pre-test condition. Remove tape and plastic from all temporarily sealed openings, being careful not to deface painted surfaces. If paint is removed from finished surfaces, repaint to match existing surfaces. Unless otherwise directed by the Contracting Officer's representative, return fuel (gas) valves to their pre-test position and relight pilot lights. Return all fans and air handling units to pre-test conditions.

# 3.9 REPAIR AND PROTECTION

Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for testing, inspection, and similar services. Upon completion of inspection, testing, or sample taking and similar services, repair damaged construction and restore substrates and

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finishes, protect construction exposed by or for quality control service activities, and protect repaired construction.

# 3.10 APPENDICES

The following forms are available for download as a MS Word file at http://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/forms-graphic

Appendix A - Air Leakage Test Form Appendix B - Air Leakage Test Results Form Appendix C - Test Agency Qualifications Sheet

-- End of Section --

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# BOARD AND BLOCK INSULATION 02/16, CHG 2: 08/20

#### PART 1 GENERAL

#### 1.1 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	С272/С272М	(2016) Standard Test Method for Water Absorption of Core Materials for Sandwich Constructions
ASTM	C578	(2022) Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
ASTM	D1621	(2016) Standard Test Method for Compressive Properties of Rigid Cellular Plastics
ASTM	E96/E96M	(2022) Standard Test Methods for Gravimetric Determination ofWater Vapor Transmission Rate of Materials
	U.S. GREEN BUILDING COUN	ICIL (USGBC)

LEED v4 BDC Ref Guide	(2013; R 2020) USGBC LEED Reference Guide for Building Design and Construction, v4
LEED v4.1 BDC Ref Guide	(2023) LEED v4.1 Building Design and Construction Reference Guide

## 1.2 SUSTAINABILITY REPORTING

Work of this section is intended to contribute to the achievement of, or compliance with, the requirements of the Guiding Principles Validation and LEED Prerequisites and attempted Credits. Refer to Section 01 33 29.00 06 SUSTAINABILITY REPORTING for specific documentation requirements and list of Prerequisites, attempted Credits and LEED version.

Comply with product, material content, performance criteria, activity, documentation, and other technical requirements as described in the LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide as applicable.

Collect, organize, and submit product data, drawings, diagrams, photos and cost information necessary to demonstrate compliance with LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide requirements as applicable.

Data collection shall commence with the notice to proceed and will only be deemed complete upon acceptance of the Final Sustainability Notebook and LEED Online submission by the Contracting Officer, the LEED Project

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Administrator, and the Green Building Certification Institute.

#### 1.3 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Manufacturer's Standard Details; G, AE

Block or Board Insulation; G, AE

Accessories including sealants; G, AE

Recycled Content for Block or Board Insulation; S

Environmental Product Declarations; S

Embodied Carbon Optimization Report/Action Plan; S

Extended Producer Responsibility; S

Local/Regional Materials; S

Material Ingredient Reporting; S

SD-07 Certificates

Block or Board Insulation; G, AE

Draft Special Warranties; G

Final Special Warranties; G

SD-08 Manufacturer's Instructions

Block or Board Insulation

Adhesive

# 1.4 SUSTAINABLE DESIGN REQUIREMENTS

## 1.4.1 Environmental Product Declarations

At a minimum, use materials or products with an Environmental Product Declaration in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.4.2 Embodied Carbon Optimization Report/Action Plan

At a minimum, use materials or products with an Embodied Carbon Optimization Report/Action Plan in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative

> SECTION 07 21 13 Page 2 Certified Final Submittal
materials requirements and LEED Implementation Plan.

1.4.3 Sourcing of Raw Materials

Provide products that meet one or more of the following categories:

## 1.4.3.1 Extended Producer Responsibility

At a minimum, use materials or products from manufacturers that participate in an extended producer responsibility program in accordance with the LEED Implementation Plan. Provide manufacturer letter verifying extended producer responsibility program is in place and that product is eligible. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.4.3.2 Recycled Content Materials

At a minimum, use materials or products with recycled content in accordance with the LEED Implementation Plan. Provide manufacturers product literature identifying the percentage of recycled material incorporated within each product used. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan. If recycled content minimum is specified in this section, the greater of the two percentages governs.

## 1.4.4 Material Ingredient Reporting

At a minimum, use materials or products with chemical inventory to at least 0.1% (1000 ppm) in accordance with the LEED Implementation Plan. Provide Health Product Declaration (HPD), Cradle to Cradle Certificate, Declare label, or other manufacturer's published content inventory in compliance with LEED v4.1 Material Ingredient Reporting credit. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

## 1.4.5 Local/Regional Materials

Use materials or products extracted, harvested, or recovered, as well as manufactured, within a 100 mile radius from the project site, if available from a minimum of three sources. provide a letter from the manufacturer stating the extraction location, manufacturing location, and purchasing location of the products provided, referencing the project name and location specifically and distance to the project site. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

## 1.5 MANUFACTURER'S DETAILS

Submit manufacturer's standard details indicating methods of attachment and spacing, transition and termination details, and installation details. Include verification of existing conditions.

## 1.6 DELIVERY, STORAGE, AND HANDLING

## 1.6.1 Delivery

Deliver materials to the site in original sealed wrapping bearing manufacturer's name and brand designation, specification number, type, grade, R-value, and class. Store and handle to protect from damage. Do

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not allow insulation materials to become wet, soiled, crushed, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storing, and protecting of materials before and during installation.

# 1.6.2 Storage

Inspect materials delivered to the site for damage and store out of weather in manufacturer's original packaging. Store only in dry locations, not subject to open flames or sparks, and easily accessible for inspection and handling. Keep materials wrapped and separated from off-gassing materials (such as drying paints and adhesives). Do not use materials that have visible moisture or biological growth. Comply with manufacturer's recommendations for handling, storage, and protection of materials before and during installation.

#### 1.7 SPECIAL WARRANTIES

## 1.7.1 Guarantee

Guarantee insulation installation against failure due to ultraviolet light exposure for a period of three years from the date of Beneficial Occupancy or Substantial Completion. Submit draft and final guarantees in accordance with Sections 00 80 00.00 06 SPECIAL PROVISIONS.

### 1.7.2 Warranty

Provide manufacturer's material warranty for all system components for a period of three years from the date of Beneficial Occupancy or Substantial Completion. Submit draft and final warranties in accordance with Sections 00 80 00.00 06 SPECIAL PROVISIONS.

# PART 2 PRODUCTS

#### 2.1 BLOCK OR BOARD INSULATION

Provide thermal insulating materials as recommended by manufacturer for each type of application indicated. Provide insulation with the following physical properties and in accordance with the following standards:

b. Extruded Preformed Cellular Polystyrene: ASTM C578 REV A

# 2.1.1 Thermal Resistance

Unless otherwise indicated, Below Slab R-10.

#### 2.1.2 Other Material Properties

Provide thermal insulating materials with the following properties:

- a. Rigid cellular plastics: Compressive Resistance at Yield: Not less than 10 pounds per square inch (psi) when measured according to ASTM D1621.
- b. Water Vapor Permeance: Not more than 1.1 Perms or less when measured according to ASTM E96/E96M, desiccant method, in the thickness required to provide the specified thermal resistance, including facings, if any.

- e. Water Absorption: Not more than 2 percent by total immersion, by volume, when measured according to ASTM C272/C272M.
- 2.1.3 Recycled Materials

Provide thermal insulation containing recycled materials to the extent practicable, provided that the material meets all other requirements of this section. The minimum required recycled material contents (by weight, not volume) are:

Extruded polystyrene:	9 percent

Provide data identifying percentage of recycled content for block or board insulation.

2.1.4 Prohibited Materials

Do not provide materials containing asbestos.

# 2.2 ACCESSORIES

#### 2.2.1 Adhesive

As recommended by insulation manufacturer.

2.2.2 Mechanical Fasteners

Corrosion resistant fasteners as recommended by the insulation manufacturer.

# PART 3 EXECUTION

3.1 EXISTING CONDITIONS

Prior to installation, ensure all areas that are in contact with the insulation are dry and free of projections that could cause voids, compressed insulation, or punctured vapor retarders. For foundation perimeter or under slab applications, check that subsurface fill is flat, smooth, dry, and well tamped. Do not proceed with installation if moisture or other conditions are present, and notify the Contracting Officer of such conditions. Do not proceed with the work until conditions have been corrected and verified to be dry.

- 3.2 INSTALLATION
- 3.2.1 Installation and Handling

Provide insulation in accordance with the manufacturer's printed installation instructions. Keep material dry and free of extraneous materials.

## 3.2.2 Continuity of Insulation

Butt tightly against adjoining boards, studs, rafters, joists, sill plates, headers and obstructions. Provide continuity and integrity of insulation at corners, wall to ceiling joint, roof, and floor. Avoid creating thermal bridges and voids. Provide and verify continuity of insulative barrier throughout the building enclosure.

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# 3.2.3 Coordination

Verify final installed insulation thicknesses comply with thicknesses indicated, R-values specified herein, and with the approved insulation submittal(s).

3.3 PERIMETER AND UNDER SLAB INSULATION

Install perimeter thermal insulation where heated spaces are adjacent to exterior walls, slab edges in slab-on-grade, or floating slab construction.

3.3.1 Manufacturer's Instructions

Layout insulation, tape edges, provide vapor retarder and other required accessories to protection against vermin, insects, and damage in accordance with manufacturer's printed instructions.

# 3.3.2 Insulation on Vertical Surfaces

Provide thermal insulation below grade. Fasten insulation with adhesive or mechanical fasteners.

3.3.3 Insulation Under Slab

Provide insulation horizontally under slab on grade as indicated on Drawings.

3.3.4 Protection of Insulation

Protect insulation from damage during construction and back filling by application of protection board or a coating. Do not leave installed vertical insulation unprotected overnight. Protect installed insulation from weather, including rain and ultraviolet light, from mechanical abuse, compression, and dislocation.

-- End of Section --

SECTION 07 22 00

# ROOF AND DECK INSULATION 02/16, CHG 3: 11/18

## PART 1 GENERAL

# 1.1 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 C1177/C1177M	(2017) Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
ASTM C1289	(2021) Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
ASTM D4263	(1983; R 2018) Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
ASTM D6866	(2022) Standard Test Methods for Determining the Biobased Content of Solid, Liquid, and Gaseous Samples Using Radiocarbon Analysis
ASTM E84	(2020) Standard Test Method for Surface Burning Characteristics of Building Materials
CALIFORNIA DEPARTMENT O	F PUBLIC HEALTH (CDPH)
CDPH SECTION 01350	(2017; Version 1.2) Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources using Environmental Chambers
FM GLOBAL (FM)	
FM 4470	(2016) Single-Ply, Polymer-Modified Bitumen Sheet, Built-up Roof (BUR), and Liquid Applied Roof Assemblies for Use in Class 1 and Noncombustible Roof Deck Construction
FM APP GUIDE	(updated on-line) Approval Guide http://www.approvalguide.com/
INTERNATIONAL CODE COUN	CIL (ICC)
ICC IBC	(2018) International Building Code

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#### SCIENTIFIC CERTIFICATION SYSTEMS (SCS)

SCS SCS Global Services (SCS) Indoor Advantage

U.S. GREEN BUILDING COUNCIL (USGBC)

LEED	v4	BDC	Ref	Guide	(201	.3;	R	2020	)) (	JSGB	C LE	ED	Ref	eren	ice	Gui	.de
					for	Bui	.⊥d	ing	Des	sign	and	Co	nst	ruct	ion	, V	74
		_															

LEED v4.1 BDC Ref Guide (2023) LEED v4.1 Building Design and Construction Reference Guide

UNDERWRITERS LABORATORIES (UL)

UL 1256 (2002; Reprint Jul 2013) Fire Test of Roof Deck Constructions UL 2818 (2013) GREENGUARD Certification Program For Chemical Emissions For Building

Materials, Finishes And Furnishings

#### 1.2 SUSTAINABILITY REPORTING

Work of this section is intended to contribute to the achievement of, or compliance with, the requirements of the Guiding Principles Validation and LEED Prerequisites and attempted Credits. Refer to Section 01 33 29.00 06 SUSTAINABILITY REPORTING for specific documentation requirements and list of Prerequisites, attempted Credits and LEED version.

Comply with product, material content, performance criteria, activity, documentation, and other technical requirements as described in the LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide as applicable.

Collect, organize, and submit product data, drawings, diagrams, photos and cost information necessary to demonstrate compliance with LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide requirements as applicable.

Data collection shall commence with the notice to proceed and will only be deemed complete upon acceptance of the Final Sustainability Notebook and LEED Online submission by the Contracting Officer, the LEED Project Administrator, and the Green Building Certification Institute.

## 1.3 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Insulation Board Layout and Attachment; G, AE

Verification of Existing Conditions; G

SD-03 Product Data

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Detroit Arsenal, MI
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Insulation; G, AE Cover Board; G, AE Fasteners; G Recycled Content For Insulation; S Environmental Product Declarations; S Embodied Carbon Optimization Report/Action Plan; S Extended Producer Responsibility; S Bio-Based Materials; S Local/Regional Materials; S Material Ingredient Reporting; S SD-06 Test Reports

Flame Spread Rating; G

SD-07 Certificates

Installer Qualifications; G

Indoor Air Quality For Insulation; S

SD-08 Manufacturer's Instructions

Nails and Fasteners; G

Roof Insulation; G

# 1.4 SUSTAINABLE DESIGN REQUIREMENTS

1.4.1 Environmental Product Declarations

At a minimum, use materials or products with an Environmental Product Declaration in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.4.2 Embodied Carbon Optimization Report/Action Plan

At a minimum, use materials or products with an Embodied Carbon Optimization Report/Action Plan in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.4.3 Sourcing of Raw Materials

Provide products that meet one or more of the following categories:

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# 1.4.3.1 Extended Producer Responsibility

At a minimum, use materials or products from manufacturers that participate in an extended producer responsibility program in accordance with the LEED Implementation Plan. Provide manufacturer letter verifying extended producer responsibility program is in place and that product is eligible. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

# 1.4.3.2 Bio-Based Materials

At a minimum, use materials or products with bio-based content in accordance with the LEED Implementation Plan. Provide manufacturer signed letter confirming ASTM D6866 test method was conducted validating bio-based material weight within product, type of bio-based material used within product, and confirmation raw material was legally harvested. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan. If bio-based content minimum is specified in this section, the greater of the two percentages governs.

# 1.4.3.3 Recycled Content Materials

At a minimum, use materials or products with recycled content in accordance with the LEED Implementation Plan. Provide manufacturers product literature identifying the percentage of recycled material incorporated within each product used. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan. If recycled content minimum is specified in this section, the greater of the two percentages governs.

# 1.4.4 Material Ingredient Reporting

At a minimum, use materials or products with chemical inventory to at least 0.1% (1000 ppm) in accordance with the LEED Implementation Plan. Provide Health Product Declaration (HPD), Cradle to Cradle Certificate, Declare label, or other manufacturer's published content inventory in compliance with LEED v4.1 Material Ingredient Reporting credit. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

## 1.4.5 Local/Regional Materials

Use materials or products extracted, harvested, or recovered, as well as manufactured, within a 100 mile radius from the project site, if available from a minimum of three sources. provide a letter from the manufacturer stating the extraction location, manufacturing location, and purchasing location of the products provided, referencing the project name and location specifically and distance to the project site. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

# 1.4.6 Low-Emitting Materials

Use only insulation products that comply with LEED v4.1 BDC Ref Guide requirements for VOC emissions. Submit documedntation identifying compliance with CDPH SECTION 01350. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for low-emitting material requirements.

#### 1.5 SHOP DRAWINGS

Submit insulation board layout and attachment indicating methods of attachment and spacing, transitions, tapered components, thicknesses of materials, and closure and termination conditions. Show locations of ridges, valleys, crickets, interface with, and slope to, roof drains. Base shop drawings on verified field measurements and include verification of existing conditions. Show wood nailers. Show location and spacing of wood nailers required for securing of insulation.

### 1.6 PRODUCT DATA

Include data for material descriptions, recommendations for product shelf life, requirements for cover board or coatings, and precautions for flammability and toxicity. Include data to verify compatibility of sealants with insulation.

## 1.7 MANUFACTURER'S INSTRUCTIONS

Include field of roof and perimeter attachment requirements.

Provide a complete description of installation sequencing for each phase of the roofing system. Include weatherproofing procedures.

#### 1.8 QUALITY CONTROL

Provide certification of installer qualifications from the insulation manufacturer confirming the specific installer has the required qualifications for installing the specific roof insulation system(s) indicated.

#### 1.9 FIRE PERFORMANCE REQUIREMENTS

#### 1.9.1 Insulation in Roof Systems

Comply with the requirements of ICC IBC, UL 1256, and FM 4470. Roof insulation must have a flame spread rating of 75 or less when tested in accordance with ASTM E84. Additional documentation of compliance with flame spread rating is not required when insulation of the type used for this Project as part of the specific roof assembly is listed and labeled as FM Class 1 approved.

#### 1.9.2 Fire-Resistance Ratings for Roofs

Provide in accordance with ICC IBC Chapter 7 and Table 721.1(3) Min Protection for Floor and Roof Systems.

### 1.10 CERTIFICATIONS

Provide products certified to meet indoor air quality requirements by UL 2818(Greenguard) Gold, SCS Global Services Indoor Advantage Gold, or provide certification by other third-party programs. Provide current product certification documentation from certification body.

## 1.11 DELIVERY, STORAGE, AND HANDLING

### 1.11.1 Delivery

Deliver materials to the project site in manufacturer's unopened and

undamaged standard commercial containers bearing the following legible information:

- a. Name of manufacturer
- b. Brand designation
- c. Specification number, type, and class, as applicable, where materials are covered by a referenced specification

Deliver materials in sufficient quantity to allow continuity of the work.

### 1.11.2 Storage and Handling

Store and handle materials in accordance with manufacturer's printed instructions. Protect from damage, exposure to open flame or other ignition sources, wetting, condensation, and moisture absorption. Keep materials wrapped and separated from off-gassing materials (such as drying paints and adhesives). Do not use materials that have visible moisture or biological growth. Store in an enclosed building or trailer that provides a dry, adequately ventilated environment. Replace damaged material with new material.

#### 1.12 ENVIRONMENTAL CONDITIONS

Do not install roof insulation during inclement weather or when air temperature is below 40 degrees F and interior humidity is 45 percent or greater, or when there is visible ice, frost, or moisture on the roof deck.

- 1.13 PROTECTION
- 1.13.1 Completed Work

Cover completed work with cover board for the duration of construction. Avoid traffic on completed work particularly when ambient temperature is above 80 degrees F. Replace crushed or damaged insulation prior to roof surface installation.

PART 2 PRODUCTS

#### 2.1 INSULATION

## 2.1.1 Insulation Types

Provide roof insulation that is compatible with attachment methods for the specified insulation and roof membrane.

a. Polyisocyanurate Board: Provide in accordance with ASTM C1289 REV A Type II, glass mat membrane both sides, except minimum compressive strength of 20 pounds per square inch (psi).

## 2.1.2 Recycled Materials

Provide thermal insulation materials containing recycled content. Unless specified otherwise, the minimum required recycled content for listed materials are:

Polyisocyanurate/polyurethane: 9 percent recovered material

Provide data identifying percentage of recycled content for insulation.

2.1.3 Indoor Air Quality

Provide certification of indoor air quality for insulation.

2.1.4 Insulation Thickness

As necessary to provide the thermal resistance (R-value) indicated. Base calculation on the R-value for aged insulation.

2.1.5 Tapered Roof Insulation

One layer of the tapered roof insulation assembly must be factory tapered to a slope of not less than one in 1/2 inch per foot. Factory fabricate mitered joints from two diagonally cut boards or one board shaped to provide required slopes.

2.2 COVER BOARD

For use as a cover board for adhesive-applied roofing membrane over roof insulation.

2.2.1 Glass Mat Gypsum Roof Board

ASTM C1177/C1177M, 0 Flame Spread and 0 Smoke Developed when tested in accordance with ASTM E84, 500 psi, Class A, non-combustible, 1/4-inch thick, 4 by 8 feet board size.

2.3 FASTENERS

Provide flush-driven fasteners through flat round or hexagonal steel or plastic plates. Provide zinc-coated steel plates, flat round not less than 1 3/8 inch diameter, hexagonal not less than 28 gage. Provide high-density plastic plates, molded thermoplastic with smooth top surface, reinforcing ribs, and not less than 3 inches in diameter. Fully recess fastener head into plastic plate after it is driven. Form plates to prevent dishing. Do not use bell- or cup-shaped plates. Provide fasteners in accordance with insulation manufacturer's recommendations for holding power when driven. Provide fasteners for concrete decks in accordance with FM APP GUIDE (<u>http://www.approvalguide.com/</u>) for Class I roof deck construction, and spaced to withstand uplift pressure of 90 pounds per square foot.

2.3.1 Fasteners for Cast-in-Place Concrete Decks

Approved hardened fasteners or screws to penetrate deck at least 1 inch but not more than 1 1/2 inches, in accordance with FM 4470, and listed in FM APP GUIDE for Class I roof deck construction. Quantity and placement to withstand an uplift pressure of 90 psf in accordance with FM APP GUIDE.

PART 3 EXECUTION

- 3.1 EXAMINATION AND PREPARATION
- 3.1.1 Surface Inspection

Ensure surfaces are clean, smooth, and dry prior to application. Check roof deck surfaces, including surfaces sloped to roof drains and outlets, for defects before starting work.

The Contractor must inspect and approve the surfaces immediately before starting installation. Prior to installing insulation, perform the following:

- a. In the presence of the Contracting Officer perform the following surface dryness test on concrete substrates:
  - (1) Foaming: When poured on the deck, one pint of asphalt when heated in the range of 350 to 400 degrees F, does not foam upon contact.
  - (2) Strippability: After asphalt used in the foaming test application has cooled to ambient temperatures, test coating for adherence. Should a portion of the sample be readily stripped clean from surface, do not consider surface to be dry and do not start application. Should rain occur during application, stop work and do not resume until surface has been re-tested by method above and found dry.
- b. Prior to installing any roof system on a concrete deck, moisture test the deck in accordance with ASTM D4263. The deck is acceptable for roof system application when there is no visible moisture on underside of plastic sheet after 24 hours.
- 3.1.2 Surface Preparation

Correct defects and inaccuracies in roof deck surface to eliminate poor drainage from hollow or low spots, perform the following:

- a. Provide wood nailers of the same thickness as the insulation at eaves, edges, curbs, walls, and roof openings for securing of flashing flanges. Space nailers in accordance with approved shop drawings.
- b. Solidly apply asphalt primer to cast-in-place concrete decks at the rate of 1 gallon per 100 square feet of roof surface. Allow primer to dry thoroughly.

#### 3.2 INSULATION INSTALLATION

Apply insulation in two layers with staggered joints when total required thickness of insulation exceeds 1/2 inch. Lay insulation so that continuous longitudinal joints are perpendicular to direction of roofing, as specified in Section 07 53 23, and end joints of each course are staggered with those of adjoining courses. When using multiple layers of insulation, provide joints of each succeeding layer that are parallel and offset in both directions with respect to the layer below. Keep insulation 1/2 inch clear of vertical surfaces penetrating and projecting from roof

surface. Verify required slopes to each roof drain.

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3.2.1 Installation Using Only Mechanical Fasteners

Secure total thickness of insulation with penetrating type fasteners.

- 3.2.2 Special Precautions for Installation of Foam Insulation
- 3.2.2.1 Polyisocyanurate Insulation

Where polyisocyanurate foam board insulation is provided, install glass-mat -faced gypsum roof board over top surface of foam board insulation. Stagger joints of insulation with respect to foam board insulation below.

## 3.3 PROTECTION

3.3.1 Protection of Applied Insulation

Completely cover each day's installation of insulation with finished roofing specified in Section 07 53 23 on same day. Phased construction is not permitted. Protect open spaces between insulation and parapets or other walls and spaces at curbs, scuttles, and expansion joints, until permanent roofing and flashing are applied. Storing, walking, wheeling, or trucking directly on insulation or on roofed surfaces is not permitted. Provide smooth, clean board or plank walkways, runways, and platforms near supports, as necessary, to distribute weight in accordance with indicated live load limits of roof construction. Protect exposed edges of insulation with cutoffs at the end of each work day or whenever precipitation is imminent. Cutoffs must be two layers of EPDM membrane set in roof cement. Fill all profile voids in cutoffs to prevent trapping moisture below the membrane. Remove cutoffs when work resumes.

# 3.3.2 Damaged Work and Materials

Restore work and materials that become damaged during construction to original condition or replace with new materials.

#### 3.4 INSPECTION

Establish and maintain inspection procedures to assure compliance of the installed roof insulation with contract requirements. Remove, replace, correct in an approved manner, any work found not in compliance. Quality control must include, but is not limited to, the following:

- a. Observation of environmental conditions; number and skill level of insulation workers; start and end time of work.
- b. Verification of certification, listing or label compliance with FM Data Sheets.

# https://www.fmglobal.com/fmglobalregistration/Downloads.aspx)

- c. Verification of proper storage and handling of insulation materials before, during, and after installation.
- d. Inspection of mechanical fasteners; type, number, length, and spacing.

- e. Coordination with other materials and nailing strips.
- f. Inspection of insulation joint orientation and laps between layers, joint width, and bearing of edges of insulation on deck.
- g. Installation of cutoffs and proper joining of work on subsequent days.
- h. Continuation of complete roofing system installation to cover insulation installed same day.
- i. Verification of required slope to each roof drain.
  - -- End of Section --

SECTION 07 27 10.00 10

# BUILDING AIR BARRIER SYSTEM 08/19, CHG 1: 02/20

## PART 1 GENERAL

#### 1.1 SUMMARY

This Section specifies the construction and quality control of the installation of an air barrier system. Construct the air barrier system indicated, taking responsibity for the means, methods, and workmanship of the installation of the air barrier system. The air barrier must be contiguous and connected across all surfaces of the enclosed air barrier envelope indicated. The maximum leakage requirements of individual air barrier components and materials are specified in the other specification sections covering these items.

This section also defines the maximum allowable leakage of the final air barrier system. The workmanship must be adequate to meet the maximum allowable leakage requirements of this specification. Test the assembled air barrier system to demonstrate that the building envelope is properly sealed and insulated. Passing the air barrier system leakage test and thermography test will result in system acceptance. Conform air barrier system leakage and thermography testing and reporting to the requirements of Section 07 05 23 PRESSURE TESTING AN AIR BARRIER SYSTEM FOR AIR TIGHTNESS.

### 1.2 REFERENCES

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

#### ASTM INTERNATIONAL (ASTM)

ASTM D4541	(2017) Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
ASTM E96/E96M	(2016) Standard Test Methods for Water Vapor Transmission of Materials
ASTM E2178	(2021a) Standard Test Method for Air Permeance of Building Materials
ASTM E2357	(2017) Standard Test Method for Determining Air Leakage of Air Barrier Assemblies

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 285

(2012) Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components

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#### 1.3 DEFINITIONS

The following terms as they apply to this section:

### 1.3.1 Air Barrier Accessory

Products designated to maintain air tightness between air barrier materials, air barrier assemblies and air barrier components, to fasten them to the structure of the building, or both (e.g., sealants, tapes, backer rods, transition membranes, fasteners, strapping, primers).

#### 1.3.2 Air Barrier Assembly

The combination of air barrier materials and air barrier accessories that are designated and designed within the environmental separator to act as a continuous barrier to the movement of air through the environmental separator.

1.3.3 Air Barrier Component

Pre-manufactured elements such as windows, doors, dampers and service elements that are installed in the environmental separator.

## 1.3.4 Air Barrier Envelope

The combination of air barrier assemblies and air barrier components, connected by air barrier accessories that are designed to provide a continuous barrier to the movement of air through an environmental separator. There may be more than one air barrier envelope in a single building. Also known as Air Barrier System.

# 1.3.5 Air Barrier Material

A building material that is designed, tested and/or produced to provide the primary resistance to airflow through an air barrier assembly of a wall system.

# 1.3.6 Air Barrier System

Same as AIR BARRIER ENVELOPE.

#### 1.3.7 Air Leakage Rate

The rate of airflow (CFM) driven through a unit surface area (sq.ft.) of an assembly or system by a unit static pressure difference (Pa) across the assembly. (example: 0.25 CFM/sq.ft. @ 75 Pa)

1.3.8 Air Leakage

The total airflow (CFM) driven through the air barrier system by a unit static pressure difference (Pa) across the air barrier envelope. (example: 6500 CFM @ 75 Pa)

# 1.3.9 Air Permeance

The tested rate of airflow (CFM) through a unit area (sq.ft.) of a material driven by unit static pressure difference (Pa) across the material (example: 0.004 CFM/sq.ft. @ 75 Pa) as established by ASTM E2178.

### 1.3.10 Environmental Separator

The parts of a building that separate the controlled interior environment from the uncontrolled exterior environment, or that separate spaces within a building that have dissimilar environments. Also known as the Control Layer.

## 1.3.11 Vapor Permeance

Vapor permeance is separated into three classes based on the water vapor permeance of a material as tested via ASTM E96/E96M

Class I Vapor Barrier/Retarder 0.1 perm or less Class II Vapor Barrier/Retarder 0.1 perm to 1.0 perm Class III Vapor Barrier/Retarder 1.0 perm to 10 perm

## 1.4 PREPARATORY PHASE OR PRECONSTRUCTION CONFERENCE

Organize pre-construction conferences between the air barrier inspector and the sub-contractors involved in the construction of or penetration of the air barrier system to discuss where the work of each sub-contractor begins and ends, the sequence of installation, and each sub-contractor's responsibility to ensure airtight joints, junctures, penetrations and transitions between materials. Discuss the products, and assemblies of products specified in the different sections to be installed by the different sub-contractors.

## 1.5 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Air Barrier System Shop Drawings; G, AE, Manufacturer produced warranted air barrier system

SD-03 Product Data

Air Barrier System Product Data; G, AE

SD-04 Samples

Mock-Up; G, AE

Material Samples For Air Barrier System; G

SD-06 Test Reports

Testing and Inspection; G

SD-07 Certificates

Air Barrier Inspector; G, RO

1.6 AIR BARRIER ENVELOPE SURFACE AREA AND LEAKAGE REQUIREMENTS

The building air barrier systems must meet the following leakage requirements. The allowable leakage rate and the maximum leakage are at a differential test pressure of 75 Pa.

Air Bar	rier Envelope 1 (Low-Bay Office Area)					
Surface Area	<pre>Floor: 20,006 square feet Walls:</pre>					
Architectural Only Test:						
Allowable leakage rate	0.25 CFM/sq.ft					
Maximum leakage	12,951 total CFM					
Architectural Plus HVAC Sy	rstem Test:					
Allowable leakage rate	0.30 CFM/sq.ft					
Maximum leakage	15,541 total CFM					

## 1.7 AIR BARRIER INSPECTOR

Employ a designated Air Barrier Inspector on this project. The Air Barrier Inspector performs a Design Review, oversees quality control testing specified in these specifications, performs quality control air barrier inspection as specified, interfaces with the designer and product manufacturer's representatives to assure all installation requirements are met, and verifies that the constructed work is in accordance with both the manufacturer's recommendations for products used, the content of this specification and other contract drawings or docouments. Qualification for the Air Barrier Inspector are as follows:

- a. Training and certification as an Air Barrier Auditor from the Air Barrier Association of America (ABAA) or other third party air barrier association.
- b. Or, provide documentation in resume format that demonstrates that the individual proposed has the experience, knowledge, skills and abilities to fulfill the above stated duties as the air barrier inspector.

SECTION 07 27 10.00 10 Page 4 Certified Final Submittal

c. It is acceptable that this individual be employed by the firm who will be performing the building pressurization test or another independent third party entity, provided they meet the above requirements but shall not be a member of the installing contractor or firm.

Provide copies of Air Barrier Inspector qualifications 30 days after Notice to Proceed.

### PART 2 PRODUCTS

### 2.1 AIR BARRIER

Provide air barrier system of compatible parts from one or several manufacturers coordinated by the contractor or provide a single warranted system provided by a primary manufacturer. The air barrier system as part of a tested exterior wall assembly must meet the conditions of acceptance as tested in accordance with NFPA 285. Materials used for roof assembly air barrier must conform to the appropriate UL and FM wind and fire requirements for the specified roof assemblies.

If a complete air barrier system from a single manufacturer is utilized, whether warranted on not warranted, the air barrier system must conform to ASTM E2357.

Materials in the following categories as used in the air barrier system or assembly of the exterior wall system are tested and are required to conform to ASTM E2178: Self-adhered sheet membranes, fluid applied membranes, spray polyurethane foam, mechanically fastened commercial building wrap, factory bonded membranes to sheathing, and adhesive backed commercial building wrap and accessory products.

Other materials used as an air barrier such as concrete, glass, wood, metal or gypsum board may or may not conform to ASTM E2178 but are acceptable provided that when integrated into the air barrier system or assemblies that they are not subject to material or environmental induced degradation in their final produced state and once incorporated in the permanent construction.

All materials used must be identifiable through manufacturer testing data and/or literature to be compatible with all the attached or adjoining materials or substrates used in the system.

Provide Air Barrier System Shop Drawings, Material Samples for Air Barrier System and Air Barrier System Product Data.

#### PART 3 EXECUTION

- 3.1 QUALITY CONTROL
- 3.1.1 Documentation and Reporting

Document the entire installation process on daily job site reports. These reports include information on the Installer, substrates, substrate preparation, products used, ambient and substrate temperature, the location of the air barrier installation, the results of the quality control procedures, and testing results.

#### 3.1.2 Construction Mock-Up

Build mock-up prior to building envelope construction.

- a. Prepare a construction mock-up to demonstrate proper installation of the air barrier assemblies and components. Include air barrier system connections between floor and wall, wall and window, wall and roof. Also, include the sealing method between membrane joints at transitions from one material or component to another, at pipe or conduit penetrations of the wall and roof, and at duct penetration of the wall and roof. Work will not begin until the mock-up is satisfactory to the Contracting Officer.
- b. Size the mock-up to approximately 8 feet long by 8 feet high. The mock-up must be representative of primary exterior wall assemblies and glazing components including backup wall and typical penetrations as acceptable to the Contracting Officer. A corner of the actual building may be used as the mock-up.
- c. Mock-Up Tests for Adhesion: Test the mock-up of materials for adhesion in accordance with manufacturer's recommendations. Perform the test after the curing period recommended by the manufacturer. Record the mode of failure and the area which failed in accordance with ASTM D4541. When the air barrier material manufacturer has established a minimum adhesion level for the product on the particular substrate, the inspection report must indicate whether this requirement has been met. Where the manufacturer has not declared a minimum adhesion value for their product/substrate combination, simply record the value.

## 3.1.3 Quality Control Testing And Inspection

Conduct the following tests and inspections as applicable in the presence of the Contracting Officer during installation of the air barrier system, and submit quality control reports as indicated below.

- a. Provide a Daily Report of Observations with a copy to the Contracting Officer.
- b. Inspect to assure continuity of the air barrier system throughout the building enclosure and that all gaps are covered, the covering is structurally sound, and all penetrations are sealed allowing for no infiltration or exfiltration through the air barrier system.
- c. Inspect to assure structural support of the air barrier system to withstand design air pressures.
- d. Inspect and test to assure site conditions for application temperature, and dryness of substrates are within guidelines.
- e. Inspect to assure substrate surfaces are properly primed if applicable and in accordance with manufacturer's instructions. Priming must extend at least 2 inches beyond the air barrier material to make it obvious that the primer was applied to the substrate before the air barrier material.
- f. Inspect to assure laps in materials are at least a 2-inch minimum, shingled in the correct direction or mastic applied in accordance with manufacturer's recommendations, and with no fishmouths.

- g. Inspect to assure that a roller has been used to enhance adhesion. Identify any defects such as fishmouths, wrinkles, areas of lost adhesion, and improper curing. Note the intended remedy for the deficiencies.
- h. Measure application thickness of liquid applied materials to assure that manufacturer's specifications for the specific substrate are met.
- i. Inspect to assure that the correct materials are installed for compatibility.
- j. Inspect to assure proper transitions for change in direction and structural support at gaps.
- k. Inspect to assure proper connection between assemblies (membrane and sealants) for cleaning, preparation and priming of surfaces, structural support, integrity and continuity of seal.
- 1. Perform adhesion tests for fluid-applied and self-adhered air barrier membranes to assure that the manufacturer's specified adhesion strength properties are met. Determine the bond strength of coatings to substrate in accordance with ASTM D4541.
- m. Provide written test reports of all tests performed.
- 3.2 REPAIR AND PROTECTION

Upon completion of inspection, testing, sample removal and similar services, repair damaged construction and restore substrates, coatings and finishes. Protect construction exposed by or for quality control service activities, and protect repaired construction.

-- End of Section --

SECTION 07 27 19.01

# SELF-ADHERING AIR BARRIERS 05/17, CHG 2: 08/20

## PART 1 GENERAL

1.1 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.

Quality Assurance Program

AIR BARRIER ASSOCIATION OF AMERICA (ABAA)

ABAA QAP

ASTM INTERNATIONAL (ASTM)

ASTM D146/D146M	(2004; E 2012; R 2012) Sampling and Testing Bitumen-Saturated Felts and Woven Fabrics for Roofing and Waterproofing
ASTM D412	(2016) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension
ASTM D570	(1998; E 2010; R 2010) Standard Test Method for Water Absorption of Plastics
ASTM D903	(1998; R 2017) Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
ASTM D1876	(2008; R 2015; E 2015) Standard Test Method for Peel Resistance of Adhesives (T-Peel Test)
ASTM D4263	(1983; R 2018) Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
ASTM D4541	(2017) Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
ASTM E84	(2020) Standard Test Method for Surface Burning Characteristics of Building Materials
ASTM E96/E96M	(2022) Standard Test Methods for Gravimetric Determination ofWater Vapor Transmission Rate of Materials
ASTM E154/E154M	(2008a; R 2013; E 2013) Water Vapor Retarders Used in Contact with Earth Under

SECTION 07 27 19.01 Page 1 Certified Final Submittal

Concrete	Slabs,	on	Walls,	or	as	Ground
Cover						

- ASTM E283 (2019) Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
- ASTM E331 (2000; R 2016) Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
- ASTM E2178 (2021a) Standard Test Method for Air Permeance of Building Materials
- ASTM E2357 (2017) Standard Test Method for Determining Air Leakage of Air Barrier Assemblies

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 285 (2012) Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components

### 1.2 RELATED REQUIREMENTS

Coordinate the requirements of Section 07 27 10.00 10 BUILDING AIR BARRIER SYSTEM, Section 07 05 23 PRESSURE TESTING AN AIR BARRIER SYSTEM FOR AIR TIGHTNESS and other building enclosure sections to provide a complete building air barrier system. Submit all materials, components, and assemblies of the air barrier system together as one complete submittal package.

# 1.3 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Qualifications of Manufacturer; G

Qualifications of Installer; G

SD-02 Shop Drawings

Self-adhering Air Barrier; G-AE

SD-03 Product Data

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P2#: 506474 - Manned/Unmanned Tactical Vehicle Lab (MUMT)
Detroit Arsenal, MI
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Self-adhering Air Barrier; G-AE

Primers, Adhesives, and Mastics; G-AE

Safety Data Sheets; G-AE

SD-04 Samples

Self-adhering Air Barrier Mockup; G

SD-06 Test Reports

Field Peel Adhesion Test; G

Flame Propagation of Wall Assemblies; G

Flame Spread and Smoke Developed Index Ratings; G

Site Inspections and Testing; G

SD-07 Certificates

Self-adhering Air Barrier; G

SD-08 Manufacturer's Instructions

Self-adhering Air Barrier; G

Primers, Adhesives, and Mastics; G

## 1.4 MISCELLANEOUS REQUIREMENTS

For self-adhering air barrier provide the following:

# 1.4.1 Shop Drawings

Submit self-adhering air barrier shop drawings showing locations and extent of air barrier assemblies and details of all typical conditions, intersections with other building enclosure assemblies and materials, and membrane counterflashings. Show details for bridging of gaps in construction, treatment of inside and outside corners, expansion joints, methods of attachment of materials covering the self-adhered barrier without compromising the barrier. Indicate how miscellaneous penetrations such as conduit, pipes, electric boxes, brick ties, and similar items will be sealed.

# 1.4.2 Product Data

Submit manufacturer's technical data indicating compliance with performance and environmental requirements, manufacturer's printed instructions for evaluating, preparing, and treating substrates, temperature and other limitations of installation conditions, safety requirements for installation, and Safety Data Sheets. Indicate flame and smoke spread ratings for all products.

1.4.3 Mockup

Provide a mockup of the self-adhering air barrier system specified. Apply product in an area designated by the Contracting Officer. Apply an area

of not less than 54 square feet. Include all components specified as representative of the complete system. Notify the Contracting Officer a minimum of 48 hours prior to the test application. Select a test area representative of conditions to be covered including window or door openings, wall to ceiling transitions, flashings, and penetrations, as applicable.

## 1.4.4 Test Reports

Submit test reports indicating that field peel-adhesion tests on all materials have been performed and the changes made, if required, in order to achieve successful and lasting adhesion. Submit test reports for flame propagation of wall assemblies tested in accordance with NFPA 285. Submit test reports for flame spread and smoke developed index ratings of barrier system materials tested in accordance with ASTM E84.

# 1.5 DELIVERY, STORAGE, AND HANDLING

# 1.5.1 Delivery

Deliver and store materials in sufficient quantity to allow for uninterrupted flow of work. Inspect materials delivered to the site for damage and store out of weather. Deliver materials to the jobsite in their original unopened packages, clearly marked with the manufacturer's name, brand designation, description of contents, and shelf life of containerized materials. Store and handle to protect from damage.

# 1.5.2 Storage

Inspect materials delivered to the site for damage; unload and store out of weather in manufacturer's original packaging. Store only in dry locations, not subject to open flames or sparks, and easily accessible for inspection and handling. Protect stored materials from direct sunlight. Keep materials sealed and separated from absorptive materials, such as wood and insulation.

## 1.6 FIELD PEEL ADHESION TEST

Perform a field peel-adhesion test on the construction mockup. Test the self-adhering air barrier for adhesion in accordance with ASTM D4541 using a Type II pull tester except use a disk that is 4 inches in diameter and cut through the membrane to separate the material attached to the dish from the surrounding material. Perform test after curing period in accordance with manufacturer's written recommendations. Record mode of failure and area which failed in accordance with ASTM D4541. Compare adhesion values with the manufacturer's established minimum values for the particular combination of material and substrate. Indicate on the inspection report whether the manufacturer's requirement has been met. Where the manufacturer has not declared a minimum adhesion value for their product and substrate combination, the inspector must record actual values.

# 1.7 AIR BARRIER TESTING

Perform air barrier testing in accordance with Section 07 27 10.00 10 BUILDING AIR BARRIER SYSTEMand Section 07 05 23 PRESSURE TESTING AN AIR BARRIER SYSTEM FOR AIR TIGHTNESS.

#### 1.8 QUALITY ASSURANCE

1.8.1 Qualifications of Manufacturer

Submit documentation verifying that the manufacturer of the self-adhering air barrier is currently accredited by Air Barrier Association of America (ABAA Accreditation https://www.airbarrier.org/).

1.8.2 Qualifications of Installer

Submit documentation verifying that installers of the self-adhering air barrier are currently certified in accordance with the ABAA QAP Quality Assurance Program (https://www.airbarrier.org/qap/).

## 1.9 PRECONSTRUCTION MEETING

Conduct a preconstruction meeting a minimum of two weeks prior to commencing work specified in this Section. Agenda must include, at a minimum, construction and testing of mockup, sequence of construction, coordination with substrate preparation, materials approved for use, compatibility of materials, coordination with installation of adjacent and covering materials, and details of construction. Attendance is required by representatives of related trades including covering materials, substrate materials, adjacent materials, and materials and components of the air barrier system.

## 1.10 ENVIRONMENTAL CONDITIONS

## 1.10.1 Temperature

Install air barrier within the range of ambient and substrate temperatures as recommended in writing by the air barrier manufacturer. Verify that the surface to receive self-adhering air barrier is dry for a minimum of 48 hours prior to the installation of the barrier. Do not apply air barrier to damp or wet substrates. Do not apply during inclement weather or when ice, frost, surface moisture, or visible dampness is present on surfaces to be covered, or when precipitation is imminent.

1.10.2 Exposure to Weather and Ultraviolet Light

Protect air barrier products from direct exposure to rain, snow, sunlight, mist, and other extreme weather conditions. Replace, at no additional cost to the government, barrier products that have been exposed to ultraviolet (sun)light longer than allowed by manufacturer's written requirements.

## PART 2 PRODUCTS

#### 2.1 SELF ADHERING AIR BARRIER

Provide minimum 0.040 inch thick self-adhering, vapor retarding, air barrier membrane consisting of a cross-laminated high density polyethylene (HDPE) film, fully coated with rubberized asphalt adhesive. Provide membrane in rolls of various widths interleaved with disposable silicone release paper. Self-adhering air barrier must exhibit no visible water leakage when tested in accordance with ASTM E331 and must perform as a liquid water drainage plane flashed to discharge to the exterior any incidental condensation or water penetration. Use regular or low temperature formulation depending on site conditions, within temperature

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ranges specified by manufacturer.

- 2.1.1 Physical Properties
  - a. Air Permeance (ASTM E2178): In accordance with Section 07 27 10.00 10 BUILDING AIR BARRIER SYSTEM
  - b. Air Leakage (ASTM E2357, ASTM E283): In accordance with Section 07 27 10.00 10 BUILDING AIR BARRIER SYSTEM and Section 07 05 23 PRESSURE TESTING AN AIR BARRIER SYSTEM FOR AIR TIGHTNESS.
  - c. Tensile Strength (ASTM D412 die C modified): Not less than 400 psi.
  - d. Tensile Elongation (ASTM D412 die C modified): Not less than 200 percent.
  - e. Puncture Resistance (ASTM E154/E154M): Not less than 40 lbs.
  - f. Pliability (ASTM D146/D146M): Unaffected at minus 25 degrees F, 0.063 inch mandrel.
  - g. Lap Adhesion (ASTM D1876 modified): Not less than 4.0 lbs per inch.
  - h. Peel Adhesion (ASTM D903): Not less than 5.0 lbs per inch.
  - i. Water Vapor Permeance (Vapor Impermeable Air Barrier) (ASTM E96/E96M, desiccant method A): 0.1 perms or less.
  - j. Water Absorption (ASTM D570): Not to exceed 0.12 percent by weight.
  - k. Flame propagation of wall assemblies (NFPA 285): Pass
  - 1. Surface Burning Characteristics (ASTM E84):
    - (1) Flame Spread Index Rating not higher than 75.
    - (2) Smoke Developed Index Rating not higher than 150.

2.2 PRIMERS, ADHESIVES, AND MASTICS

Provide primers, adhesives, mastics and other accessory materials as recommended in writing by the manufacturer of the self-adhering air barrier for adequate bonding to each type of substrate.

#### 2.3 SHEET METAL FLASHING

Provide as specified in Section 07 60 00 FLASHING AND SHEET METAL.

2.4 JOINT SEALANTS

Provide as specified in Section 07 92 00 JOINT SEALANTS. Verify compatibility with adjacent products that are or will be in contact with one another.

## PART 3 EXECUTION

#### 3.1 EXAMINATION

Before installing air barrier, examine substrates, areas, and conditions

SECTION 07 27 19.01 Page 6 Certified Final Submittal

under which air barrier assemblies will be applied, with Installer present, for compliance with requirements. Ensure the following conditions are met:

- a. Surfaces are sound, dry, even, and free of oil, grease, dirt, excess mortar or other contaminants.
- b. Concrete surfaces are cured and dry, smooth without large voids, spalled areas or sharp protrusions.
- c. Verify substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method in accordance with ASTM D4263 and take suitable measures until substrate passes moisture test.
- d. Verify sealants used in sheathing are compatible with membrane proposed for use. Perform field peel adhesion test on materials to which sealants are adhered.

## 3.2 PREPARATION

Clean, prepare, and treat substrate in accordance with manufacturer's written instructions. Ensure clean, dust-free, and dry substrate for air barrier application.

- a. Prime masonry and concrete substrates with conditioning primer.
- b. Prime gypsum sheathing an adequate number of coats to achieve required bond, with adequate drying time between coats.
- c. Prime wood, metal, and painted substrates with primer.
- d. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through air barrier and at protrusions.

#### 3.3 INSTALLATION

3.3.1 Installation of Self-adhering Air Barrier

Install materials in accordance with manufacturer's recommendations and the following:

- a. Apply primer at rate recommended by manufacturer prior to membrane installation. Allow primer to dry completely before membrane application. Apply as many coats as necessary for proper adhesion.
- b. When membrane is properly positioned, press into place and roll membrane with roller immediately after placement.
- c. Apply membrane sheets to shed water naturally without interception by a sheet edge, unless that edge is sealed with permanently flexible termination mastic.
- d. Position subsequent sheets of membrane applied above so that membrane overlaps the membrane sheet below by a minimum of 2-1/2 inches, unless greater overlap is recommended by manufacturer. Roll into place with roller.
- e. Make all side laps a minimum of 2-1/2 inches and all end laps a

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minimum of 5 inches, unless greater overlap is recommended by manufacturer. Roll seams with roller.

- f. Roll membrane to adhere to substrate. Cover corners and joints with two layers of reinforcement by first applying a 12 inch width of membrane centered along the axis. Flash drains and projections with a second ply of membrane for a distance of 6 inches from the drain or projection.
- g. Seal around all penetrations through the air barrier resulting from pipes, vents, conduit, electrical fixtures, structural members, or other construction passing through it. Seal with termination mastic, extruded silicone sealant, membrane counterflashing or other sealing methods in accordance with manufacturer's written recommendations.
- h. Continuously connect the air barrier between walls, roof, floor and below grade assemblies to form a continuous integrated air barrier system around the entire building enclosure. Extend the air barrier membrane into rough openings such as doors, windows, louvers, and other exterior penetrations. Seal edges of barrier at junctures with rough openings.
- i. At changes in substrate plane, provide transition material (e.g. bead of sealant, mastic, extruded silicone sealant, membrane counterflashing or other material recommended by manufacturer) under membrane to eliminate all sharp 90 degree inside corners and to make a smooth transition from one plane to another.
- j. Provide mechanically fastened non-corrosive metal sheet to span gaps in substrate plane and to make a smooth transition from one plane to the other. Continuously support membrane with substrate.
- k. At deflection and control joints, provide backup for the membrane to accommodate anticipated movement.
- 1. At expansion and seismic joints provide transition to the joint assemblies.
- m. Apply a bead or trowel coat of mastic along membrane seams at reverse lapped seams, rough cuts, and as recommended by the manufacturer.
- n. At end of each working day, seal top edge of membrane to substrate with termination mastic.
- o. Do not allow materials to come in contact with chemically incompatible materials.
- p. Counterflash upper edge of thru-wall flashing and air barrier. Counter flashing and thru-wall flashing are specified in Section 07 60 00 FLASHING AND SHEET METAL.
- 3.4 FIELD QUALITY CONTROL
- 3.4.1 Site Inspections and Testing

Provide site inspections and testing in accordance with ABAA protocol to verify conformance with the manufacturer's instructions, the ABAA QAP Quality Assurance Program (<u>https://www.airbarrier.org/qap/</u>), Section 07 27 10.00 10 BUILDING AIR BARRIER SYSTEM, Section 07 05 23 PRESSURE

SECTION 07 27 19.01 Page 8 Certified Final Submittal

TESTING AN AIR BARRIER SYSTEM FOR AIR TIGHTNESS, and this section.

- a. Conduct inspections and testing at 5, 50, and 95 percent completion of this scope of work. Forward written site inspections and testing reports to the Contracting Officer within five working days of the inspection and test being performed.
- b. If inspections reveal any defects, promptly remove and replace defective work at no additional expense to the Government.

#### 3.5 FIELD PEEL ADHESION TEST

Conduct in accordance with test protocol indicated in Part 1, paragraph FIELD PEEL ADHESION TEST.

- 3.6 PROTECTION AND CLEANING
- 3.6.1 Protection
- 3.6.1.1 Adjacent Surfaces

Protect exposed adjacent surfaces that could be damaged by primers and adhesives associated with air barrier membrane. Provide protection during application and the remainder of construction in accordance with manufacturer's written instructions.

3.6.1.2 The Air Barrier Assembly

Protect finished portions of the air barrier assembly from damage during ongoing application and throughout the remainder of the construction period in accordance with manufacturer's written instructions. Coordinate timing of installation of materials that will cover the air barrier membrane to ensure the exposure period does not exceed that recommended by the air barrier manufacturer's written installation instructions. Remove and replace, at no additional cost to the government, membrane products that exceed the manufacturer's allowed exposure limits.

## 3.6.2 Cleaning

Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction and as acceptable to the primary material manufacturer.

-- End of Section --

SECTION 07 27 36

# SPRAY FOAM AIR BARRIERS 05/17, CHG 2: 08/20

## PART 1 GENERAL

1.1 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.

AIR BARRIER ASSOCIATION OF AMERICA (ABAA)

ABAA	Accreditation	Accreditation

ABAA QAP Quality Assurance Program

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

ASSP	Z9.2	(2018)	Fundame	enta	als Gov	verning t	the Design	n
		and Op	eration	of	Local	Exhaust	Ventilat:	ion
		System	IS					

ASSP Z88.2 (2015) American National Standard Practices for Respiratory Protection

ASTM INTERNATIONAL (ASTM)

ASTM	C518	(2021) Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
ASTM	C1029	(2015) Standard Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation
ASTM	C1303/C1303M	(2015) Standard Test Method for Predicting Long-Term Thermal Resistance of Closed-Cell Foam Insulation
ASTM	C1338	(2014) Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings
ASTM	D1621	(2016) Standard Test Method for Compressive Properties of Rigid Cellular Plastics
ASTM	D1622	(2014) Apparent Density of Rigid Cellular Plastics
ASTM	D1623	(2017) Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics

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Detroit Arsenal, MI	
ASTM D2126	(2009) Response of Rigid Cellular Plastics to Thermal and Humid Aging
ASTM D2842	(2012) Water Absorption of Rigid Cellular Plastics
ASTM D4541	(2017) Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
ASTM D6226	(2015) Standard Test Method for Open Cell Content of Rigid Cellular Plastics
ASTM E84	(2020) Standard Test Method for Surface Burning Characteristics of Building Materials
ASTM E96/E96M	(2022) Standard Test Methods for Gravimetric Determination ofWater Vapor Transmission Rate of Materials
ASTM E283	(2019) Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
ASTM E736	(2000; R 2011) Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members
ASTM E2178	(2021a) Standard Test Method for Air Permeance of Building Materials
ASTM E2357	(2017) Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
ICC EVALUATION SERVICE,	INC. (ICC-ES)
ICC-ES AC377	(2016) Acceptance Criteria for Spray-Applied Foam Plastic Insulation
INTERNATIONAL CODE COUN	CIL (ICC)
ICC IBC	(2021) International Building Code
ICC IECC	(2021) International Energy Conservation Code
INTERNATIONAL SAFETY EQ	UIPMENT ASSOCIATION (ISEA)
ANSI/ISEA Z87.1	(2020) Occupational and Educational Personal Eye and Face Protection Devices
NATIONAL FIRE PROTECTIO	N ASSOCIATION (NFPA)
NFPA 10	(2022; ERTA 1 2021) Standard for Portable Fire Extinguishers

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NFPA 31	(2020) Standard for the Installation of Oil-Burning Equipment
NFPA 54	(2021) National Fuel Gas Code
NFPA 70	(2020; TIA 22-1; ERTA 1 2022) National Electrical Code
NFPA 211	(2019) Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances
NFPA 275	(2017) Standard Method of Fire Tests for the Evaluation of Thermal Barriers
NFPA 285	(2012) Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components

SPRAY POLYURETHANE FOAM ALLIANCE (SPFA)

SPFA TechDocs	(2015	5) SI	PFA	Techni	.cal	Docum	lents	Library,
	four	cate	egor	ies:	Gene	eral,	Insul	lation,
	Roofing, Specialty							

U.S. DEPARTMENT OF DEFENSE (DOD)

UFC	3-600-01	(2016; wi	.th Change	6, 2021	l) Fire
		Protection	on Engineer	ing for	: Facilities

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29	CFR 1910.132	Personal Protective Equipment
29	CFR 1910.133	Eye and Face Protection
29	CFR 1910.134	Respiratory Protection

1.2 RELATED REQUIREMENTS

Coordinate the requirements of Section 07 27 10.00 10 BUILDING AIR BARRIER SYSTEM, Section 07 05 23 PRESSURE TESTING AN AIR BARRIER SYSTEM FOR AIR TIGHTNESS, Section 07 27 19.01 SELF-ADHERING AIR BARRIERS, and other building envelope sections to provide a complete air barrier system. Submit all materials, components, and assemblies of the air barrier system together as one complete submittal package.

## 1.3 DEFINITIONS

## 1.3.1 Long Term Thermal Resistance (LTTR)

The thermal resistance value of a closed cell foam insulation product measured using accelerated aging ASTM C1303/C1303M equivalent to the time-weighted average thermal resistance value over 15 years. Loss in thermal resistance is attributable to changes in cell gas composition caused by diffusion of air into and blowing agent out of the foam cells.

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1.3.2 SPFA TechDocs

Reformatted documents, named SPFA TechDocs ( http://www.sprayfoam.org/technical/spfa-technical-documents), places each document in one of four categories for easy reference and identification: Roofing, Insulation, Specialty and General.

Spray Polyurethane Foam: Thermal and air barrier system consisting of sprayed polyurethane foam (SPF).

1.4 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Qualification of Manufacturer; G Qualification of Installer; G Quality Control Plan; G Safety Plan; G Fire Prevention Plan; G Respirator Plan; G SD-02 Shop Drawings Spray Foam Air Barrier System Foam Air Barrier System; G-AE Fire-Rated Assemblies; G-AE SD-03 Product Data

Closed Cell SPF; G-AE Transition Membrane; G-AE Primers, Adhesives, and Mastics; G-AE Sealants; G-AE Safety Data Sheets; G-AE Thermal Barrier Materials; G-AE Accessories; G-AE Recycled Content for Closed Cell Spray Foam Air Barrier; S

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W912QR25R0052 Specs Vol1-0000 P2#: 506474 - Manned/Unmanned Tactical Vehicle Lab (MUMT) Detroit Arsenal, MI SD-04 Samples Spray Foam Air Barrier Mockup; G SD-06 Test Reports Field Peel Adhesion Test; G Thermographic Test; G Air Barrier Test; G Primers; G Fire-Ratings Of Thermal Barrier Materials; G Flame Spread And Smoke Developed Index Ratings Of SPF Products; G Flame Propagation Of Wall Assemblies; G Site Inspections Reports; G SD-07 Certificates Closed cell SPF; G Transition Membrane; G Indoor Air Quality for Spray Foam Air Barrier; S SD-08 Manufacturer's Instructions SPF Handling, Storage, and Spray Procedures; G Substrate Preparation; G Thermal Barrier; G Transition Membrane; G Primers, Adhesives, and Mastics; G SD-09 Manufacturer's Field Reports Core Samples; G Daily Work Record; G Visual Inspection and Thermal Scanning; G MISCELLANEOUS REQUIREMENTS 1.5 For the spray foam air barrier system provide the following: 1.5.1 Shop Drawings

Submit spray foam air barrier shop drawings showing locations, detailing, and extent of spray foam air barrier assemblies. Provide details of all typical conditions, intersections with other envelope assemblies and

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materials, membrane counter-flashings. Provide details for fire-rated assemblies and indicate materials for thermal barriers. Show details for bridging of gaps in construction, treatment of inside and outside corners, expansion joints, methods of attachment of materials covering the SPF without compromising the barrier. Indicate how miscellaneous penetrations such as conduit, pipes, electric boxes, brick ties, and similar items will be sealed.

# 1.5.2 Product Data

Submit manufacturer's technical data indicating compliance with performance and environmental requirements, manufacturer's printed instructions for evaluating, preparing, and treating substrates, temperature and other limitations of installation conditions, safety requirements for installation, and Safety Data Sheets. Indicate flame and smoke spread ratings for all products. Submit thermal barrier literature including material description, physical properties, and fire-ratings.

# 1.5.3 Mockup

Provide a mockup of each foam system specified. Apply foam in an area designated by the Contracting Officer. Apply an area of not less than 50 square feet. Include all components specified for the finished assembly including primers, support components, expansion and contraction joints, thermal barriers, and other accessories as representative of the complete system. Isolate the area and protect workers as required by 29 CFR 1910.132, 29 CFR 1910.133 and 29 CFR 1910.134. Notify the Contracting Officer a minimum of 48 hours prior to the test application. Select a test area representative of conditions to be sprayed including window or door openings, wall to ceiling transitions, flashings, and penetrations, as applicable.

# 1.5.4 Test Reports

Submit test reports indicating that field peel adhesion tests on all materials have been performed and the changes made, if required, in order to achieve successful and lasting adhesion. Submit test reports for flame spread and smoke developed index ratings of SPF products tested in accordance with ASTM E84. Submit test reports for flame propagation of wall assemblies tested in accordance with NFPA 285. Submit test reports for fire-ratings of thermal barrier materials tested in accordance with ASTM E84.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

## 1.6.1 Delivery

Deliver and store materials in sufficient quantity to allow for uninterrupted flow of work. Inspect materials delivered to the site for damage; unload and store out of weather. Deliver materials to the jobsite in their original unopened packages, clearly marked with the manufacturer's name, brand designation, description of contents, and shelf life of containerized materials. Store and handle to protect from damage. Submit SPF Handling, Storage, and Spray Procedures in accordance with submittal procedures.

# 1.6.2 Storage

Store materials in clean, dry areas, away from excessive heat, sparks, and

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open flame. Maintain temperatures in the storage area below the materials' flash point(s) and within limits recommended by the manufacturer's printed instructions. Provide ventilation in accordance with ASSP Z9.2 to prevent build-up of flammable gases. Store MDI (A-side) drums in locations that limit the risk of contact with water, acids, caustics (such as lye), alcohols, and strong oxidizing and reducing agents.

#### 1.6.3 Handling

Handle materials and containers safely and in accordance with manufacturer's recommendations. Store liquids in airtight containers and keep containers closed except when removing materials. Do not use equipment or containers containing remains of dissimilar materials. Do not expose foam component containers to direct sunlight. Do not use materials from containers with content temperatures in excess of 80 degrees F.

Containers exposed to long periods of cold may also exhibit separation and poor performance. Do not use materials exposed to temperature ranges outside of manufacturer's instructions for exposure limits.

Mark and remove from job site materials which have been exposed to moisture, that exceed shelf life limits, or that have been exposed to temperature extremes.

#### 1.6.3.1 Venting and Handling of Material Containers

Partially unscrew material container and drum caps to gradually vent the containers prior to opening. Do not inhale vapors. Decontaminate empty component containers by filling with water and allowing to stand for 48 hours with bung caps removed. Do not, under any circumstances seal, stop, or close containers which have been emptied of foam components.

# 1.7 FIELD PEEL ADHESION TEST

Perform a field peel adhesion test on the construction mockup. Test the SPF for adhesion in accordance with ASTM D4541 using a Type II pull tester except use a disk that is 4 inches in diameter and cut through the membrane to separate the material attached to the dish from the surrounding material. Perform test after curing period in accordance with manufacturer's written recommendations. Record mode of failure and area which failed in accordance with ASTM D4541. Compare adhesion values with the manufacturer's established minimum values for the particular combination of material and substrate. Indicate on the inspection report whether the manufacturer's requirement has been met. Where the manufacturer has not declared a minimum adhesion value for their product and substrate combination, the inspector must record actual values.

# 1.8 AIR BARRIER TESTING

Perform air barrier testing in accordance with Section 07 27 10.00 10 BUILDING AIR BARRIER SYSTEM and Section 07 05 23 PRESSURE TESTING AN AIR BARRIER SYSTEM FOR AIR TIGHTNESS.

# 1.9 SAFETY PROVISIONS

# 1.9.1 Fire Prevention

Provide a written fire prevention plan for the SPF application. Address

specific fire hazards such as spontaneous combustion from exothermic heat build-up of SPF components during curing. Provide a continuous fire watch during mixing and spraying of SPF and for a minimum of 30 minutes after completion of work at the end of each day. Maintain fire watch for additional time as required to ensure no potential ignition conditions exist.

# 1.9.1.1 Fire Extinguishers

Furnish two fire extinguishers of minimum 15 pounds capacity each, in accordance with NFPA 10, in the immediate vicinity of the work. CAUTION: Do not discharge high pressure carbon dioxide extinguishers where explosive vapors exist since the discharge can cause a spark which will ignite the vapors.

#### 1.9.2 Respirator Plan

Provide a written respirator plan in accordance with OSHA regulations that protects installers during application and addresses separation of the area to prevent other workers from entering the work area during spraying.

# 1.9.3 Isolation

Isolate the work area as recommended by spray foam manufacturer's written requirements. Prevent workers without respiratory, skin, and eye Personal Protective Equipment (PPE) or training from entering the work area or otherwise being exposed to off-gassing of the insulation in excess of permissible exposure limits.

# 1.9.4 Respirators and Eye Protection

Respiratory protective devices (respirators) must meet the requirements of ASSP Z88.2. Eye and face protective equipment must meet the requirements of ANSI/ISEA Z87.1. Additionally, sprayers and workers in the immediate vicinity of the spray must wear NIOSH-approved, full-face, supplied air respirators (SAR) operated in positive pressure or continuous flow mode. Workers not in the immediate vicinity of the sprayer must wear air purifying respirators (APR) with an organic gas / P100 particulate cartridge. Instruct personnel in the use of devices. Maintain such equipment and inspect regularly. All workers are required to have undergone pulmonary function testing and fit testing and must provide certification that they have done so. Change APR cartridges in accordance with manufacturer's written recommendations.

# 1.9.5 Clothing and Gloves

Sprayers and workers must wear protective clothing and gloves in accordance with OSHA requirements during materials application. Disposable coveralls must be worn and must cover all exposed skin. Sprayers and workers must wear fabric gloves coated with nitrile, neoprene, butyl or PVC.

#### 1.9.6 Additional Requirements

Require personnel to review the Health, Safety and Environmental Aspects of Spray Polyurethane Foam and Coverings published by the Spray Polyurethane Foam Alliance (SPFA). Verify compliance prior to allowing personnel on site for installation work. http://www.sprayfoam.org.

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# 1.10 QUALITY ASSURANCE

1.10.1 Qualification of Manufacturer

Submit documentation verifying that the manufacturer of the SPF is currently accredited by the Air Barrier Association of America (ABAA Accreditation <a href="https://www.airbarrier.org/">https://www.airbarrier.org/</a>) and by the Spray Polyurethane Foam Alliance (SPFA).

# 1.10.2 Qualification of Installer

Submit documentation verifying that installers of the spray foam air barrier are currently certified by ABAA/BPQI (Building Performance Quality Institute) and by the Spray Polyurethane Foam Alliance (SPFA) Professional Certification Program (PCP). Installers must provide photo identification certification cards for inspection upon request.

1.10.3 General Quality Requirements

Provide all products and installation in accordance with SPFA TechDocs requirements (<u>http://www.sprayfoam.org/technical/spfa-technical-documents</u>) and documented best practices.

1.11 PRECONSTRUCTION MEETING

Conduct a preconstruction meeting after approval of submittals and a minimum of two weeks prior to commencing work specified in this Section. Attendance is required by the Contracting Officer's designated personnel, Contractor, and representatives of related trades including covering materials, substrate materials, adjacent materials, and materials and components of the air/vapor/thermal barrier system. Agenda must include, at a minimum, the following items:

- a. Drawings, specifications and submittals related to the SPF work;
- b. Sequence of construction;
- c. Coordination with substrate preparation work and responsibility of repairing defects in substrates. Determine method of ensuring SPF work does not begin until substrates have been inspected and accepted;
- d. Compatibility of materials;
- e. Construction and testing of construction mockup;
- f. Application of self-adhering air barrier transitions strips and primer as required for sealing the spray foam air barrier system at openings including but not limited to windows, doors and louvers;
- g. Spray foam air barrier system installation; including methods to be used to provide a continuous barrier at thru-wall flashing, penetrations, and covering of embed items;
- h. Quality control plan including methods of applying the product so that a consistent thickness across the face of the substrate is achieved.
- i. Procedures for SPF manufacturer's technical representative's onsite inspection and acceptance of substrates, contact info for the representative, frequency of visits, and distribution of copies of

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> inspection reports. Determine where core samples will be taken and review procedures for daily documentation of SPF application.

- j. Property protection measures and prevention of overspray and clean-up should overspray occur.
- k. Safety requirements, including review of PPE, fire prevention, safety plan, respirator plan, ventilation and separation of the work area, fall protection, and posting of warning signs. Provide a complete schedule and a detailed, written fire protection plan.

#### 1.12 ENVIRONMENTAL CONDITIONS

1.12.1 Temperature and Weather

Install SPF within the range of ambient and substrate surface temperatures in accordance with manufacturer's written instructions. Do not apply SPF to damp or wet substrates. Do not apply SPF during inclement weather or when ice, frost, surface moisture, or visible dampness is present on surfaces to be covered, or when precipitation is imminent. Do not apply SPF to exterior building surfaces when wind speeds exceed 25 miles per hour. Use moisture measuring methods and equipment to verify that the moisture conditions of substrate surfaces are in accordance with SPF manufacturer requirements prior to application. Substrate temperatures must be within limits recommended by the manufacturer's printed instructions.

1.12.2 Conditions for Primers

Follow manufacturer's printed application and curing instructions. Do not apply primer when ambient temperature is below 40 degrees F or when ambient temperature is expected to fall below 35 degrees F for the duration of the drying or curing period.

1.12.3 Conditions for Ignition Barriers

Ensure that sprayed surfaces comply with manufacturer's written requirements for application coverage, thickness, and curing prior to application of ignition barrier coatings.

1.12.4 Temporary Ventilation

Provide temporary ventilation for work of this section in accordance with manufacturer's written instructions and with OSHA requirements for this type of application.

- 1.13 FOAM SPRAY EQUIPMENT
- 1.13.1 Applicator

Use an air purge foam spray gun.

1.13.2 Equipment Calibration

Fully calibrate the foam metering equipment to monitor each liquid component to within 2 percent of the SPF manufacturer's required metering ratio. Calibrate spray equipment each day at the start of operations, after each restart if spraying operations have been terminated for more than one hour, whenever there is a change in fan pattern or pressure,

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whenever slow curing areas are noticed, whenever a change is made in hose length or working height, and after changeover between materials. Calibration consists of demonstrating that the equipment is adjusted to deliver components in proper mix and proportion. Conduct calibration tests on cardboard or plywood on a wall adjacent to the area to be sprayed.

#### 1.13.3 Metering Equipment Requirements

Use foam metering equipment capable of developing and maintaining the SPF manufacturer's required liquid component pressures and temperatures. Foam metering equipment must have gages for visual monitoring. Equipment must provide temperature control of foam components to within the temperature ranges recommended by the foam manufacturer's printed instructions.

# 1.13.4 Moisture Protection

Protect surfaces of supply containers and tanks used to feed foam metering equipment from moisture.

1.13.5 Compressed Air

Supply compressed air that is in contact with SPF during mixing or atomization through moisture traps that are continuously bled.

1.13.6 Dispense Excess Materials

Do not deposit materials used for cleaning of equipment or materials dispensed for calibration purposes and establishment of spray gun pattern onto the ground. Dispense such materials into scrap containers or onto plastic film, or cardboard, and dispose of in accordance with safety requirements and jobsite regulations.

# PART 2 PRODUCTS

- 2.1 SPRAY FOAM AIR BARRIER
- 2.1.1 General

Provide a closed cell, sprayed in place, SPF that forms a continuous air /thermal barrier at the building enclosure. Provide in accordance with ASTM C1029, with the requirements of UFC 3-600-01, ICC IBC Chapter 26, ICC-ES AC377, and NFPA 285. In the event of a conflict, the most stringent requirement applies. Provide all system components necessary for a complete, code compliant installation, whether indicated or not, including material support components, expansion and contraction joints, thermal barrier materials, and accessories.

# 2.1.2 Physical Properties

Provide a closed cell product with the following characteristics:

- a. Density (ASTM D1622): 2.0 lb per cf, nominal
- b. Thermal Resistance (ASTM C518)
  - (1) Initial R-value per inch thickness: 7 sf.degrees F h per Btu
  - (2) Aged R-value per inch thickness (180 days at 76 degrees F): 6.6 sf.degrees F.h per Btu

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- c. Air Permeance (ASTM E2178): In accordance with Section 07 27 10.00 10 BUILDING AIR BARRIER SYSTEM.
- d. Air Leakage (ASTM E2357, ASTM E283): In accordance with Section 07 27 10.00 10 BUILDING AIR BARRIER SYSTEM and Section 07 05 23 PRESSURE TESTING AN AIR BARRIER SYSTEM FOR AIR TIGHTNESS.
- e. Compressive Strength (ASTM D1621): Minimum 28.3 psi
- f. Tensile Strength (ASTM D1623)
  - (1) Medium density: 15 psi
  - (2) Roofing: 40 psi
- g. Water Vapor Permeance (ASTM E96/E96M, water method): less than 1.2 US Perms at one inch thickness
- h. Vapor Retarder (ICC IBC, ICC IECC) Class III
- i. Surface Burning Characteristics (ASTM E84) 3 inch thickness:
  - (1) Flame Spread (FS) Index Rating less than 75 ,.
  - (2) Smoke Developed (SD) Index Rating less than 150. SPF with an SD rating greater than 150 but less than 450 may be used when fully encapsulated. Approval of SPF product is contingent upon approval of encapsulation products and assemblies..
- j. Closed Cell Content (ASTM D6226): 90 percent
- k. Dimensional Stability (Humid Aging) (ASTM D2126): 15 percent at 28 days at 158 degrees F with 97 percent relative humidity.
- 1. Water Absorption (ASTM D2842): Maximum 1.0 per volume
- m. Fungi Resistance (ASTM C1338): Pass, with no growth
- n. Recycled Content: Minimum 9 percent (pre- and post-consumer). Provide data identifying percentage of recycled content for closed cell spray foam air barrier.
- 2.1.3 Expansion and Contraction

Provide an assembly that allows for relative movement due to temperature, moisture, and air pressure changes. Provide expansion and contraction measures as required by the manufacturer's written recommendations.

2.1.4 Fire-ratings, Flame Spread and Smoke Developed Index Ratings

Where fire-rated materials are indicated, provide products with the appropriate markings of a qualified testing agency. Submit fire-rating test reports. Submit flame spread (FS) and smoke developed (SD) index data. Where FS and SD values of foam products do not meet requirements, provide corresponding thermal barrier products or assemblies and verify complete encapsulation of the spray foam air barrier through product data or on shop drawings. Submit for approval in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

#### 2.1.5 Prohibited Materials

Products that contain hexabromocyclododecane (HBCD) flame retardants are prohibited. Products that contain hydrochlorofluorocarbons (HCFCs), chlorofluorocarbons (CFCs), or other high ozone depleting blowing agents, are prohibited. For a list of acceptable substitute foam blowing agents see <a href="https://www.epa.gov/snap/foam-blowing-agents">https://www.epa.gov/snap/foam-blowing-agents</a>. Provide validation of indoor air quality for spray foam air barrier that no prohibited materials are used.

#### 2.1.6 Thermal Barrier

Provide a thermal barrier in locations where SPF is exposed to the interior of the building, including attics and plenum spaces. Provide thermal barriers in accordance with ICC IBC Chapter 26 "Plastics," with ICC-ES AC377, ASTM E736, and NFPA 275. Choose one or more of the following methods of separation:

- a. Building interior, other than fire-rated enclosures: Separate the SPF from the occupied interior of a building by a continuous thermal barrier of 1/2 inch glass mat gypsum wallboard (GWB) in accordance with ICC IBC Chapter 26 requirements.. Provide in accordance with NFPA 275.
- b. Building interior, fire-rated enclosures: At walls, ceilings and floors that are required to be fire-rated, separate the SPF from the occupied interior of a building with an ignition barrier consisting of 5/8 inch, Type X, fire-rated GWB in the number of layers corresponding to required ratings. Include all accessories as necessary for complete fire-rated assemblies.
- c. Unoccupied attics, crawl spaces: Where fire-rated enclosures are not required, and where entry is made only for service of utilities, separate the SPF from the attic or crawl space with a continuous ignition barrier in accordance with ICC IBC Chapter 26 requirements, and as approved by the Contracting Officer's Representative. Provide one of the following:
  - (1) 1-1/2 inch thick mineral fiber insulation
  - (2) 1-1/2 inch thick cellulose insulation

#### 2.2 TRANSITION MEMBRANE

Provide as specified in Section 07 27 19.01 SELF-ADHERING AIR BARRIERS.

#### 2.3 PRIMERS, ADHESIVES, AND MASTICS

Provide primers, adhesives, mastics and other accessory materials as recommended by spray foam manufacturer's printed literature.

# 2.4 FLASHING

As specified in Section 07 60 00 FLASHING AND SHEET METAL.

# 2.5 JOINT SEALANTS

As specified in Section 07 92 00 JOINT SEALANTS. Verify compatibility

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with other system products.

# PART 3 EXECUTION

#### 3.1 EXAMINATION

Before installing the spray foam air barrier and with the installer present, examine substrates, areas, and conditions under which SPF will be applied, for compliance with requirements. Ensure that surfaces are sound, dry, even, and free of oil, grease, dirt, excess mortar or other contaminants. Ensure that concrete surfaces are cured and dry, smooth without large voids, spalled areas or sharp protrusions. Correct defects that adversely affect the spray foam application or performance. Verify that work by other trades is in place and complete prior to application of spray foam.

#### 3.2 PREPARATION

#### 3.2.1 Substrate Preparation

Clean, prepare, and treat substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for spray foam application.

- a. Prepare surfaces by brushing, scrubbing, scraping, or grinding to remove loose mortar, dust, oil, grease, oxidation, mill scale and other contaminants which will affect adhesion of the SPF.
- b. Wipe down metal surfaces to remove release agents or other non-compatible coatings, using clean sponges or rags soaked in a solvent compatible with the SPF.

# 3.2.2 Protection

Protect adjacent areas and surfaces from spray applied materials in accordance with the following:

- a. Mask and cover adjacent areas to protect from over spray.
- b. Ensure required foam stops and back up materials are in place to achieve a complete seal.
- c. Seal off ventilation equipment. Install temporary ducting and fans to provide required exhaust of spray fumes. Provide make-up air as required.
- d. Erect barriers, isolate area, and post warning signs to notify non-protected personnel of the requirement to avoid the spray area.
- 3.2.3 Blocking Around Heat Producing Devices

Install non-combustible blocking around heat producing devices to provide the following clearances:

a. Recessed light fixtures, including wiring compartments, ballasts, and other heat producing devices, unless certified for installation surrounded by insulation: Minimum of 3 inches from outside face of fixtures and devices and in accordance with NFPA 70 and, if insulation is to be placed above fixture or device, 24 inches above fixture.

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- b. Vents and vent connectors used for venting products of combustion, flues, and chimneys other than masonry chimneys: Minimum clearances in accordance with NFPA 211.
- c. Gas Fired Appliances: Clearances in accordance with NFPA 54.
- d. Oil Fired Appliances: Clearances in accordance with NFPA 31. Blocking is not required if chimneys or flues are certified by the manufacturer for use in contact with insulating materials.

#### 3.2.4 Fire and Explosion Hazards

Prohibit open flames, sparks, welding, and smoking in the application area. Provide and maintain fire extinguishers of appropriate type, size and distance, as required by NFPA, in the application area. Mix batches in small enough quantities to avoid spontaneous combustion from exothermic heat build-up of SPF components during curing.

# 3.2.5 Warning Signs

Post warning signs at ground level adjacent to the work area and a minimum of 150 feet from the application area stating the area is off limits to unauthorized persons and warning of potential hazards. Place clearly visible and legible warning sign at entrance to primary road leading to the project facility warning of presence of flammable materials, irritating fumes, and potential of overspray damage.

#### 3.2.6 Prime Substrate

Provide as recommended by the manufacturer for each substrate to be primed. Use primers at full strength. Do not dilute primers unless required and as recommended in writing by the manufacturer. Do not use cleaning solvents for thinning primers or other materials. Ensure that diluted primer(s) meet VOC requirements.

#### 3.3 INSTALLATION

#### 3.3.1 Sequencing and Coordination

Sequence the work so as to prevent access to the work area by other trades during foam application and curing. Limit access of non-essential workers during application. Notify the Contracting Officer 24 hours in advance of spraying operations. Sequence spray foam work with other trades to permit continuous self-flashing of the spray foam air barrier. Ensure expansion and control joints are provided as detailed on the manufacturer's shop drawings to accommodate the expansion of each layer of the air/thermal envelope. Provide temporary fire protection of uncured foam, and isolate the work area, until foam application is isolated with a permanent thermal barrier.

# 3.3.2 Installation of Transition Membrane

Install transition membrane materials in accordance with the details on the drawings, Section 07 27 19.01 SELF-ADHERING AIR BARRIERS, and the following:

a. Install transition membrane at all required locations prior to

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installation of the fluid-applied membrane air barrier.

- b. Verify transition membrane is fully adhered to substrate and that its surface is clean, dry and wrinkle free prior to installation of the fluid-applied membrane air barrier.
- c. Verify transition membrane completely covers all transition areas and will provide continuity of the finished SPF air barrier without gaps or cracks.
- 3.3.3 Installation of Spray Foam Air Barrier

Install materials in accordance with paragraph SAFETY PROVISIONS, in accordance with manufacturer's recommendations, and in accordance with the following:

- a. Use spray equipment that complies with foam manufacturer's recommendations for the specific type of application, and as specified herein. Record equipment settings on the Daily Work Record. Each proportioned unit can supply only one spray gun.
- b. Apply only when surfaces and environmental conditions are within limits prescribed by the material manufacturer.
- c. Continuously connect the spray foam air barrier between walls, roof, floor, and below grade assemblies to form a continuous integrated air barrier system around the entire building enclosure. Extend the spray foam air barrier into rough openings such as doors, windows, louvers, and other exterior penetrations. Use self-adhering air barrier transition strips if necessary to achieve full extension and continuity of the barrier at these locations. Seal edges of barrier at junctures with rough openings.
- d. Install within manufacturer's tolerances, but not more than minus 1/4 inch or plus 1/2 inch.
- e. Sequence work so as to completely seal all penetrations resulting from pipes, vents, wires, conduit, electrical fixtures, structural members, or other construction. If penetrations through the spray foam air barrier are made after the initial SPF application, reapply in accordance with manufacturer's written instructions for such remedial work.
- f. Do not install SPF within 3 inches of heat emitting devices such as light fixtures and chimneys.
- g. Finished surface of SPF must be free of voids and embedded foreign objects.
- Remove masking materials and over spray from adjacent areas immediately after foam surface has hardened. Ensure cleaning methods do not damage work performed by other sections.
- i. Trim, as required, any excess thickness that would interfere with the application of cladding and covering system by other trades.
- j. Clean and restore surfaces soiled or damaged by work of other trades. Before cleaning and restoring damaged work, consult with other trades for appropriate and approved methods for cleaning and restoration to

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prevent further damage.

- k. Complete connections to other components and repair any gaps, holes or other damage using material approved by the manufacturer.
- Provide expansion joints in the SPF application aligned with expansion joints in the building enclosure, where substrate materials change, and in accordance with manufacturer's recommendations.
- m. Provide a continuous fire watch in accordance with paragraph SAFETY PROVISIONS.
- 3.4 FIELD QUALITY CONTROL
- 3.4.1 General Site Inspections and Testing

Provide site inspections and testing in accordance with ABAA protocol to verify conformance with the manufacturer's instructions, the ABAA QAP Quality Assurance Program (<u>https://www.airbarrier.org/qap/</u>), Section 07 27 10.00 10 BUILDING AIR BARRIER SYSTEM, Section 07 05 23 PRESSURE TESTING AN AIR BARRIER SYSTEM FOR AIR TIGHTNESS, and this section.

- a. Conduct inspections and testing at 5, 50, and 95 percent of completion of this scope of work. Forward written inspection reports to the Contracting Officer within 5 working days of the inspection and test being performed.
- b. If inspections reveal any defects, promptly remove and replace defective work at no additional expense to the Government.

# 3.4.2 Manufacturer Site Inspections

Manufacturer's technical representative must visit the site during the installation process to ensure the SPF and accessories are being applied in compliance with requirements. At a minimum, manufacturer's technical representative must be present at work startup and perform field inspection of the first day's completed application and at substantial completion, prior to demobilization. After each inspection, submit an inspection report signed by the manufacturer's technical representative, to the Contracting Officer within five working days. The inspection report must note overall quality of work, deficiencies, and recommended corrective actions in detail. Notify the Contracting Officer a minimum of two working days prior to site visits by manufacturer's technical representative.

3.4.3 Contractor's Site Inspections

Establish and maintain an inspection procedure to ensure compliance of the foam installation with contract requirements. Conduct inspections and testing at 5, 50, and 95 percent completion of application. Forward written inspection reports to the Contracting Officer within five working days of the inspection and test being performed. Work not in compliance must be promptly removed and replaced or corrected, in an approved manner, at no additional cost to the Government. Quality control must include, but is not limited to, the following:

a. Observation of environmental conditions; number and skill level of insulation workers.

- b. Verification of certification, listing, or label.
- c. Verification of proper storage and handling of materials before, during, and after installation.
- d. Inspection of SPF, support structure, primer, expansion joints, thermal barrier, and accessories.
- 3.4.4 Field Peel Adhesion Test

Conduct in accordance with test protocol indicated in Part 1 paragraph FIELD PEEL ADHENSION TEST.

3.4.5 Visual Inspection and Thermal Scanning

Following completion of installation, inspect the SPF surface or cavity using infrared (IR) scanning as specified in ASTM C1060 and ASTM C1153. Where the IR inspection indicates construction inconsistencies including wet insulation, remove inconsistent portions of the assembly and replace insulation to correct thermal anomalies. Reinspect and document corrections to the satisfaction of the Contracting Officer.

3.4.5.1 Thermographic Test Report

Include thermographs in color and a color temperature scale to define the temperature indicated by the various colors. Identify the high temperature reading, the outdoor air temperature, the building indoor air temperature, and the wind speed and direction. Note areas of compromise in the building enclosure, and note actions required and taken to correct those areas. Final thermography test report must demonstrate that the problem areas have been corrected. Submit the complete test and analysis.

3.5 CORRECTION OF DEFICIENCIES

Upon completion of inspection, testing, or sample taking, repair damaged construction, restore substrates and finishes, and protect repaired construction. Deficiencies found during inspection must be corrected within 5 working days following notification.

3.6 CLEANUP OF SPILLS

Conduct cleanup of uncured product spillage in accordance with paragraph SAFETY PROVISIONS and the manufacturer's written safe handling instructions. In the event of a conflict, the most stringent requirement governs.

- 3.7 PROTECTION AND CLEANING
- 3.7.1 Protection of Installed Work

Protect SPF installation from damage during application and remainder of construction period in accordance with manufacturer's written instructions. Repair damaged areas to new condition.

# 3.7.2 Cleaning of Adjacent Surfaces

Clean overspray from adjacent construction using cleaning agents and procedures as recommended in writing by the manufacturer of each type of affected construction and as acceptable to same.

-- End of Section --

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# METAL WALL PANELS 05/11, CHG 2: 02/18

# PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)

AAMA	501.1	(2017) Standard Test Method for Water Penetration of Windows, Curtain Walls an Doors Using Dynamic Pressure	.d
AAMA	800	(2016) Voluntary Specifications and Test Methods for Sealants	

AMERICAN IRON AND STEEL INSTITUTE (AISI)

AISI S100	(2012) North American Specification for
	the Design of Cold-Formed Steel Structural
	Members

AISI SG03-3 (2002; Suppl 2001-2004; R 2008) Cold-Formed Steel Design Manual Set

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7-16 (2017; Errata 2018; Supp 1 2018) Minimum Design Loads and Associated Criteria for Buildings and Other Structures

ASTM INTERNATIONAL (ASTM)

ASTM	A36/A36M	(2019) Standard Specification for Carbon Structural Steel
ASTM	A123/A123M	(2017) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM	A463/A463M	(2015; R 2020; E 2020) Standard Specification for Steel Sheet, Aluminum-Coated, by the Hot-Dip Process
ASTM	A606/A606M	(2018) Standard Specification for Steel Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance
ASTM	A653/A653M	(2020) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by

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P2#: 50 Detroit	6474 - Manned/Unmanned Arsenal, MI	Tactical Vehicle Lab (MUMT)
		the Hot-Dip Process
ASTM	A792/A792M	(2021a) Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process
ASTM .	A1008/A1008M	(2021) Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable
ASTM	B117	(2019) Standard Practice for Operating Salt Spray (Fog) Apparatus
ASTM	C591	(2021) Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation
ASTM	C612	(2014; R 2019) Standard Specification for Mineral Fiber Block and Board Thermal Insulation
ASTM	C920	(2018) Standard Specification for Elastomeric Joint Sealants
ASTM	D522/D522M	(2017) Mandrel Bend Test of Attached Organic Coatings
ASTM	D523	(2014; R 2018) Standard Test Method for Specular Gloss
ASTM	D610	(2008; R 2019) Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces
ASTM	D714	(2002; R 2017) Standard Test Method for Evaluating Degree of Blistering of Paints
ASTM	D822	(2013; R 2018) Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings
ASTM	D968	(2017) Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM	D1056	(2020) Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber
ASTM	D1308	(2002; R 2013) Effect of Household Chemicals on Clear and Pigmented Organic Finishes
ASTM	D1654	(2008; R 2016; E 2017) Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments

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ASTM	D1667	(2017) Standard Specification for Flexible Cellular Materials - Poly (Vinyl Chloride) Foam (Closed-Cell)
ASTM	D2244	(2016) Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates
ASTM	D2247	(2015) Testing Water Resistance of Coatings in 100% Relative Humidity
ASTM	D2794	(1993; R 2019) Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
ASTM	D3359	(2017) Standard Test Methods for Rating Adhesion by Tape Test
ASTM	D3363	(2005; E 2011; R 2011; E 2012) Film Hardness by Pencil Test
ASTM	D4214	(2007; R 2015) Standard Test Method for Evaluating the Degree of Chalking of Exterior Paint Films
ASTM	D4587	(2011; R 2019; E 2019) Standard Practice for Fluorescent UV-Condensation Exposures of Paint and Related Coatings
ASTM	D5894	(2016) Standard Practice for Cyclic Salt Fog/UV Exposure of Painted Metal, (Alternating Exposures in a Fog/Dry Cabinet and a UV/Condensation Cabinet)
ASTM	E72	(2015) Conducting Strength Tests of Panels for Building Construction
ASTM	E84	(2020) Standard Test Method for Surface Burning Characteristics of Building Materials
ASTM	E283	(2019) Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
ASTM	E331	(2000; R 2016) Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
ASTM	E1592	(2017) Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference

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ASTM G152	(2013; R 2021) Standard Practice for
	Operating Open Flame Carbon Arc Light
	Apparatus for Exposure of Nonmetallic
	Materials

(2013; R 2021) Standard Practice for ASTM G153 Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials

METAL BUILDING MANUFACTURERS ASSOCIATION (MBMA)

MBMA MBSM (2018) Metal Building Systems Manual

NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)

NAAMM AMP 500 (2006) Metal Finishes Manual

> SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)

SMACNA 1793 (2012) Architectural Sheet Metal Manual, 7th Edition

U.S. GREEN BUILDING COUNCIL (USGBC)

LEED v4 BDC Ref Guide	(2013; R 2020) USGBC LEED Reference Guide
	for Building Design and Construction, $v4$
LEED v4.1 BDC Ref Guide	(2023) LEED v4.1 Building Design and
	Construction Reference Guide

UNDERWRITERS LABORATORIES (UL)

UL Bld Mat Dir (updated continuously online) Building Materials Directory

# 1.2 DEFINITIONS

Detroit Arsenal, MI

Metal Wall Panel: Metal wall panels, attachment system components, and accessories necessary for a complete weather-tight wall system.

#### 1.3 DESCRIPTION OF WALL PANEL SYSTEM

Factory-color-finished, galvalume metal wall panel system with concealed fastening attachment. Panel profile must be embossed flush face as shown on Drawings.

Metal Wall Panel General Performance 1.3.1

Comply with performance requirements, conforming to AISI S100, without failure due to defective manufacture, fabrication, installation, or other defects in construction. Wall panels and accessory components must conform to the following standards:

ASTM A1008/A1008M ASTM A123/A123M ASTM A36/A36M ASTM A653/A653M

ASTM A463/A463M for aluminum coated steel sheet ASTM A606/A606M ASTM D522/D522M for applied coatings UL Bld Mat Dir

# 1.3.2 Structural Performance

Maximum calculated fiber stress must not exceed the allowable value in the AISI or AA manuals; a one-third overstress for wind is allowed. Midspan deflection under maximum design loads is limited to L/180. Contract Drawings show the design wind loads and the extent and general assembly details of the metal siding. Contractor must provide design for members and connections not shown on the Drawings. Siding panels and accessories must be the products of the same manufacturer.

Provide metal wall panel assemblies complying with the load and stress requirements in accordance with ASTM E1592. Wind load force due to wind action governs the design for panels.

Wall systems and attachments must resist the wind loads as determined by ASTM E72 and ASCE 7-16 in the geographic area where the construction will take place, in pounds per square foot. Submit five copies of wind load tests to the Contracting Officer.

# 1.3.3 Air Infiltration

Air leakage must conform to the limits through the wall assembly area when tested according to ASTM E283.

1.3.4 Water Penetration Under Static Pressure

No water penetration when tested according to ASTM E331.

1.3.5 Water Penetration Under Dynamic Pressure

No evidence of water leakage when tested according to AAMA 501.1.

# 1.4 SUSTAINABILITY REPORTING

Work of this section is intended to contribute to the achievement of, or compliance with, the requirements of the Guiding Principles Validation and LEED Prerequisites and attempted Credits. Refer to Section 01 33 29.00 06 SUSTAINABILITY REPORTING for specific documentation requirements and list of Prerequisites, attempted Credits and LEED version.

Comply with product, material content, performance criteria, activity, documentation, and other technical requirements as described in the LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide as applicable.

Collect, organize, and submit product data, drawings, diagrams, photos and cost information necessary to demonstrate compliance with LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide requirements as applicable.

Data collection shall commence with the notice to proceed and will only be deemed complete upon acceptance of the Final Sustainability Notebook and LEED Online submission by the Contracting Officer, the LEED Project Administrator, and the Green Building Certification Institute.

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1.5 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Submit Documentation for the following items:

Qualification of Manufacturer; G Qualification of Installation Contractor; G Sample Warranty; G, AE

SD-02 Shop Drawings

Installation Drawings ; G, AE

SD-03 Product Data

Environmental Product Declarations; S

Embodied Carbon Optimization Report/Action Plan; S

Extended Producer Responsibility; S

Recycled Content For Insulation; S

Local/Regional Materials; S

Material Ingredient Reporting; S

Submit Manufacturer's catalog data for the following items:

Wall Panels ; G, AE Factory Color Finish Closure Materials Pressure Sensitive Tape Sealants and Caulking Accessories

#### SD-04 Samples

Submit as required each of the following samples:

Wall Panels, 12 inches long by actual panel width; G, AE Fasteners; G, AE Metal Closure Strips, 10 inches long of each type; G, AE

Color chart and chips ; G, AE

Submit manufacturer's color charts and chips, approximately 4 by 4 inches, showing full range of colors, textures and patterns available for wall panels with factory applied finishes.

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SD-05 Design Data Wind load design analysis; G, AE As applicable, submit the following wind load design analysis data, to include, but not limited to: wind speed exposure category, co-efficient, importance factor type of facility negative pressures for each zone methods and requirements of attachment SD-06 Test Reports Submit test reports for the following in accordance with the referenced articles in this section. Leakage Tests; G Wind Load Tests; G Coating Tests; G Chalking Tests; G SD-07 Certificates Submit certificates for the following items showing conformance with referenced standards contained in this section: Coil Stock; G Fasteners; G SD-08 Manufacturer's Instructions Include detailed application instructions and standard manufacturer drawings altered as required by these specifications. Installation of Wall panels; G SD-09 Manufacturer's Field Reports Submit two bound copies of the Manufacturer's Field Reports; G SD-11 Closeout Submittals Warranty; G Maintenance Instructions; G 20 year "No Dollar Limit" warranty for labor and material SUSTAINABLE DESIGN REQUIREMENTS 1.6.1 Environmental Product Declarations At a minimum, use materials or products with an Environmental Product Declaration in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

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1.6

1.6.2 Embodied Carbon Optimization Report/Action Plan

At a minimum, use materials or products with an Embodied Carbon Optimization Report/Action Plan in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

# 1.6.3 Sourcing of Raw Materials

Provide products that meet one or more of the following categories:

1.6.3.1 Extended Producer Responsibility

At a minimum, use materials or products from manufacturers that participate in an extended producer responsibility program in accordance with the LEED Implementation Plan. Provide manufacturer letter verifying extended producer responsibility program is in place and that product is eligible. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

# 1.6.3.2 Recycled Content Materials

At a minimum, use materials or products with recycled content in accordance with the LEED Implementation Plan. Provide manufacturers product literature identifying the percentage of recycled material incorporated within each product used. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan. If recycled content minimum is specified in this section, the greater of the two percentages governs.

# 1.6.4 Material Ingredient Reporting

At a minimum, use materials or products with chemical inventory to at least 0.1% (1000 ppm) in accordance with the LEED Implementation Plan. Provide Health Product Declaration (HPD), Cradle to Cradle Certificate, Declare label, or other manufacturer's published content inventory in compliance with LEED v4.1 Material Ingredient Reporting credit. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.6.5 Local/Regional Materials

Use materials or products extracted, harvested, or recovered, as well as manufactured, within a 100 mile radius from the project site, if available from a minimum of three sources. provide a letter from the manufacturer stating the extraction location, manufacturing location, and purchasing location of the products provided, referencing the project name and location specifically and distance to the project site. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

#### 1.7 QUALITY ASSURANCE

#### 1.7.1 Pre-Installation Conference

Upon notification of submittal receipt and approval by the Contracting Officer; and prior to the commencement of the work, the Contractor must attend a pre-installation conference to review the following:

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- a. Drawings and Specifications.
- b. Qualification of Installer
- c. Sustainable acquisition
- d. Approved Warranty
- e. Sample wall panels, 12-inches long by actual panel width
- f. Sample metal closure strips, 10-inches long of each type
- g. Color charts and chips
- h. Coatings and base metal tests; chalking tests
- i. Construction schedule, availability of materials, Installer's personnel, equipment and facilities required to progress with the work without delay.
- j. Methods and procedures related to installation of wall panels, including manufacturer's written instructions. Explicitly identify in writing, differences between manufacturer's instructions and the specified requirements.
- k. Support conditions for compliance with requirements, including alignment between and attachment to structural members.
- 1. Flashing, special siding details, wall penetrations, openings, and condition of other construction that will affect metal wall panels.
- m. Governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
- n. Temporary protection requirements for metal wall panel assembly during and after installation.
- Wall panel observation and repair procedures after metal wall panel installation. Provide detailed written instructions including copies of Safety Data Sheets for maintenance and repair materials, and manufacturer's maintenance instructions.

# 1.7.1.1 Installation Drawings

Installation shop drawings for wall panels, flashing, accessories, and anchorage systems must indicate completely dimensioned structural frame and erection layouts, openings in the wall, special framing details, and construction details at corners, building intersections and flashing, location and type of mastic and metal filler strips.

# 1.7.1.2 Wind Load Design Analysis

Wind design analysis must include wall plan delineating dimensions and attachment patterns for each zone. Wind design analysis must be prepared and sealed by Licensed Project Engineer in the geographic area where the construction will take place.

#### 1.7.2 Manufacturer's Technical Representative

The representative must have authorization from manufacturer to approve field changes and be thoroughly familiar with the products and installations in the geographical area where construction will take place.

# 1.7.3 Qualification of Manufacturer

Certify that metal wall panel system manufacturer has a minimum of five years of experience in manufacturing metal wall system and accessory products.

Manufacturer must also provide engineering services by an authorized engineer; currently licensed in the geographical area where construction will take place, having a minimum of four years of experience as an engineer knowledgeable in wind load design analysis, protocols and procedures per MBMA MBSM, "Metal Building Systems Manual"; ASCE 7-16, and ASTM E1592.

Provide certified engineering calculations, using the products submitted, for Wind load requirements in accordance with ASCE 7-16.

1.7.3.1 Manufacturer's Certificates

Also provide the following certifications from the manufacturer:

Coil Stock Fasteners

Submit certification from coil stock manufacturer or supplier that the machinery used will form the provided coil stock without warping, waviness, or rippling that is not a part of the panel profile, and without damage, abrasion or marring of the finish coating.

Provide evidence that products used within this specification are manufactured in the United States.

# 1.7.4 Certified Qualification of Installation Contractor

The installation contractor must be approved and certified by the metal wall panel manufacturer prior to beginning the installation of the metal wall panel system. Subcontracting by Certified Contractor for the metal wall panel work is not permitted.

# 1.7.5 Single Source

Obtain each type of metal wall panels, clips, closure materials and other accessories from the standard products of the single source from a single manufacturer to operate as a complete system for the intended use.

# 1.7.6 Manufacturer's Maintenance Instructions

Provide manufacturer's detailed written instructions including copies of Safety Data Sheets for maintenance and repair materials.

#### 1.8 DELIVERY, HANDLING, AND STORAGE

Deliver and protect package components, sheets, metal wall panels, and other manufactured items to prevent damage or deformation during

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transportation and handling.

Unload, store, and erect metal wall panels in a manner to prevent bending, warping, twisting, and surface damage.

Stack and store metal wall panels horizontally on platforms or pallets, covered with suitable weather-tight and ventilated covering to ensure dryness, with positive slope for drainage of water. Do not store metal wall panels in contact with other materials that might cause staining, denting, or other surface damage.

Retain strippable protective covering on metal wall panel until actual installation.

- 1.9 PROJECT CONDITIONS
- 1.9.1 Field Measurements

Verify locations of wall framing and opening dimensions by field measurements before metal wall panel fabrication and indicate measurements on Shop Drawings.

1.9.2 Weather Limitations

Proceed with installation preparation only when existing and forecasted weather conditions permit Work to proceed without water entering into wall system or building.

1.10 WARRANTY

Warranty must conform to the Sample Warranty as reviewed and approved by the Contracting Officer.

1.10.1 20 Year "No Dollar Limit" Warranty for Labor and Material

Furnish manufacturer's no-dollar-limit warranty for the metal wall panel system. The warranty period is to be no less than twenty years from the date of Government acceptance of the work. The warranty is to be issued directly to the Government. The warranty is to provide that if within the warranty period the metal wall panel system shows evidence of corrosion, perforation, rupture or excess weathering due to deterioration of the wall panel system resulting from defective materials and correction of the defective workmanship is to be the responsibility of the metal wall panel system manufacturer. Repairs that become necessary because of defective materials and workmanship while metal wall panel system is under warranty are to be performed within 24 hours after notification, unless additional time is approved by the Contracting Officer. Failure to perform repairs within 24 hours of notification will constitute grounds for having emergency repairs performed by others and not void the warranty.

PART 2 PRODUCTS

#### 2.1 FABRICATION

Unless approved otherwise, fabricate and finish metal wall panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes and as necessary to fulfill indicated and specified performance requirements. Comply with indicated profiles and with dimensional and structural requirements.

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Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel. Fabricate metal wall panel side laps with factory-installed captive gaskets or separator strips that provide a tight seal and prevent metal-to-metal contact, in a manner that will seal weather-tight and minimize noise from movements within panel assembly.

# 2.1.1 Sheet Metal Accessories

Fabricate flashing and trim to comply with recommendations in SMACNA 1793 that apply to the design, dimensions, metal, and other characteristics of item indicated:

- a. 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. End Seams: Fabricate nonmoving end seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
- c. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA 1793.
- d. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
- e. Fabricate cleats and attachment devices of size and metal thickness recommended by SMACNA 1793 or by metal wall panel manufacturer for application, but not less than thickness of metal being secured.

# 2.2 PANEL MATERIALS

#### 2.2.1 Steel Sheet

Roll-form steel wall panels to the specified profile; 22 gauge and depth as indicated. Material must be plumb and true, and within the tolerances listed:

- a. Aluminum-Zinc Alloy-coated Steel Sheet conforming to ASTM A792/A792M and AISI SG03-3.
- b. Individual panels must be continuous length to cover the entire length of any unbroken wall area with no joints or seams and formed without warping, waviness, or ripples that are not part of the panel profile and free of damage to the finish coating system.
- c. Provide panels with thermal expansion and contraction consistent with the type of system specified.
  - 1. Stucco-embossed, flat Surface Texture.

#### 2.2.2 Insulating Core

2.2.2.1 Non-Fire-Resistance-Rated Applications

Polyisocyanurate (ISO) core, ASTM C591 Type IV, CFC- and HCFC-free, compliant with Montreal Protocol and Clean Air Act.

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# 2.2.2.2 Fire-Resistance-Rated Applications

Rigid mineral wool insulation board, bonded with a thermal-setting resin per ASTM C612.

#### 2.2.3 Recycled Materials

Provide thermal insulation materials containing recycled content. Unless specified otherwise, the minimum required recycled content for listed materials are:

Polyisocyanurate/polyurethane: 9 percent recovered material

Provide data identifying percentage of recycled content for insulation.

#### 2.2.4 Factory Color Finish

Comply with NAAMM AMP 500 for recommendations for applying and designating finishes. Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved samples and are assembled or installed to minimize contrast.

All panels are to receive a factory-applied Kynar 500/Hylar 5000 finish consisting of a baked-on top-coat with a manufacturer's recommended prime coat conforming to the following:

# 2.2.4.1 Metal Preparation

Carefully prepare all metal surface for painting on a continuous process coil coating line by alkali cleaning, hot water rinsing, application of chemical conversion coating, cold water rinsing, sealing with acid rinse, and thorough drying.

# 2.2.4.2 Prime Coating

Apply a base coat of epoxy paint, specifically formulated to interact with the top-coat, to the prepared surfaces by roll coating to a dry film thickness of 0.20 plus 0.05 mils. Prime coat must be oven cured prior to application of finish coat.

#### 2.2.4.3 Exterior Finish Coating

Roll coat the finish coating over the primer by roll coating to dry film thickness of 0.80 plus 5 mils (3.80 plus 0.50 mils for Vinyl Plastisol) for a total dry film thickness of 1.00 plus 0.10 mils (4.00 plus 0.10 mils for Vinyl Plastisol). Oven-cure finish coat.

#### 2.2.4.4 Interior Finish Coating

Apply a wash-coat on the reverse side over the primer by roll coating to a dry film thickness of 0.30 plus 0.05 mils for a total dry film thickness of 0.50 plus 0.10 mils. Oven-cured the wash coat.

#### 2.2.4.5 Color

Provide exterior finish color as selected by the Contracting Officer from

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the manufacturer's standard PVDF color chart.

# 2.2.4.6 Physical Properties

Coating must conform to the industry and manufacturer's standard performance criteria as listed by the following certified test reports:

General:	ASTM D5894 and ASTM D4587
Abrasion:	ASTM D968
Adhesion:	ASTM D3359
Chalking:	ASTM D4214
Chemical Pollution:	ASTM D1308
Color Change and Conformity:	ASTM D2244
Creepage:	ASTM D1654
Cyclic Corrosion Test:	ASTM D5894
Flame Spread:	ASTM E84
Flexibility:	ASTM D522/D522M
Formability:	ASTM D522/D522M
Gloss at 60 and 85 degrees:	ASTM D523
Humidity:	ASTM D2247 and ASTM D714
Oxidation:	ASTM D610
Pencil Hardness:	ASTM D3363
Reverse Impact:	ASTM D2794
Salt Spray:	ASTM B117
Weatherometer:	ASTM G152, ASTM G153 and ASTM D822

# 2.3 MISCELLANEOUS METAL FRAMING

Cold-formed metallic-coated steel sheet conforming to ASTM A653/A653M and specified in Section 05 40 00 COLD-FORMED METAL FRAMING unless otherwise indicated.

# 2.3.1 Fasteners for Miscellaneous Metal Framing

Type, material, corrosion-resistance, size, and sufficient length to penetrate the supporting member a minimum of 1 inch with other properties

required to fasten miscellaneous metal framing members to supporting members and substrates in accordance with the wall panel manufacturer's and ASCE 7-16 requirements.

#### 2.4 FASTENERS

# 2.4.1 General

# 2.4.1.1 Exposed Fasteners

Provide corrosion-resistant fasteners for wall panels, made of coated steel, aluminum, or nylon-capped steel compatible with the sheet panel or flashing and of a type and size recommended by the manufacturer to meet the performance requirements and design loads.

Fasteners for accessories must be the manufacturer's standard. Provide an integral metal washer matching the color of attached material with compressible sealing EPDM gasket approximately 3/32-inch thick.

#### 2.4.1.2 Hidden Fasteners

Provide corrosion-resistant fasteners recommended by the manufacturer to meet the performance requirements and design loads.

# 2.4.1.3 Screws

Screws to be corrosion-resistant coated steel, aluminum and/or stainless steel, being the type and size recommended by the manufacturer to meet the performance requirements.

# 2.4.1.4 Rivets

Rivets to be closed-end type, corrosion-resistant coated steel, aluminum, or stainless steel where watertight connections are required.

#### 2.4.1.5 Attachment Clips

Fabricate clips from steel hot-dipped galvanized in accordance with ASTM A653/A653M, Z275 G 90 or Series 300 stainless steel. Size, shape, thickness, and capacity as required meeting the insulation thickness and design load criteria specified.

# 2.5 ACCESSORIES

# 2.5.1 General

All accessories must be compatible with the metal wall panels. Sheet metal flashing, trim, metal closure strips, caps and similar metal accessories must not be less than the minimum thickness specified for the wall panels. Exposed metal accessories/finishes to match the panels furnished, except as otherwise indicated. Molded foam rib, ridge and other closure strips must be non-absorbent closed-cell or solid-cell synthetic rubber or pre-molded neoprene to match configuration of the panels.

#### 2.5.2 Rubber Closure Strips

Provide closed-cell, expanded cellular rubber conforming to ASTM D1056 and ASTM D1667; extruded or molded to the configuration of the specified wall panel and in lengths supplied by the wall panel manufacturer.

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#### 2.5.3 Metal Closure Strips

Provide factory-fabricated steel closure strips to be the same gauge, color, finish, and profile of the specified wall panel.

# 2.5.4 Joint Sealants

# 2.5.4.1 Sealants and Caulking

Provide approved gun-type sealants for use in hand- or air-pressure caulking guns at temperatures above 40 degrees F (or frost-free application at temperatures above 10 degrees F with minimum solid content of 85 percent of the total volume. Sealants must dry with a tough, durable -surface skin which permit remaining soft and pliable underneath, providing a weather-tight joint. No migratory staining is permitted on painted or unpainted metal, stone, glass, vinyl, or wood.

Prime all joints receiving sealants with a compatible one-component or two-component primer as recommended by the wall panel manufacturer.

#### 2.5.4.2 Shop-Applied

Sealant for shop-applied caulking must be non-curing butyl compliant with AAMA 800 to ensure the sealant's plasticity at the time of field erection.

# 2.5.4.3 Field-Applied

Sealant for field-applied caulking must be an approved gun grade, non-sag one component polysulfide or two-component polyurethane with an initial maximum Shore A durometer hardness of 25, and conforming to ASTM C920, Type II. Color to match panel colors.

#### 2.5.4.4 Pressure-Sensitive Tape

Provide pressure-sensitive tape sealant, 100-percent solid with a release paper backing; permanently elastic, non-sagging, non-toxic and non-staining as approved by the wall panel manufacturer.

# 2.6 SHEET METAL FLASHING AND TRIM

#### 2.6.1 Fabrication

Shop-fabricate sheet-metal flashing and trim where practicable to comply with recommendations in SMACNA 1793 that apply to design, dimensions, metal, and other characteristics of item indicated. Obtain field measurements for accurate fit before shop fabrication.

Fabricate 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.

#### 2.7 REPAIR OF FINISH PROTECTION

Repair paint for color finish enameled wall panel must be compatible paint of the same formula and color as the specified finish furnished by the wall panel manufacturer. Provide four quarts of repair paint matching the specified wall panels.

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# PART 3 EXECUTION

# 3.1 EXAMINATION

Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal wall panel supports, and other conditions affecting performance of the Work.

Examine primary and secondary wall framing to verify that rafters, purlins, angles, channels, and other structural panel support members and anchorages have been installed within alignment tolerances required by metal wall panel manufacturer, UL, ASTM, ASCE 7-16 and as required for the geographical area where construction will take place.

Examine solid 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.

Examine roughing-in for components and systems penetrating metal wall panels to verify actual locations of penetrations relative to seam locations of metal wall panels before metal wall panel installation.

Submit to the Contracting Officer a written report, endorsed by Installer, listing conditions detrimental to performance of the Work. Proceed with installation only after unsatisfactory conditions have been corrected.

# 3.2 PREPARATION

Clean substrates of substances harmful to insulation, including removing projections capable of interfering with insulation attachment. Miscellaneous framing installation, including sub-purlins, girts, angles, furring, and other miscellaneous wall panel support members and anchorage must be according to metal wall panel manufacturer's written instructions.

#### 3.3 WALL PANEL INSTALLATION

Provide full-length metal wall panels, from sill to eave as indicated, unless otherwise indicated or restricted by shipping limitations. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement in accordance with MBMA MBSM.

Erect wall panel system in accordance with the approved erection drawings, the printed instructions and safety precautions of the manufacturer.

Sheets are not to be subjected to overloading, abuse, or undue impact. Bent, chipped, or defective sheets shall not be applied.

Sheets must be erected true and plumb and in exact alignment with the horizontal and vertical edges of the building, securely anchored, and with the indicated eave, and sill.

Work is to allow for thermal movement of the wall panel, movement of the building structure, and to provide permanent freedom from noise due to wind pressure.

Field cutting metal wall panels by torch is not permitted.

#### 3.3.1 Steel Wall Panels

Use stainless-steel fasteners for exterior surfaces and galvanized steel fasteners for interior surfaces.

#### 3.3.2 Anchor Clips

Anchor metal wall panels and other components of the Work securely in place, using manufacturer's approved fasteners according to manufacturers' written instructions.

#### 3.3.3 Metal Protection

Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal wall panel manufacturer.

# 3.3.4 Joint Sealers

Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal wall panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by metal wall panel manufacturer.

# 3.4 FASTENER INSTALLATION

Anchor metal wall panels and other components of the Work securely in place, using manufacturer's approved fasteners according to manufacturers' written instructions.

#### 3.5 FLASHING, TRIM AND CLOSURE INSTALLATION

#### 3.5.1 General Requirements

Comply with performance requirements, manufacturer's written installation instructions, and SMACNA 1793. Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams to form permanently watertight and weather resistant.

Install sheet metal work is to form weather-tight construction without waves, warps, buckles, fastening stresses or distortion, and allow for expansion and contraction. Cutting, fitting, drilling, and other operations in connection with sheet metal required to accommodate the work of other trades is to be performed by sheet metal mechanics.

# 3.5.2 Metal Flashing

Install exposed metal flashing at building corners, sills and eaves, junctions between metal siding and walling. Exposed metal flashing must be the same material, color, and finish as the specified metal wall panel.

Fasten flashing at a minimum of 8 inches on center, except where flashing is held in place by the same screws that secure covering sheets.

Flashing is to be furnished in at least 8-foot lengths. Exposed flashing is to have 1 inch locked and blind-soldered end joints, and expansion

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joints at intervals of not more than 16 feet.

Exposed flashing and flashing subject to rain penetration to be bedded in the specified joint sealant.

Isolate flashing which is in contact with dissimilar metals by means of the specified asphalt mastic material to prevent electrolytic deterioration.

Form drips to the profile indicated, with the edge folded back 1/2 inch to form a reinforced drip edge.

3.5.3 Closures

Install metal closure strips at open ends of corrugated or ribbed pattern walls, and at intersection of wall and wall unless open ends are concealed with formed eave flashing; and in other required areas.

Install mastic closure strips at intersection of the wall with metal walling; top and bottom of metal siding; heads of wall openings; and in other required locations.

#### 3.6 WORKMANSHIP

Make lines, arises, and angles sharp and true. Free exposed surfaces from visible wave, warp, buckle, and tool marks. Fold back exposed edges neatly to form a 1/2 inch hem on the concealed side. Make sheet metal exposed to the weather watertight with provisions for expansion and contraction.

Make surfaces to receive sheet metal plumb and true, clean, even, smooth, dry, and free of defects and projections which might affect the application. For installation of items not shown in detail or not covered by specifications conform to the applicable requirements of SMACNA 1793. Provide sheet metal flashing in the angles formed where roof decks abut walls, curbs, ventilators, pipes, or other vertical surfaces and wherever indicated and necessary to make the work watertight.

# 3.7 ACCEPTANCE PROVISIONS

#### 3.7.1 Erection Tolerances

Erect metal wall panels straight and true with plumb vertical lines correctly lapped and secured in accordance with the manufacturer's written instructions.

#### 3.7.2 Leakage Tests

Finished application of metal wall panels are to be subject to inspection and test for leakage by request of the Contracting Officer, Architect/Engineer. Conduct inspection and tests at no cost to the Government.

Inspection and testing is to be made promptly after erection to permit correction of defects and the removal and replacement of defective materials.

3.7.3 Repairs to Finish

Scratches, abrasions, and minor surface defects of finish may be repaired with the specified repair materials. Finished repaired surfaces must be uniform and free from variations of color and surface texture.

Repaired metal surfaces that are not acceptable to the project requirements and/or Contracting Officer are to be immediately removed and replaced with new material.

3.7.4 Paint-Finish Metal Siding

Paint-finish metal siding will be tested for color stability by the Contracting Officer during the manufacturer's specified guarantee period.

Panels that indicate color changes, fading, or surface degradation, determined by visual examination, must be removed and replaced with new panels at no expense to the Government.

New panels will be subject to the specified tests for an additional year from the date of their installation.

- 3.8 FIELD QUALITY CONTROL
- 3.8.1 Construction Monitoring

Make visual inspections as necessary to ensure compliance with specified requirements. Additionally, verify the following:

- a. Materials comply with the specified requirements.
- b. All materials are properly stored, handled and protected from damage. Damaged materials are removed from the site.
- c. Framing and substrates are in acceptable condition, in compliance with specification, prior to application of wall panels.
- d. Panels are installed without buckles, ripples, or waves and in uniform alignment and modulus.
- e. Side laps are formed, sealed, fastened or seam locked as required.
- f. The proper number, type, and spacing of attachment clips and fasteners are installed.
- g. Installer adheres to specified and detailed application parameters.
- h. Associated flashing and sheet metal are installed in a timely manner in accord with the specified requirements.

Provide five bound copies of Manufacturer's Field Reports to the Contracting Officer two weeks prior to project close-out.

# 3.9 CLEAN-UP AND DISPOSAL

Clean all exposed sheet metal work at completion of installation. Remove metal shavings, filings, nails, bolts, and wires from work area. Remove grease and oil films, excess sealants, handling marks, contamination from steel wool, fittings and drilling debris and scrub the work clean.

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Exposed metal surfaces must be free of dents, creases, waves, scratch marks, solder or weld marks, and damage to the finish coating.

Collect and place scrap/waste materials in containers. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site; transport demolished materials from government property and legally dispose of them.

-- End of Section --

# SECTION 07 54 19

#### THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

- PART 1 GENERAL
- 1.1 REFERENCES

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

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI/SPRI ES-1 (2003) Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7-16 (2017; Errata 2018; Supp 1 2018) Minimum Design Loads and Associated Criteria for Buildings and Other Structures

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

ASSP A10.24 (2022) Roofing - Safety Requirements for Low-Sloped Roofs

ASTM INTERNATIONAL (ASTM)

ASTM E108 (2020a) Standard Test Methods for Fire Tests of Roof Coverings

FM GLOBAL (FM)

FM APP GUIDE (updated on-line) Approval Guide http://www.approvalguide.com/

INTERNATIONAL CODE COUNCIL (ICC)

ICC IBC (2021) International Building Code

NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)

NRCA 3621 (2017) Quality Control and Quality-assurance Guidelines for the Application of Membrane Roof Systems NRCA 3740 (2005) The NRCA Waterproofing Manual SINGLE PLY ROOFING INDUSTRY (SPRI) ANSI/SPRI RD-1 (2014) Performance Standard for Retrofit Drains

U.S. DEPARTMENT OF ENERGY (DOE)

Energy Star (1992; R 2006) Energy Star Energy Efficiency Labeling System (FEMP)

U.S. GREEN BUILDING COUNCIL (USGBC)

LEED v4 BDC Ref Guide	(2013; R 2020) USGBC LEED Reference Guide for Building Design and Construction, v4
LEED v4.1 BDC Ref Guide	(2023) LEED v4.1 Building Design and Construction Reference Guide
UNDERWRITERS LABORATORI	ES (UL)
UL 790	(2022) UL Standard for Safety Test Methods

for Fire Tests of Roof Coverings

#### 1.2 SUMMARY

Adhered Thermoplastic Polyolefin (TPO) roof membrane system applied over fiber-reinforced gypsum panel. Incorporate air barrier in the roof assembly as specified in Section 07 22 00 ROOF AND DECK INSULATION.

#### 1.3 ASSEMBLY REQUIREMENTS

Provide roofing membrane sheet widths consistent with membrane attachment methods and wind uplift requirements, and as large as practical. In order to minimize joints and 3-way overlaps, prefabricated sheets are not accepted. Provide membrane which is free of defects and foreign material. Coordinate flashing work to permit continuous roof-surfacing operations. Install insulation and weatherproofed planned sections on the same day.

#### 1.3.1 Fire Resistance

Complete roof system assembly:

- a. Class A rated in accordance with ASTM E108 or UL 790; and
- b. Be listed as Class I roof deck construction in FM APP GUIDE.

FM or UL approved components of the roof covering assembly must bear the appropriate FM or UL label.

# 1.3.2 Wind Uplift Resistance

Provide a complete roof system assembly that is rated and installed to resist wind loads indicated on drawings and validated by uplift resistance testing in accordance with Factory Mutual (FM) test procedures. Do not install non-rated systems, except as approved by the Contracting Officer. Submit Engineering calculations, signed, sealed, and dated by a Registered Engineer validating the wind resistance per ASCE 7-16, and ANSI/SPRI ES-1 of non-rated roof system. Base wind uplift measurements on the design wind speed indicated on structural drawings mph in accordance with ASCE 7-16 and other applicable building code requirements.
#### 1.4 SUSTAINABILITY REPORTING

Work of this section is intended to contribute to the achievement of, or compliance with, the requirements of the Guiding Principles Validation and LEED Prerequisites and attempted Credits. Refer to Section 01 33 29.00 06 SUSTAINABILITY REPORTING for specific documentation requirements and list of Prerequisites, attempted Credits and LEED version.

Comply with product, material content, performance criteria, activity, documentation, and other technical requirements as described in the LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide as applicable.

Collect, organize, and submit product data, drawings, diagrams, photos and cost information necessary to demonstrate compliance with LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide requirements as applicable.

Data collection shall commence with the notice to proceed and will only be deemed complete upon acceptance of the Final Sustainability Notebook and LEED Online submission by the Contracting Officer, the LEED Project Administrator, and the Green Building Certification Institute.

## 1.5 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings
Detail Drawings; G, AE
Roof Plan; G, AE
SD-03 Product Data
TPO Roofing Membrane; G, AE
Energy Star Label for roof membrane; S
Heat Island Reduction; S
Environmental Product Declarations; S
Embodied Carbon Optimization Report/Action Plan; S
Extended Producer Responsibility; S
Recycled Content Materials; S
Local/Regional Materials; S
Material Ingredient Reporting; S
Bonding Adhesive

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P2#: 506474 - Manned/Unmanned Tactical Vehicle Lab (MUMT)
Detroit Arsenal, MI
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Flashing

Membrane Fasteners and Plates

Roof Insulation

Pre-Manufactured Accessories

Water Cutoffs

Information Card

SD-05 Design Data

Wind Uplift Resistance; G, AE

SD-07 Certificates

Qualification of Manufacturer

Qualifications of Applicator

Qualification of Engineer of Record

Wind Uplift Resistance

Fire Resistance classification

Sample Warranty; G, AE

SD-08 Manufacturer's Instructions

Application Method; G

Membrane Flashing; G, AE

Perimeter Attachment

Auxiliary Fasteners

Pre-Manufactured Accessories

Cold Weather; G

SD-11 Closeout Submittals

Warranty; G

Information Card; G

Instructions to Government Personnel; G

## 1.6 SUSTAINABLE DESIGN REQUIREMENTS

1.6.1 Environmental Product Declarations

At a minimum, use materials or products with an Environmental Product Declaration in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials

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requirements and LEED Implementation Plan.

1.6.2 Embodied Carbon Optimization Report/Action Plan

At a minimum, use materials or products with an Embodied Carbon Optimization Report/Action Plan in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

#### 1.6.3 Sourcing of Raw Materials

Provide products that meet one or more of the following categories:

1.6.3.1 Extended Producer Responsibility

At a minimum, use materials or products from manufacturers that participate in an extended producer responsibility program in accordance with the LEED Implementation Plan. Provide manufacturer letter verifying extended producer responsibility program is in place and that product is eligible. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

## 1.6.3.2 Recycled Content Materials

At a minimum, use materials or products with recycled content in accordance with the LEED Implementation Plan. Provide manufacturers product literature identifying the percentage of recycled material incorporated within each product used. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan. If recycled content minimum is specified in this section, the greater of the two percentages governs.

# 1.6.4 Material Ingredient Reporting

At a minimum, use materials or products with chemical inventory to at least 0.1% (1000 ppm) in accordance with the LEED Implementation Plan. Provide Health Product Declaration (HPD), Cradle to Cradle Certificate, Declare label, or other manufacturer's published content inventory in compliance with LEED v4.1 Material Ingredient Reporting credit. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

# 1.6.5 Local/Regional Materials

Use materials or products extracted, harvested, or recovered, as well as manufactured, within a 100 mile radius from the project site, if available from a minimum of three sources. provide a letter from the manufacturer stating the extraction location, manufacturing location, and purchasing location of the products provided, referencing the project name and location specifically and distance to the project site. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

# 1.6.6 Solar Reflectance Index (SRI)

SRI measures the roof's ability to reject solar heat, defined such that a standard black (reflectance 0.05, emittance 0.90) is 0 and a standard white (reflectance 0.80, emittance 0.90) is 100. Use roofing materials having minimum appropriate SRI for 100 percent of roof surface (low slope

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(less than 2:12) SRI greater than 82.

#### 1.7 QUALITY ASSURANCE

1.7.1 Qualification of Manufacturer

Thermoplastic Polyolefin sheet roofing system manufacturer must have a minimum of 15 years experience in manufacturing TPO roofing products.

# 1.7.2 Qualifications of Applicator

Roofing system applicator must be approved, authorized, or licensed in writing by the TPO sheet roofing system manufacturer and have a minimum of five years experience as an approved, authorized, or licensed applicator with that manufacturer and be approved at a level capable of providing the specified warranty. Supply the names, locations and client contact information of five projects, within the previous three years, of similar size and scope that the applicator has constructed using the manufacturer's roofing products submitted for this project.

# 1.7.3 Qualification of Engineer of Record

Engineer of Record must be currently licensed within the jurisdiction of the project, and have a minimum of five years experience as an approved Engineer for manufacturers of similar roof systems. Engineer of Record must supply the names and locations of five projects of similar size and scope for which he has provided engineering calculations using the manufacturer's products submitted for this project within the previous three years. Engineer of Record must provide certified engineering calculations for:

Wind uplift requirements in accordance with Local and State codes

ASCE 7-16, in accordance with ICC IBC.

Snow load requirements per ICC IBC Chapter 16 Section 1608 and Section 7 of ASCE 7-16

1.7.4 Conformance and Compatibility

Provide an entire roofing and flashing system that is in accordance with specified and indicated requirements, including fire and wind resistance.

1.7.5 Preroofing Conference

After approval of submittals and before performing roofing and insulation system installation work, hold a preroofing conference to review the following:

- a. Drawings, including roof plan, specifications and submittals related to the roof work. Field inspection and verification of all existing conditions, including all fire safety issues, existing structure, and existing materials, including concealed combustibles, which may require additional protection during installation.
- b. Roof system components installation;

- c. Procedure for the roof manufacturer's technical representative's onsite inspection and acceptance of the roofing substrate, and roofing substrate, the name of the manufacturer's technical representatives, the frequency of the onsite visits, distribution of copies of the inspection reports from the manufacturer's technical representative to roof manufacturer;
- d. Contractor's plan for coordination of the work of the various trades involved in providing the roofing system and other components secured to the roofing; and
- e. Quality control(NRCA 3621) plan for the roof system installation;
- f. Safety requirements.

Coordinate preroofing conference scheduling with the Contracting Officer. The conference must be attended by the Contractor, the Contracting Officer's designated personnel, personnel directly responsible for the installation of roofing and insulation, flashing and sheet metal work, mechanical and electrical work, other trades interfacing with the roof work, designated safety personnel trained to enforce and copy with ASSP A10.24, and a representative of the roofing materials manufacturer. Before beginning roofing work, provide a copy of meeting notes and action items to all attending parties. Note action items requiring resolution prior to start of roof work.

# 1.8 DETAIL DRAWINGS

Submit roof plan depicting wind loads and boundaries of enhanced perimeter and corner attachments of roof system components, location of perimeter half-sheets, spacing of perimeter, corner, and infield fasteners, as applicable. Provide drawings that reflect the project roof plan of each roof level and conditions indicated. Submit bids with approved detail drawings and specifications approved and furnished by the TPO membrane manufacturer.

1.9 DELIVERY, STORAGE, AND HANDLING

# 1.9.1 Delivery

Deliver materials in the manufacturer's original, unopened containers and rolls with labels intact and legible. Mark and remove wet or damaged materials from the site. Where materials are covered by a referenced specification number, the container must bear the specification number, type, class, and shelf life expiration date where applicable. Deliver materials in sufficient quantity to allow work to proceed without interruption.

#### 1.9.2 Storage

Protect materials against moisture absorption and contamination or other damage. Avoid crushing or crinkling of roll materials. Store roll materials on end on clean raised platforms or pallets one level high in dry locations with adequate ventilation, such as an enclosed building or closed trailer. Do not store roll materials in buildings under construction until concrete, mortar, and plaster work is finished and dry. Maintain roll materials at temperatures above 50 degrees F for 24 hours immediately before application. Do not store materials outdoors unless approved by the Contracting Officer. Completely cover felts stored

outdoors, on and off roof, with waterproof canvas protective covering. Do not use polyethylene sheet as a covering. Tie covering securely to pallets to make completely weatherproof. Provide sufficient ventilation to prevent condensation. Do not store more materials on roof than can be installed the same day and remove unused materials at end of each days work. Distribute materials temporarily stored on roof to stay within live load limits of the roof construction.

- a. Maintain a minimum distance of 35 foot for all stored flammable materials, including materials covered with shrink wraps, craft paper or tarps from all torch/welding applications.
- b. Immediately remove wet, contaminated or otherwise damaged or unsuitable materials from the site. Damaged materials may be marked by the Contracting Officer.

## 1.9.3 Handling

Prevent damage to edges and ends of roll materials. Do not install damaged materials in the work. Select and operate material handling equipment to prevent damage to materials or applied roofing.

#### 1.10 ENVIRONMENTAL REQUIREMENTS

Do not install roofing system when air temperature is below 40 degrees F, during any form of precipitation, including fog, or when there is ice, frost, moisture, or any other visible dampness on the roof deck. Follow manufacturer's printed instructions for Cold Weather Installation.

#### 1.11 SEQUENCING

Coordinate the work with other trades to ensure that components which are to be secured to or stripped into the roofing system are available and that permanent flashing and counterflashing in accordance with NRCA 3740, are installed as the work progresses. Ensure temporary protection measures are in place to preclude moisture intrusion or damage to installed materials. Apply roofing immediately following application of insulation as a continuous operation. Coordinate roofing operations with insulation work so that all roof insulation applied each day is covered with roof membrane installation the same day.

#### 1.12 WARRANTY

Provide roof system material and workmanship warranties. Provide revision or amendment to standard membrane manufacturer warranty as required to comply with the specified requirements. Provide a manufacturer's warranty that has no dollar limit, covers full system water-tightness, and has a minimum duration of 20 years. Submit sample certificate.

#### 1.12.1 Roof Membrane Manufacturer Warranty

Furnish the roof membrane manufacturer's 20-year, no dollar limit roof system materials and installation workmanship warranty, including flashing, insulation, and accessories necessary for a watertight roof system construction. Provide warranty directly to the Government commencing at the time of Government's acceptance of the building. The warranty must state that:

a. If within the warranty period the roof system, as installed for its

> intended use in the normal climatic and environmental conditions of the facility, becomes non-watertight, shows evidence of moisture intrusion within the assembly, splits, tears, cracks, delaminates, separates at the seams, or shows evidence of excessive weathering due to defective materials or installation workmanship, the repair or replacement of the defective and damaged materials of the roof system assembly and correction of defective workmanship are the responsibility of the roof membrane manufacturer. All costs associated with the repair or replacement work are the responsibility of the roof membrane manufacturer.

b. When the manufacturer or his approved applicator fail to perform the repairs within 72 hours of notification, emergency temporary repairs performed by others does not void the warranty.

#### 1.12.2 Roofing System Installer Warranty

The roof system installer must warrant for a minimum period of three years that the roof system, as installed, is free from defects in installation workmanship, to include the roof membrane, flashing, insulation, accessories, attachments, and sheet metal installation integral to a complete watertight roof system assembly. Write the warranty directly to the Government. The roof system installer is responsible for correction of defective workmanship and replacement of damaged or affected materials. The roof system installer is responsible for all costs associated with the repair or replacement work.

#### 1.12.3 Continuance of Warranty

Repair or replacement work that becomes necessary within the warranty period must be approved, as required, and accomplished in a manner so as to restore the integrity of the roof system assembly and validity of the manufacturer warranty for the remainder of the manufacturer warranty period.

#### PART 2 PRODUCTS

## 2.1 MATERIALS

Coordinate with other specification sections related to the roof work. Furnish a combination of specified materials that comprise a roof system acceptable to the roof membrane manufacturer and meeting specified requirements. Protect materials provided from defects and make suitable for the service and climatic conditions of the installation.

## 2.1.1 TPO Roof Membrane

Provide a fully adhered 72 mil scrim reinforced "fleeceback" TPO as specified herein. Provide TPO system capable of obtaining 20 year warranties and as listed in the applicable wind uplift and fire rating classification listings. Color-White

Submit Data as required by Section 07 22 00 ROOF AND DECK INSULATION together with requirements of this section. Provide data that includes written acceptance by the roof membrane manufacturer of the insulation and other products and accessories to be provided by and warranted under the full system guarantee of the roof membrane manufacturer.

a. Coordinate with other specification sections related to the roof

> work. Furnish a combination of specified materials that comprise a roof system acceptable to the roof membrane manufacturer and meeting specified requirements. Provide materials free of defects and suitable for the service and climatic conditions of the installation. Provide warranted roof system in which all components are sourced from the TPO roof membrane manufacturer, including but not limited to all insulation, coverboards, accessories, adhesives and edge metal.

- b. For each roof, furnish a typewritten information card for facility records and a card laminated in plastic and framed for interior display at roof access point, or a photoengraved 0.032 inch thick aluminum card for exterior display. Provide card that is 8 1/2 by 11 inches minimum. On the information card identify facility name and number; location; contract number; approximate roof area; detailed roof system description, including deck type, membrane, number of plies, method of application, manufacturer, insulation and cover board system and thickness; presence of tapered insulation for primary drainage, presence of vapor retarder; date of completion; installing Contractor identification and contact information; membrane manufacturer warranty expiration, warranty reference number, and contact information. Install card at roof top or access location as directed by the Contracting Officer and provide a paper copy to the Contracting Officer.
- 2.1.2 Energy Star

Provide a roof membrane that is Energy Star labeled. Provide data identifying Energy Star label for roof membrane product.

2.1.3 Energy and Cool Roof Performance

Install a roof system that meets an overall performance as specified on the drawings or by insulation specified in other sections. The roofing system will need to meet the criteria for Cool Roof Products. Provide emittance and reflectance percentages, solar reflectance index values, and slopes , to meet sustainable third party certification requirements for Heat Island Reduction.

# 2.1.4 Bonding Adhesive

Provide TPO membrane manufacturer's recommended adhesive, as supplied by roof membrane manufacturer, and recommended by the manufacturer's printed data for bonding of TPO membrane materials to acceptable insulation, wood, metal, concrete or other acceptable substrate materials. Do not use bonding adhesive to bond membrane materials to each other.

2.1.5 Water Cutoff Mastic/Water Block

As supplied by the roof membrane manufacturer and recommended by the manufacturer's printed data.

# 2.1.6 Membrane Flashing

Provide Manufacturer's standard TPO coated metal flashing consisting of 24 gauge galvanized metal. TPO Coating to be same color as membrane. All flashings and accessories provided shall be compatible with 20 year roof warranty.

# 2.1.7 Membrane Fasteners and Plates

Coated, corrosion-resistant fasteners as recommended and supplied by the TPOroof membrane manufacturer and meeting the requirements of <u>FM RoofNav</u> (www.roofnav.com) or FM APP GUIDE for Class I roof deck construction and the wind uplift resistance specified. Fasteners and plates to be supplied and warranted for the substrate type(s) by TPO membrane manufacturer and recommended by TPO membrane manufacturer's printed data.

## 2.1.7.1 Stress Plates, Bar or Rail for Fasteners

Utilize corrosion-resistant stress plates as recommended by the roof membrane manufacturer's printed instructions. Stress plates to be supplied by TPO roof membrane manufacturer. Form stress plates to prevent dishing or cupping. Manufacturer-supplied anchoring bar or rails may be utilized for high wind conditions.

## 2.1.7.2 Auxiliary Fasteners

Provide corrosion resistant screws, nails, or anchors suitable for intended attachment purpose and be recommended and supplied for use by the TPO roof membrane manufacturer.

#### 2.1.8 Pre-manufactured Accessories

Provide manufacturer's standard pre-manufactured accessories for intended purpose, in compliance with applicable specification section, compatible with the membrane roof system and approved for use and supplied by the TPO roof membrane manufacturer.

# 2.1.9 Roof Insulation

Provide insulation system and facer material compatible with membrane application specified and be approved and supplied by the TPO membrane roof manufacturerand as specified in Section 07 22 00 ROOF AND DECK INSULATION.

## 2.1.10 Wood Products

As specified in Section 06 10 00 ROUGH CARPENTRY, except that fire retardant treated materials must not be in contact with TPO membrane or TPO accessory products, unless approved by the membrane manufacturer and the Contracting Officer.

## PART 3 EXECUTION

#### 3.1 EXAMINATION

Ensure that the following conditions exist prior to application of the roofing materials:

- a. Do not install items that show visual evidence of biological growth.
- b. Drains, curbs, control joints, expansion joints, perimeter walls, roof penetrating components, and equipment supports are in place.
- c. Surfaces are rigid, clean, dry, smooth, and free from cracks, holes, and sharp changes in elevation.

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- d. Substrate is sloped to provide positive drainage.
- e. Walls and vertical surfaces are constructed to receive counterflashing, and will permit mechanical fastening of the base flashing materials.
- f. Treated wood nailers are in place on non-nailable surfaces, to permit nailing of base flashing at minimum height of 8 inches above finished roofing surface.
- g. Pressure-preservative treated wood nailers are fastened in place at eaves, gable ends, openings, and intersections with vertical surfaces for securing of membrane, edging strips, attachment flanges of sheet metal, and roof fixtures. Embedded nailers are flush with deck surfaces. Surface-applied nailers are the same thickness as the roof insulation.
- h. TPO materials are not in contact with fire retardant treated wood, except as approved by the TPO membrane roof manufacturer and Contracting Officer.
- i. Insulation boards are installed smoothly and evenly, and are not broken, cracked, or curled. There are no gaps in insulation board joints exceeding 1/4 inch in width. Insulation is attached as specified in Section 07 22 00 ROOF AND DECK INSULATION. Insulation is being roofed over on the same day the insulation is installed.

# 3.2 APPLICATION METHOD

Apply entire TPO membrane roofing utilizing adhered application method. Apply roofing materials as specified herein unless approved otherwise by the Contracting Officer. Submit instructions including pattern and frequency of mechanical attachments required in the field for roof, corners, and perimeters to provide for the specified wind resistance, if any.

- 3.2.1 Special Precautions
  - a. Do not dilute coatings or sealants unless specifically recommended by the material manufacturer's printed application instructions. Do not thin liquid materials or cleaners used for cleaning TPO sheet.
  - b. Keep liquids in airtight containers, and keep containers closed except when removing materials.
  - c. Use liquid components, including adhesives, within their shelf life period. Store adhesives at 60 to 80 degrees F prior to use. Avoid excessive adhesive application and adhesive spills, as they can be destructive to some thermoplastic sheets and insulations; follow adhesive manufacturer's printed application instructions. Mix and use liquid components in accordance with label directions and manufacturer's printed instructions.
  - d. Provide clean, dry cloths or pads for applying membrane cleaners and cleaning of membrane.
  - e. Do not use heat guns or open flame to expedite drying of adhesives or primers.

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- f. Require workmen and others who walk on the membrane to wear clean, soft-soled shoes to avoid damage to roofing materials.
- g. Do not use equipment with sharp edges which could puncture the TPO membrane roofing sheet.
- h. Shut down air intakes and any related mechanical systems and seal open vents and air intakes when applying solvent-based materials in the area of the opening or intake. Coordinate shutdowns with the Contracting Officer.

# 3.2.2 TPO Roofing Membrane

Provide a watertight roof membrane sheet free of contaminants and defects that might affect serviceability. Provide a uniform, straight, and flat edge. Provide and install only felt-backed membrane directly on concrete deck or other hard surface which may otherwise damage the membrane, absent the felt backing. Do not place non-felt-backed TPO membrane roofing sheet directly on concrete deck or other hard surface which may damage the membrane. Provide membrane overlap of a minimum of 3 inches at sides for adhered applications and 5.5-7 inches for mechanically fastened applications and minimum 4 inches at ends. Direction of laps must allow water to flow over and not against the lap. Install membrane joints that are free of wrinkles and fishmouths. During the day of installation, probe the entire length of hot-air-welded seams and correct any deficiencies. Reweld defective areas. Cut out any fishmouths, or damaged areas and cover the area with membrane using a continuous hot-air-welded seam on all sides. Probe test repairs for continuity. Hot-air-welded seams are to be accomplished in accordance with the TPO membrane roofing manufacturer's published requirements.

# 3.2.2.1 Flashing

Flash all roof edges, projections through the roof and changes in roof planes. Seal the seam a minimum of 3 inches beyond the fasteners which attach the membrane to nailers. Secure the installed flashing at the top of the flashing a maximum of12 inches on centers under the counterflashing or cap. Where possible, install prefabricated components for pipe seals and flashing accessories.

# 3.2.2.2 Cutoffs

If work is terminated prior to weatherproofing the entire roof, seal the membrane to the roof deck. Also, seal flutes in metal decking along the cutoff edge. Pull the membrane free or cut to expose the insulation when resuming work and remove the cut insulation sheets used for fill-in. Do not use asphalt or coal-tar products for sealing.

# 3.2.2.3 Walkways

Install walkways on a loose-laid pad of the membrane material extending at least 1 inch beyond the walkway material, and as specified by the manufacturer. Do not place stone ballast below or above walkways.

## 3.2.3 Adhered Membrane Application

Layout membrane and side lap adjoining sheets in accordance with membrane manufacturer's printed installation instructions. Allow for sufficient membrane to form proper membrane terminations. Remove dusting agents and

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dirt from membrane and substrate areas where bonding adhesives are to be applied. Apply specified adhesive evenly and continuously to substrate and/or and underside of sheets at rates recommended by the roof membrane manufacturer's printed application instructions. When adhesive is spray applied, roll with a paint roller to ensure proper contact and coverage. Do not apply bonding adhesive to surfaces of membrane in seam or lap areas. Allow adhesive to flash off or dry to consistency prescribed by manufacturer before adhering sheets to the substrate. When adhesive is peel and stick release paper-activated, follow manufacturer's printed instructions. Roll each sheet into adhesive slowly and evenly to avoid wrinkles; broom or roll the membrane to remove air pockets and fishmouths and to ensure adequately uniform bonding of sheet to substrate. Form field hot-air-welded laps or seams as specified and ensure that hot-air welded dimension is at width required by the membrane manufacturer's installation instructions. Check all seams and continuous hot-air-weld of all seams and lap seals.

# 3.2.4 Perimeter Attachment

Adhesive bond or mechanically secure roof membrane sheet at roof perimeter in a manner to comply with wind resistance requirements and in accordance with membrane manufacturer's printed application instructions. When adhesively bonding a mechanically fastened system in perimeter areas, the perimeter boundary of the adhesive bond must be the same as the boundary required for additional perimeter mechanical fastening to meet wind resistance requirements.

#### 3.2.5 Securement at Base Tie-In Conditions

Mechanically fasten the roof membrane at penetrations, at base of curbs and walls, and at all locations where the membrane turns and angles greater than 4 degrees (1:12). Space fasteners a maximum of 12 inches on center, except where more frequent attachment is required to meet specified wind resistance or where recommended by the roof membrane manufacturer. Cover over fasteners with a layer of flashing material. Hot-air-weld all seams of flashing material as recommended by the roof membrane manufacturer's printed data.

# 3.2.6 Pre-fabricated Curbs

Securely anchor prefabricated curbs to nailer or other base substrate and flashed with TPO membrane flashing materials.

# 3.2.6.1 Set-On Accessories

Where pipe or conduit blocking, supports and similar roof accessories, or isolated paver block, are set on the membrane, adhere reinforced membrane or walkpad material, as recommended by the roof membrane manufacturer, to bottom of accessories prior to setting on roofing membrane. Specific method of installing set-on accessories must permit normal movement due to expansion, contraction, vibration, and similar occurrences without damaging roofing membrane. Do not mechanically secure set-on accessories through roofing membrane into roof deck substrate.

# 3.3 FLASHINGS

Provide flashings in the angles formed at walls and other vertical surfaces and where required to make the work watertight, except where metal flashings are indicated.

#### 3.3.1 General

Provide a one-ply flashing membrane, as specified for the system used, and install immediately after the roofing membrane is placed and prior to finish coating where a finish coating is required. Flashings must be stepped where vertical surfaces abut sloped roof surfaces. Provide sheet metal reglet in which sheet metal cap flashings are installed of not more than 16 inch nor less than 8 inch above the roofing surfaces. Exposed joints and end laps of flashing membrane must be made and sealed in the manner required for roofing membrane.

# 3.3.2 Membrane Flashing

# 3.3.2.1 Installation

Install flashing and flashing accessories as the roof membrane is installed. Apply flashing to cleaned surfaces and as recommended by the roof membrane manufacturer and as specified. Utilize cured TPO membrane flashing and prefabricated accessory flashings to the maximum extent recommended by the roof membrane manufacturer. Limit uncured flashing material to reinforcing inside and outside corners and angle changes in plane of membrane, and to flashing scuppers, pourable sealer pockets, and other formed penetrations or unusually shaped conditions as recommended by the roof membrane manufacturer where the use of cured material is impractical. Extend base flashing not less than 8 inch above roofing surface and as necessary to provide for seaming overlap on roof membrane as recommended by the roof membrane manufacturer.

# 3.3.2.2 Sealing

Seal flashing membrane for a minimum of 3 inch on each side of fastening device used to anchor roof membrane to nailers. Completely adhere flashing sheets in place. Seam flashing membrane in the same manner as roof membrane, except as otherwise recommended by the membrane manufacturer's printed instructions and approved by the Contracting Officer. Reinforce all corners and angle transitions by applying uncured membrane to the area in accordance with roof membrane manufacturer recommendations. Mechanically fasten top edge of base flashing with manufacturer recommended termination bar fastened at maximum 12 inch on center. Install sheet metal flashing over the termination bar in the completed work. Mechanically fasten top edge of base flashing for all other terminations in a manner recommended by the roof membrane manufacturer. Apply membrane liner over top of exposed nailers and blocking and to overlap top edge of base flashing installation at curbs, parapet walls, expansion joints and as otherwise indicated to serve as waterproof lining under sheet metal flashing components.

# 3.3.3 Flashing at Roof Drain

Provide a tapered insulation sump into the drain bowl area. Do not exceed tapered slope of 18 degrees for unreinforced membrane and 5 degrees for reinforced membrane. Provide tapered insulation with surface suitable for adhering membrane in the drain sump area. Avoid field seams running through or within 24 inch of roof drain, or as otherwise recommended by the roof membrane manufacturer. Adhere the membrane to the tapered in the drain sump area. Apply water block mastic and extend membrane sheets over edge of drain bowl opening at the roof drain deck flange in accordance with membrane manufacturer's printed application instructions. Ensure

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membrane is free of wrinkles and folds in the drain area. Securely clamp membrane in the flashing clamping ring. Ensure membrane is cut to within 3/4 inch of inside rim of clamping ring to maintain drainage capacity. Do not cut back to bolt holes. Retrofit roof drains must conform to ANSI/SPRI RD-1.

# 3.4 ROOF WALKPADS

Install walkpads at roof access points and where otherwise indicated for traffic areas and for access to mechanical equipment, in accordance with the roof membrane manufacturer's printed instructions. Provide minimum 6 inch separation between adjacent walkpads to accommodate drainage.

# 3.5 CORRECTION OF DEFICIENCES

Where any form of deficiency is found, take additional measures as deemed necessary by the Contracting Officer to determine the extent of the deficiency and provide corrective action recommendations. Perform corrective action as directed by the Contracting Officer.

# 3.6 PROTECTION OF APPLIED ROOFING

At the end of the day's work and when precipitation is imminent, protect applied membrane roofing system from water intrusion.

#### 3.6.1 Water Cutoffs

Straighten insulation line using loose-laid cut insulation sheets and seal the terminated edge of the roof membrane system in an effective manner. Seal off flutes in metal decking along the cutoff edge. Remove the water cut-offs to expose the insulation when resuming work, and remove the insulation sheets used for fill-in.

#### 3.6.2 Temporary Flashing for Permanent Roofing

Provide temporary flashing at drains, curbs, walls and other penetrations and terminations of roofing sheets until permanent flashings can be applied. Remove temporary flashing before applying permanent flashing.

#### 3.6.3 Temporary Walkways, Runways, and Platforms

Do not permit storing, walking, wheeling, and trucking directly on applied roofing system. Provide temporary walkways, runways, and platforms of smooth clean boards, mats or planks as necessary to avoid damage to applied roofing materials, and to distribute weight to conform to live load limits of roof construction. Use rubber-tired equipment for roofing work.

#### 3.7 FIELD QUALITY CONTROL

#### 3.7.1 Construction Monitoring

During progress of the roof work, make visual inspections as necessary to ensure compliance with specified parameters. Additionally, verify the following:

- a. Equipment is in working order. Metering devices are accurate.
- b. Materials are not installed in adverse weather conditions.

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- c. Substrates are in acceptable condition, in compliance with specification, prior to application of subsequent materials.
  - (1) Nailers and blocking are provided where and as needed.
  - (2) Insulation substrate is smooth, properly secured to its substrate, and without excessive gaps prior to membrane application.
  - (3) The proper number, type, and spacing of fasteners are installed.
  - (4) Materials comply with the specified requirements.
  - (5) All materials are properly stored, handled and protected from moisture or other damages. Liquid components are properly mixed prior to application.
  - (6) Adhesives are applied uniformly to both mating surfaces and checked for proper set prior to bonding mating materials. Mechanical attachments are spaced as required, including additional fastening of membrane in corner and perimeter areas as required.
  - (7) Membrane is properly overlapped.
  - (8) Membrane seaming is as specified by TPO membrane manufacturer. All seams are checked at the end of each work day.
  - (9) Applied membrane is inspected and repaired as necessary prior to paver installation.
  - (10) Membrane is adhered without ridges, wrinkles, kinks, fishmouths.
  - (11) Installer adheres to specified and detailed application parameters.
  - (12) Associated flashing's and sheet metal are installed in a timely manner in accord with the specified requirements.
  - (13) Paver ballast is within the specified weight range.
  - (14) Temporary protection measures are in place at the end of each work shift.

# 3.7.2 Manufacturer's Inspection

Manufacturer's technical representative must be present full time when Single Source Contract Liability Warranty is desired visit the site a minimum of 3 times during the installation for purposes of reviewing materials installation practices and adequacy of work in place. Inspections must occur during the first day of membrane installation, at mid-point of the installation, and at substantialcompletion, at a minimum. Additional inspections need not exceed one for each 100 squares of total roof area with the exception that follow-up inspections of previously noted deficiencies or application errors must be performed as requested by the Contracting Officer. After each inspection, a report, signed by the manufacturer's technical representative to the roofing Contractor and then to the Contracting Officer within 3 working days. Within the report state the overall quality of work, deficiencies and any

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other concerns, and recommended corrective action.

3.8 CLEAN UP

Remove debris, scraps, containers and other rubbish and trash resulting from installation of the roofing system from job site each day.

3.9 INSTRUCTIONS TO GOVERNMENT PERSONNEL

Furnish written and verbal instructions on proper maintenance procedures to designated Government personnel. Furnish instructions by a competent representative of the roof membrane manufacturer and include a minimum of 4 hours on maintenance and emergency repair of the membrane. Include a demonstration of membrane repair, and give sources of required special tools. Furnish information on safety requirements during maintenance and emergency repair operations. Include copies of Safety Data Sheets for maintenance/repair materials.

# 3.10 ROOF DRAIN TEST

After completing roofing but prior to Government acceptance, perform the following test for watertightness. Plug roof drains and fill with water to edge of drain sump for 8 hours. Do not plug secondary overflow drains at the same time as adjacent primary drain. To ensure some drainage from roof, do not test all drains at same time. Measure water at beginning and end of the test period. When precipitation occurs during test period, repeat test. When water level falls, remove water, thoroughly dry, and inspect installation; repair or replace roofing at drain to provide for a properly installed watertight flashing seal. Repeat test until there is no water leakage. -- End of Section --

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# FLASHING AND SHEET METAL 05/17, CHG 2: 11/18

#### PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN WELDING SOCIETY (AWS)

AWS D1.2/D1.2M	(2014;	Erra	ta 1	L 201	4;	Erra	ta 2	202	0)
	Structu	ıral	Weld	ling	Cod	e – .	Alun	linum	L

ASTM INTERNATIONAL (ASTM)

- ASTM A480/A480M (2020a) Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip
- ASTM B32 (2020) Standard Specification for Solder Metal
- ASTM B209 (2014) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
- ASTM B221 (2020) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
- ASTM D41/D41M (2011; R 2016) Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing
- ASTM D226/D226M (2017) Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
- ASTM D4586/D4586M (2007; E 2012; R 2012) Asphalt Roof Cement, Asbestos-Free

SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)

SMACNA 1793 (2012) Architectural Sheet Metal Manual, 7th Edition

SINGLE PLY ROOFING INDUSTRY (SPRI)

ANSI/SPRI RD-1

(2014) Performance Standard for Retrofit Drains

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U.S. GREEN BUILDING COUNCIL (USGBC)

LEED v4 BDC Ref Guide	(2013; R 2020) USGBC LEED Reference Guide
	for Building Design and Construction, V4
LEED v4.1 BDC Ref Guide	(2023) LEED v4.1 Building Design and Construction Reference Guide

# 1.2 GENERAL REQUIREMENTS

Finished sheet-metal assemblies must form a weathertight enclosure without waves, warps, buckles, fastening stresses, or distortion, while allowing for expansion and contraction without damage to the system. The sheetmetal installer is responsible for cutting, fitting, drilling, and other operations in connection with sheet-metal modifications required to accommodate the work of other trades. Coordinate installation of sheetmetal items used in conjunction with roofing work to permit continuous, uninterrupted roofing operations.

# 1.3 SUSTAINABILITY REPORTING

Work of this section is intended to contribute to the achievement of, or compliance with, the requirements of the Guiding Principles Validation and LEED Prerequisites and attempted Credits. Refer to Section 01 33 29.00 06 SUSTAINABILITY REPORTING for specific documentation requirements and list of Prerequisites, attempted Credits and LEED version.

Comply with product, material content, performance criteria, activity, documentation, and other technical requirements as described in the LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide as applicable.

Collect, organize, and submit product data, drawings, diagrams, photos and cost information necessary to demonstrate compliance with LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide requirements as applicable.

Data collection shall commence with the notice to proceed and will only be deemed complete upon acceptance of the Final Sustainability Notebook and LEED Online submission by the Contracting Officer, the LEED Project Administrator, and the Green Building Certification Institute.

# 1.4 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Exposed Sheet-Metal Coverings; G, AE Downspouts; G, AE Splash Pans; G, AE Flashing for Roof Drains; G, AE

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P2#: 506474 - Manned/Unmanned Tactical Vehicle Lab (MUMT)
Detroit Arsenal, MI
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Base Flashing; G, AE Counterflashing; G, AE Flashing at Roof Penetrations and Equipment Supports; G, AE Reglets; G, AE Copings; G, AE Conductor Heads; G, AE Recycled Content; S Environmental Product Declarations; S Embodied Carbon Optimization Report/Action Plan; S Extended Producer Responsibility; S Local/Regional Materials; S Material Ingredient Reporting; S Scuppers; G

SD-04 Samples

Finish Samples; G, AE

SD-08 Manufacturer's Instructions

Instructions for Installation; G

Quality Control Plan; G

SD-10 Operation and Maintenance Data

Cleaning and Maintenance; G

- 1.5 SUSTAINABLE DESIGN REQUIREMENTS
- 1.5.1 Environmental Product Declarations

At a minimum, use materials or products with an Environmental Product Declaration in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.5.2 Embodied Carbon Optimization Report/Action Plan

At a minimum, use materials or products with an Embodied Carbon Optimization Report/Action Plan in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

# 1.5.3 Sourcing of Raw Materials

Provide products that meet one or more of the following categories:

# 1.5.3.1 Extended Producer Responsibility

At a minimum, use materials or products from manufacturers that participate in an extended producer responsibility program in accordance with the LEED Implementation Plan. Provide manufacturer letter verifying extended producer responsibility program is in place and that product is eligible. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

#### 1.5.3.2 Recycled Content Materials

At a minimum, use materials or products with recycled content in accordance with the LEED Implementation Plan. Provide manufacturers product literature identifying the percentage of recycled material incorporated within each product used. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan. If recycled content minimum is specified in this section, the greater of the two percentages governs.

# 1.5.4 Material Ingredient Reporting

At a minimum, use materials or products with chemical inventory to at least 0.1% (1000 ppm) in accordance with the LEED Implementation Plan. Provide Health Product Declaration (HPD), Cradle to Cradle Certificate, Declare label, or other manufacturer's published content inventory in compliance with LEED v4.1 Material Ingredient Reporting credit. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

#### 1.5.5 Local/Regional Materials

Use materials or products extracted, harvested, or recovered, as well as manufactured, within a 100 mile radius from the project site, if available from a minimum of three sources. provide a letter from the manufacturer stating the extraction location, manufacturing location, and purchasing location of the products provided, referencing the project name and location specifically and distance to the project site. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

# 1.6 MISCELLANEOUS REQUIREMENTS

## 1.6.1 Product Data

Indicate thicknesses, dimensions, fastenings, anchoring methods, expansion joints, and other provisions necessary for thermal expansion and contraction. Scaled manufacturer's catalog data may be submitted for factory fabricated items.

# 1.6.2 Finish Samples

Submit two color charts and two finish sample chips from manufacturer's standard color and finish options for each type of finish indicated.

## 1.6.3 Operation and Maintenance Data

Submit detailed instructions for installation and quality control during installation, cleaning and maintenance, for each type of assembly indicated.

#### 1.7 DELIVERY, HANDLING, AND STORAGE

Package and protect materials during shipment. Uncrate and inspect materials for damage, dampness, and wet-storage stains upon delivery to Project site. Remove from Project site and replace damaged materials that cannot be restored to like-new condition. Handle sheet-metal items to avoid damage to surfaces, edges, and ends. Store materials in dry, weather-tight, ventilated areas until installation.

# PART 2 PRODUCTS

#### 2.1 RECYCLED CONTENT

Provide products with recycled content. Provide data for each product with recycled content, identifying percentage of recycled content.

# 2.2 MATERIALS

Do not use lead, lead-coated metal, or galvanized steel. Use any metal listed by SMACNA 1793 for a particular item, unless otherwise indicated. Provide materials, thicknesses, and configurations in accordance with SMACNA 1793 for each material. Different items need not be of the same metal, except that contact between dissimilar metals must be avoided.

Furnish sheet-metal items in 8- to 10-foot lengths. Single pieces less than 8-feet long may be used to connect to factory-fabricated inside and outside corners, and at ends of runs. Factory-fabricate corner pieces with minimum 12-inch legs. Provide accessories and other items essential to complete the sheet-metal installation. Provide accessories made of the same or compatible materials as the items to which they are applied. Fabricate sheet-metal items of the materials specified below and to the gage, thickness, or weight shown in Table I at the end of this Section. Provide sheet-metal items with mill finish unless specified otherwise. Where more than one material is listed for a particular item in Table I, each is acceptable and may be used, except as follows:

# 2.2.1 Exposed Sheet-Metal Items

Must be of the same material. Consider the following as exposed sheet metal: copings, cap and base flashings, and related accessories.

## 2.2.2 Stainless Steel

Provide in accordance with ASTM A480/A480M, Type 302 or 304, 2D Finish, fully annealed, dead-soft temper.

#### 2.2.3 Aluminum Alloy Sheet and Plate

Provide in accordance with ASTM B209 from alloy and temper appropriate for use. Provide material not less than 0.032-in in thickness.

2.2.3.1 Alclad

When fabricated of aluminum, fabricate the following items with Alclad 3003, Alclad 3004, or Alclad 3005, clad on one side unless otherwise indicated.

- a. Downspouts, and hangers
- b. Flashing
- 2.2.4 Finishes

Provide exposed exterior sheet metal and aluminum with a baked on, factoryapplied color coating of polyvinylidene fluoride (PVF2) or approved equal fluorocarbon coating. Dry-film thickness of coatings must be 0.8 to 1.3 mils. Color to be selected from manufacturer's full range of color choices. Field applications of color coatings are prohibited and will be rejected.

2.2.5 Aluminum Alloy, Extruded Bars, Rods, Shapes, and Tubes

ASTM B221.

2.2.6 Solder

Provide in accordance with ASTM B32, 95-5 tin-antimony.

- 2.2.7 Reglets
- 2.2.7.1 Metal Reglets

Provide factory-fabricated caulked type or friction type reglets with a minimum opening of 1/4 inch and a depth of 1-1/4 inch, as approved.

#### 2.2.7.1.1 Caulked Reglets

Provide with rounded edges, temporary reinforcing cores, and accessories as required for securing to adjacent construction. Provide built-up mitered corner pieces for inside and outside corners.

#### 2.2.7.1.2 Friction Reglets

Provide with flashing-receiving slots not less than 5/8-inch deep, with 1inch jointing tongues, and upper and lower anchoring flanges installed at 24 inch maximum (snap-lock type receiver).

2.2.8 Scuppers

Line interiors of scupper openings with sheet metal. Provide a drip edge at bottom edges with returns of not less than one inch against the face of the outside wall at the top and sides. Provide the perimeter of the lining approximately 1/2 inch less than the perimeter of the scupper.

## 2.2.9 Conductor Heads

Provide conductor heads and screens in the same material as downspouts. Provide outlet tubes not less than 4 inches long.

2.2.10 Splash Pans

Provide splash pans where downspouts discharge onto roof surfaces and at locations indicated. Unless otherwise indicated, provide pans not less than 24 inches long by 18 inches wide with metal ribs across bottoms of pans. Provide sides of pans with vertical baffles not less than one inch high in the front, and 4 inches high in the back.

2.2.11 Bituminous Plastic Cement

Provide in accordance with ASTM D4586/D4586M, Type I.

2.2.12 Roofing Felt

Provide in accordance with ASTM D226/D226M Type I or Type II.

2.2.13 Asphalt Primer

Provide in accordance with ASTM D41/D41M.

2.2.14 Fasteners

Use the same metal as, or a metal compatible with, the item fastened. Confirm compatibility of fasteners and items to be fastened to avoid galvanic corrosion due to dissimilar materials.

- PART 3 EXECUTION
- 3.1 INSTALLATION
- 3.1.1 Workmanship

Make lines and angles sharp and true. Free exposed surfaces from visible wave, warp, buckle, and tool marks. Fold back exposed edges neatly to form a 1/2-inch hem on the concealed side. Make sheet metal exposed to the weather watertight with provisions for expansion and contraction.

Make surfaces to receive sheet metal plumb and true, clean, even, smooth, dry, and free of defects and projections. For installation of items not shown in detail or not covered by specifications conform to the applicable requirements of SMACNA 1793, Architectural Sheet Metal Manual. Provide sheet-metal flashing in the angles formed where roof decks abut walls, curbs, ventilators, pipes, or other vertical surfaces and wherever indicated and necessary to make the work watertight. Join sheet-metal items together as shown in Table II.

3.1.2 Cleats

Provide cleats for sheet metal 18 inches and over in width. Space cleats evenly not over 12 inches on center unless otherwise specified or indicated. Unless otherwise specified, provide cleats of 2-inches wide by 3-inches long and of the same material and thickness as the sheet metal being installed. Secure one end of the cleat with two fasteners and the cleat folded back over the fastener heads. Lock the other end into the seam. Use screws and drive in expansion shields set in concrete. Pre-tin cleats for soldered seams.

# 3.1.3 Bolts, Rivets, and Screws

Install bolts, rivets, and screws where indicated or required. Provide compatible washers where required to protect surface of sheet metal and to provide a watertight connection. Provide mechanically formed joints in aluminum sheets 0.040 inches or less in thickness.

3.1.4 Seams

Straight and uniform in width and height with no solder showing on the face.

3.1.4.1 Flat-Lock Seams

Finish not less than 3/4-inch wide.

3.1.4.2 Lap Seams

Finish soldered seams not less than 1-inch wide. Overlap seams not soldered, not less than 3 inches.

3.1.4.3 Loose-Lock Expansion Seams

Not less than 3-inches wide; provide minimum 1-inch movement within the joint. Completely fill the joints with the specified sealant, applied at not less than 1/8-inch thick bead.

3.1.4.4 Standing Seams

Not less than 1-inch high, double-locked without solder.

3.1.4.5 Flat Seams

Make seams in the direction of the flow.

3.1.5 Soldering

Where soldering is specified, apply to stainless steel items. Pre-tin edges of sheet metal before soldering is begun. Seal the joints in aluminum sheets of 0.040 inch or less in thickness with specified sealants. Do not solder aluminum.

3.1.5.1 Edges

Flux brush the seams in before soldering. Treat with soldering acid flux the edges of stainless steel to be pre-tinned. Seal the joints in aluminum sheets of 0.040 inch or less in thickness with specified sealants. Do not solder aluminum.

# 3.1.6 Welding and Mechanical Fastening

Use welding for aluminum of thickness greater than 0.040 inch. Aluminum 0.040 inch or less in thickness must be butted and the space backed with formed flashing plate; or lock joined, mechanically fastened, and filled with sealant as recommended by the aluminum manufacturer.

# 3.1.6.1 Welding of Aluminum

Use welding of the inert gas, shield-arc type. For procedures, appearance

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and quality of welds, and the methods used in correcting welding work, conform to AWS D1.2/D1.2M.

3.1.6.2 Mechanical Fastening of Aluminum

Use No. 12, aluminum alloy, sheet-metal screws or other suitable aluminum alloy or stainless steel fasteners. Drive fasteners in holes made with a No. 26 drill in securing side laps, end laps, and flashings. Space fasteners 12 inches maximum on center. Where end lap fasteners are required to improve closure, locate the end-lap fasteners not more than 2 inches from the end of the overlapping sheet.

- 3.1.7 Protection from Contact with Dissimilar Materials
- 3.1.7.1 Aluminum

Do not allow aluminum surfaces in direct contact with other metals except stainless steel, zinc, or zinc coating. Where aluminum contacts another metal, paint the dissimilar metal with a primer followed by two coats of aluminum paint. Where drainage from a dissimilar metal passes over aluminum, paint the dissimilar metal with a non-lead pigmented paint.

#### 3.1.7.2 Metal Surfaces

Paint surfaces in contact with concrete with alkali-resistant coatings such as heavy-bodied bituminous paint.

3.1.7.3 Wood or Other Absorptive Materials

Paint surfaces that may become repeatedly wet and in contact with metal with two coats of aluminum paint or a coat of heavy-bodied bituminous paint.

3.1.8 Expansion and Contraction

Provide expansion and contraction joints at not more than 32-foot intervals - for aluminum and at not more than 40-foot intervals for other metals. Provide an additional joint where the distance between the last expansion joint and the end of the continuous run is more than half the required interval. Space joints evenly.

# 3.1.9 Base Flashing

Extend up vertical surfaces of the flashing not less than 8 inches. Where finish wall coverings form a counterflashing, extend the vertical leg of the flashing up behind the applied wall covering not less than 6 inches. Overlap the flashing strips with the previously laid flashing not less than 3 inches. Fasten the strips at their upper edge to the deck. Horizontal flashing at vertical surfaces must extend vertically above the roof surface and fastened at their upper edge to the deck a minimum of 6 inches on center with hex headed, galvanized shielded screws a minimum of 2-inch lap of any surface. Solder end laps and provide for expansion and contraction. Extend the metal flashing over crickets at the up-slope side of curbs and similar vertical surfaces extending through sloping roofs. Extend the metal flashings onto the roof covering not less than 4.5 inches at the lower side of vertical surfaces extending through the roof decks. Install and fit the flashings so as to be completely weathertight. Provide factory-fabricated base flashing for interior and exterior corners.

# 3.1.10 Counterflashing

Except where indicated or specified otherwise, insert counterflashing in reglets located from 9 to 10 inches above roof decks, extend down vertical surfaces over upturned vertical leg of base flashings not less than 3 inches. Fold the exposed edges of counterflashings 1/2 inch. Provide end laps in counterflashings not less than 3 inches and make it weathertight with plastic cement. Do not make lengths of metal counterflashings exceed 10 feet. Form flashings to the required shapes before installation. Factory-form corners not less than 12 inches from the angle. Secure the flashings in the reglets with lead wedges and space not more than 18 inches apart; on short runs, place wedges closer together. Fill caulked-type reglets or raked joints which receive counterflashings built into concrete walls not less than 1/4 inch and extend not less than 2 inches into the walls. Install counterflashing to provide a spring action against base flashing.

# 3.1.11 Metal Reglets

Keep temporary cores in place during installation. Ensure factory-fabricated caulked-type or friction-type reglets have a minimum opening of 1/4 inch and a minimum depth of 1-1/4 inch, when installed.

# 3.1.11.1 Caulked Reglets

Wedge flashing in reglets with lead wedges every 18 inches, caulked full and solid with an approved compound.

## 3.1.11.2 Friction Reglets

Install flashing snap lock receivers at 24 inches on center maximum. When flashing has been inserted the full depth of the slot, caulk the slot, lock with wedges, and fill with sealant.

3.1.12 DownspoutsSpace supports for downspouts according to the manufacturer's recommendation for the masonry or steel substrate. Types, shapes and sizes are indicated. Provide complete including elbows and offsets. Provide downspouts in approximately 10 foot lengths. Provide end joints to telescope not less than 1/2 inch and lock longitudinal joints. Provide gutter outlets with wire ball strainers for each outlet. Provide strainers to fit tightly into outlets and be of the same material used for gutters. Keep downspouts not less than one inch away from walls. Fasten to the walls at top, bottom, and at an intermediate point not to exceed 5 feet on center with leader straps or concealed rack-and-pin type fasteners. Form straps and fasteners of metal compatible with the downspouts.

# 3.1.12.1 Terminations

Provide downspouts terminating in splash blocks with elbow-type fittings. Provide splash pans as specified.

## 3.1.13 Flashing for Roof Drains

Provide a 30-inches square sheet indicated. Taper insulation to drain from 24 inches out. Set flashing on finished felts in a full bed of asphalt roof cement, ASTM D4586/D4586M. Heavily coat the drain flashing ring with asphalt roof cement. Clamp the roof membrane, flashing sheet, and

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stripping felt in the drain clamping ring. Secure clamps so that felts and drain flashing are free of wrinkles and folds. Retrofit roof drains must conform to ANSI/SPRI RD-1.

# 3.1.14 Scuppers

Extend the scupper liner through and project outside of, the wall it penetrates to form a bottom drip edge against the face of the wall. Fold outside edges under 1/2 inch on all sides. Join the top and sides of the lining on the roof deck side to a closure flange by a locked and soldered joint. Join the bottom edge by a locked and soldered joint to the closure flange, where required, form with a ridge to act as a gravel stop around the scupper inlet. Provide surfaces to receive the scupper lining and coat with bituminous plastic cement.

# 3.1.15 Conductor Heads

Set the depth of the top opening equal to two-thirds of the width or the conductor head. Flat-lock solder seams. Where conductor heads are used in conjunction with scuppers, set the conductor a minimum of 2 inches wider than the scupper. Attach conductor heads to the wall with masonry fasteners. Securely fasten screens to heads.

# 3.1.16 Splash Pans

Install splash pans lapped with horizontal roof flanges not less than 4 inches wide to form a continuous surface. Bend the rear flange of the pan to contour of can't strip and extend up 6 inches under the side wall covering or to height of base flashing under counterflashing. Bed the pans and roof flanges in plastic bituminous cement and strip-flash as specified.

# 3.1.17 Sheet-Metal Covering on Flat, Sloped, or Curved Surfaces

Except as specified or indicated otherwise, cover and flash all minor flat, sloped, or curved surfaces such as crickets, bulkheads, dormers and small decks with metal sheets of the material used for flashing; maximum size of sheets, 16 by 18 inches. Fasten sheets to sheathing with metal cleats. Lock seams and solder. Lock aluminum seams as recommended by aluminum manufacturer. Provide an underlayment of roofing felt for all sheet-metal covering.

#### 3.1.18 Flashing at Roof Penetrations and Equipment Supports

Provide metal flashing for all pipes, ducts, and conduits projecting through the roof surface and for equipment supports, guy wire anchors, and similar items supported by or attached to the roof deck. Goose-necks, rain hoods, power roof ventilators, and the like are specified in Division 23 ("Mechanical").

# 3.1.19 Single-Pipe Vents

Use a two-piece formed metal housing. Set metal housing with a metal sleeve having a 4-inch roof flange in bituminous plastic cement and nailed 3 inches on center. Extend sleeve a minimum of 8 inches above the roof deck and lapped a minimum of 3 inches by a metal hood secured to the vent pipe by a draw band. Seal the area of hood in contact with vent pipe with an approved sealant.

## 3.1.20 Copings

Terminate outer edges in edge strips. Install with sealed symmetrical lap joints over underlying place as indicated.

# 3.2 PAINTING

Touch ups in the field may be applied only after metal substrates have been cleaned and pretreated in accordance with manufacturer's written instructions and products.

Field-paint sheet metal for separation of dissimilar materials.

#### 3.3 CLEANING

Clean exposed sheet-metal work at completion of installation. Remove grease and oil films, handling marks, contamination from steel wool, fittings and drilling debris, and scrub-clean. Free the exposed metal surfaces of dents, creases, waves, scratch marks, and solder or weld marks.

# 3.4 REPAIRS TO FINISH

Scratches, abrasions, and minor surface defects of finish may be repaired in accordance with the manufacturer's printed instructions and as approved. Repair damaged surfaces caused by scratches, blemishes, and variations of color and surface texture. Replace items which cannot be repaired.

## 3.5 FIELD QUALITY CONTROL

Establish and maintain a Quality Control Plan for sheet metal used in conjunction with roofing to assure compliance of the installed sheet-metal work with the contract requirements. Remove work that is not in compliance with the contract and replace or correct. Include quality control, but not be limited to, the following:

- a. Observation of environmental conditions; number and skill level of sheet-metal workers; condition of substrate.
- b. Verification that specified material is provided and installed.
- c. Inspection of sheet-metal work, for proper size(s) and thickness(es), fastening and joining, and proper installation.
- d. A roofing technician responsible directly to the Contractor and experienced in construction of the specified type of roofing system and related work must perform quality control functions and be present on Project site during roofing installations.

# 3.5.1 Procedure

Submit for approval prior to start of roofing work. Include a checklist of points to be observed. Document the actual quality-control observations and inspections. Furnish a copy of the documentation to the Contracting Officer at the end of each day.

TABLE I. SHEET METAL	WEIGHTS, THICKNESSES, A	ND GAGES
Sheet-Metal Items	Aluminum, inch	Stainless Steel, inch
Building Expansion Joints		
Cover	0.032	0.015
Waterstop-bellows or flanged, U-type.	-	0.015
Covering on minor flat, pitched or	0.040	0.018
curved surfaces		
Flashings:		
Base	0.040	0.018
Cap (Counter-flashing)	0.032	0.015
Bond barrier	-	0.015
Roof drain		
Coping	0.040	-
Toint Cover plates (See Table II)	0.022	0.015
bothe cover places (see lable II)	0.032	0.013
Reglets	-	0.010

TABLE II. SHEET-METAL JOINTS						
TYPE OF JOINT						
Item Designation	Stainless Steel	Aluminum	Remarks			
Joint cap for building expansion seam, cleated joint at roof	1.25-inch single lock, standing seam, cleated	1.25-inch single lock, standing				
Flashings						
Base	1-inch; 3-inch lap for expansion joint	1-inch flat locked, soldered; sealed; 3- inch lap for expansion joint	Aluminum manufacturer's recommended hard setting sealant for locked aluminum joints. Fill each metal expansion joint with a joint sealing compound.			
Cap-in reglet	3-inch lap	3-inch lap	Seal groove with joint sealing compound.			
Reglets	Butt joint		Seal reglet groove with joint sealing compound.			

-- End of Section --

# SECTION 07 81 00

# SPRAY-APPLIED FIREPROOFING 02/11

## PART 1 GENERAL

1.1 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.

ASSOCIATION OF THE WALL AND CEILING INDUSTRY (AWCI)

AWCI TM 12-A	(1997; 3rd Ed) Standard Practice for the
	Testing and Inspection of Field Applied
	Sprayed Fire-Resistive Materials; An
	Annotated Guide

ASTM INTERNATIONAL (ASTM)

ASTM E84 (2020) Standard Test Method for Surface Burning Characteristics of Building Materials ASTM E119 (2020) Standard Test Methods for Fire Tests of Building Construction and Materials ASTM E605/E605M (1993; R 2015; E 2015) Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members ASTM E736 (2000; R 2011) Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members (1992; R 2020) Standard Test Method for ASTM E759/E759M Effect of Deflection on Sprayed Fire-Resistive Material Applied to Structural Members ASTM E760/E760M (1992; R 2020) Standard Test Method for Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members (1992; R 2020) Standard Test Method for ASTM E761/E761M Compressive Strength of Sprayed Fire-Resistive Material Applied to Structural Members ASTM E859/E859M (1993; R 2020) Standard Test Method for Air Erosion of Sprayed Fire-Resistive Materials (SFRMs) Applied to Structural

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Members

- ASTM E937/E937M (1993; R 2020) Standard Test Method for Corrosion of Steel by Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members
- ASTM E1042 (2002; R 2021) Standard Classification for Acoustically Absorptive Materials Applied by Trowel or Spray
- ASTM G21 (2015; R 2021; E 2021) Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH (CDPH)

CDPH SECTION 01350 (2017; Version 1.2) Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources using Environmental Chambers

ICC EVALUATION SERVICE, INC. (ICC-ES)

ICC-ES AC23 (2012; R 2016) Acceptance Criteria for Sprayed Fire-resistant Materials (SFRMs), Intumescent Fire-resistant Coatings and Mastic Fire-resistant Coatings Used to Protect Structural Steel Members

U.S. GREEN BUILDING COUNCIL (USGBC)

- LEED v4 BDC Ref Guide (2013; R 2020) USGBC LEED Reference Guide for Building Design and Construction, v4
- LEED v4.1 BDC Ref Guide (2023) LEED v4.1 Building Design and Construction Reference Guide

UNDERWRITERS LABORATORIES (UL)

UL 263 (2011; Reprint Aug 2021) UL Standard for Safety Fire Tests of Building Construction and Materials

- UL Fire Resistance (2014) Fire Resistance Directory
- 1.2 SYSTEM DESCRIPTION

1.2.1 General Requirements

Protect all structural steel, including undersides of steel roof decks (if required), with spray-applied fireproofing to a fire-resistance hour-rating as indicated below, unless otherwise indicated.

1.2.2 Fire Resistance Rating

Fire-resistance ratings must be in accordance with the fire-rated assemblies listed in UL Fire Resistance. Proposed materials not listed in UL Fire Resistance must have fire-resistance ratings at least equal to the

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UL Fire Resistance ratings as determined by an approved independent testing laboratory, based on tests specified in UL 263 or ASTM E119. Submit reports and test records, attesting that the fireproofing material conforms to the specified requirements. Each test report must conform to the report requirements specified by the test method. For the underside of the decking use metal lath installed prior to the fireproofing material or Rigid Board Fireproofing Material as outlined in the UL Fire Resistance Directory Volume 1. Apply fireproofing to structural steel members, with the following hourly fire-resistance rating and in accordance with the following UL design or approved equivalent. Use unrestrained fireresistance ratings, unless the architect/engineer has specified that the degree of thermal restraint of the construction meets or exceeds the degree of thermal restraint of the tested assembly. Performance tests must be in accordance with ASTM E119.

Fire Rating Schedule				
Element	Hourly Rating	UL Design Reference		
Columns supporting roof	3	x829		
Roof decks	1-1/2	D902		

## 1.2.3 Evaluation Reports - ICC-ES Reports

Materials must be evaluated in accordance with ICC-ES AC23. ICC-ES Reports must be included as part of the Submittals below. The reports will identify the product as code compliant and having met the physical performance requirements outlined in paragraphs "Dry Density and Cohesion/Adhesion" through "Air Erosion."

# 1.3 SUSTAINABILITY REPORTING

Work of this section is intended to contribute to the achievement of, or compliance with, the requirements of the Guiding Principles Validation and LEED Prerequisites and attempted Credits. Refer to Section 01 33 29.00 06 SUSTAINABILITY REPORTING for specific documentation requirements and list of Prerequisites, attempted Credits and LEED version.

Comply with product, material content, performance criteria, activity, documentation, and other technical requirements as described in the LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide as applicable.

Collect, organize, and submit product data, drawings, diagrams, photos and cost information necessary to demonstrate compliance with LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide requirements as applicable.

Data collection shall commence with the notice to proceed and will only be deemed complete upon acceptance of the Final Sustainability Notebook and LEED Online submission by the Contracting Officer, the LEED Project Administrator, and the Green Building Certification Institute.

# 1.4 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification

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identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Fireproofing Material; G, AE

Environmental Product Declarations; S

Embodied Carbon Optimization Report/Action Plan; S

Extended Producer Responsibility; S

Recycled Content Materials; S

Local/Regional Materials; S

Material Ingredient Reporting; S

Low-Emitting Materials; S

#### SD-04 Samples

Spray-Applied Fireproofing; G, AE

SD-06 Test Reports

Fire Resistance Rating; G, AE

Field Tests; G

Evaluation Reports; G, AE

SD-07 Certificates

Installer Qualifications; G

Surface Preparation Report; G

Manufacturer's Inspection Report; G, AE

# 1.5 SUSTAINABLE DESIGN REQUIREMENTS

# 1.5.1 Environmental Product Declarations

At a minimum, use materials or products with an Environmental Product Declaration in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.5.2 Embodied Carbon Optimization Report/Action Plan

At a minimum, use materials or products with an Embodied Carbon Optimization Report/Action Plan in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

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# 1.5.3 Sourcing of Raw Materials

Provide products that meet one or more of the following categories:

# 1.5.3.1 Extended Producer Responsibility

At a minimum, use materials or products from manufacturers that participate in an extended producer responsibility program in accordance with the LEED Implementation Plan. Provide manufacturer letter verifying extended producer responsibility program is in place and that product is eligible. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

## 1.5.3.2 Recycled Content Materials

At a minimum, use materials or products with recycled content in accordance with the LEED Implementation Plan. Provide manufacturers product literature identifying the percentage of recycled material incorporated within each product used. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan. If recycled content minimum is specified in this section, the greater of the two percentages governs.

# 1.5.4 Material Ingredient Reporting

At a minimum, use materials or products with chemical inventory to at least 0.1% (1000 ppm) in accordance with the LEED Implementation Plan. Provide Health Product Declaration (HPD), Cradle to Cradle Certificate, Declare label, or other manufacturer's published content inventory in compliance with LEED v4.1 Material Ingredient Reporting credit. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

# 1.5.5 Local/Regional Materials

Use materials or products extracted, harvested, or recovered, as well as manufactured, within a 100 mile radius from the project site, if available from a minimum of three sources. provide a letter from the manufacturer stating the extraction location, manufacturing location, and purchasing location of the products provided, referencing the project name and location specifically and distance to the project site. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

# 1.5.6 Low-Emitting Materials

Use only spray-applied fireproofing products that comply with LEED v4.1 BDC Ref Guide requirements for VOC content and emissions. Submit manufacturer's literature identifying compliance with CDPH SECTION 01350 and VOC content. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for low-emitting material requirements.

## 1.6 QUALITY ASSURANCE

# 1.6.1 Installer Qualifications

Engage an experienced installer that is certified, licensed, or otherwise qualified by the spray-on fireproofing manufacturer as having the necessary experience, staff, and training to install the manufacturer's

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products in accordance with specified requirements. Submit manufacturer's certification that each listed installer is qualified and trained to install the specified fireproofing. Show evidence that each fireproofing installer has had a minimum of three years of experience in installing the specified type of fireproofing. Each installer of fireproofing material must be trained, have a minimum of three years of experience and a minimum of three installations using fireproofing of the type specified. A manufacturer's willingness to sell its products to the Contractor or installer does not infer qualification of the buyer.

# 1.6.2 Pre-Installation Meeting

Hold a meeting with the installer, field testing agency, the manufacturer, subcontractors (whose employees come into contact with the fireproofing), and the Contracting Officer prior to the installation of any fireproofing material to review the substrates for acceptability, method of application, applied thickness, patching, repair, inspection, and testing procedures.

## 1.7 DELIVERY, STORAGE, AND HANDLING

Deliver packaged material in the original unopened containers, marked to show the brand name, the manufacturer, and the UL markings. Keep fireproofing material dry until ready to be used, and store off the ground, under cover, and away from damp surfaces. Damaged or opened containers will be rejected. Apply material with shelf-life prior to expiration of the shelf-life.

# 1.8 PROJECT/SITE CONDITIONS

#### 1.8.1 Temperature

Maintain substrate and ambient air temperatures above 40 degrees F during application and for 24 hours before and after application. Maintain relative humidity within the limits recommended by the fireproofing manufacturer.

## 1.8.2 Ventilation

Provide adequate ventilation to properly dry the fireproofing after application. In enclosed areas, provide a minimum of four air exchanges per hour by forced air circulation.

## PART 2 PRODUCTS

## 2.1 SPRAY-APPLIED FIREPROOFING

Provide spray-applied fireproofing material conforming to ASTM E1042, Class (a), Category A, either Type I or Type II, except that the dust removed must not exceed 0.0025 gram per square foot of fireproofing material applied as specified in the project. Material must be asbestosfree, and must resist fungus for a period of 28 days when tested in accordance with ASTM G21. Material must have a flame spread index of 25 or less and a smoke-developed index of 50 or less when tested in accordance with ASTM E84. Submit one sample panel, 18 inches square, for each specified type of fireproofing. Also, a designated sample area of not less than 100 square feet must be prepared. Sample area must be representative of typical installation of fireproofing including metal decks, beams, columns, and attachments. Equipment, materials and

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procedures used in the sample area must be the same as, or representative of, that to be used in the work. The sample area must be approved prior to proceeding with fireproofing work in any other area. The approved sample area must be used as a reference standard for applied fireproofing material. Sample area must remain in place and open to observation until all spray-applied fireproofing is completed and accepted, at which time it may become part of the work.

### 2.1.1 Dry Density and Cohesion/Adhesion

Fireproofing must have a minimum ASTM E605/E605M dry density and ASTM E736 cohesion/adhesion properties as follows.

2.1.1.1 Concealed Structural Components

Fireproofing for structural components concealed above the ceiling, or within a wall, chase, or furred space, must have a minimum applied dry density of 15 pounds per cubic foot and a cohesion/adhesion strength of 200 psf.

2.1.1.2 Exposed Structural Components

Fireproofing for exposed structural components, except where otherwise specified or indicated, must have a minimum applied dry density of 22 pounds per cubic foot and a cohesion/adhesion strength of 434 psf.

2.1.1.3 Mechanical Rooms and Storage Areas

Fireproofing for structural components located in mechanical rooms and storage areas must have a minimum applied dry density of 40 pcf and a cohesion/adhesion strength of 1,000 psf.

2.1.2 Deflection

Spray-applied fireproofing must not crack, spall, or delaminate when backing to which it is applied is subject to downward deflection 1/120th of a 10-foot clear span, when tested in accordance with ASTM E759/E759M.

2.1.3 Bond-Impact

Spray-applied fireproofing material must not crack, spall, or delaminate when tested in accordance with ASTM E760/E760M.

2.1.4 Compressive Strength

The minimum compressive strength must be 1000 psf when tested in accordance with ASTM E761/E761M.

2.1.5 Corrosion

Spray-applied fireproofing material must not contribute to corrosion of test panels when tested as specified in ASTM E937/E937M.

2.1.6 Air Erosion

Dust removal must not exceed 0.025 gram per square foot when tested in accordance with ASTM E859/E859M.

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#### 2.2 WATER

Water used for material mixing and surface preparation must be potable.

### PART 3 EXECUTION

## 3.1 SURFACE PREPARATION

Thoroughly clean surfaces to be fireproofed of dirt, grease, oil, paint, primers, loose rust, rolling lubricant, mill scale or other contaminants that will interfere with the proper bonding of the sprayed fireproofing to the substrate. Test painted/primed steel substrates in accordance with ASTM E736, with specified sprayed fireproofing material, to provide the required fire-resistance rating; painted or primed steel surfaces may require a fireproofing bond test to determine if the paint formulation will impair proper adhesion. Certify the acceptability of surfaces to receive sprayed-applied fireproofing by inspection and submit a Surface Preparation Report accordingly. The statement must list the structural members and the areas that have been inspected and certified. Overhead areas to be fireproofed must be cleared of all obstructions interfering with the uniform application of the spray-applied fireproofing. Hardware such as support sleeves, inserts, clips, hanger attachment devices and the like must be installed prior to the application of the fireproofing. Condition of the surfaces must be acceptable to the manufacturer prior to application of spray-applied fireproofing. Applications listed for use on primed surfaces must be in accordance with the manufacturer's recommendations and standards, and detailed in submittal item SD-03 Product Data.

## 3.2 PROTECTION

Cover surfaces not to receive spray-applied fireproofing to prevent contamination by splatter, rebound and overspray. Cover exterior openings in areas to receive spray-applied fireproofing prior to and during application of fireproofing with tarpaulins or other approved material. Clean surfaces not to receive fireproofing of fireproofing.

## 3.3 FIREPROOFING MATERIAL

Mix fireproofing material in accordance with the manufacturer's recommendations. Submit data identifying performance characteristics of fireproofing material. Data includes recommended application requirements and indicate thickness of fireproofing to be applied to achieve each required fire rating.

## 3.4 APPLICATION

## 3.4.1 Sequence

Prior to application of fireproofing, the manufacturer must inspect and approve application equipment, water supply and pressure, and the application procedures. If fireproofing is required to be applied to underside of steel roof deck assemblies, it must be done only after respective roof is complete. No roof traffic must be allowed during application. Fireproofing material must be applied prior to the installation of ductwork, piping, and conduits which would interfere with uniform application of the fireproofing.

## 3.4.2 Application Technique

Maintain water pressure and volume to manufacturer's recommendations throughout the fireproofing application. Apply fireproofing material to the thickness and density established for the specified fire-resistance rating, in accordance with the procedure recommended by the manufacturer, and to a uniform density and texture. Do not tamp fireproofing material to achieve the desired density.

# 3.4.3 Applied Thickness

The minimum average thickness must be no less than 0.375 inches. Thicknesses must not be less than required to achieve designated fireresistance ratings. If the specified thickness is greater than or equal to 1 inch, any individual measurement must not be less than the specified thickness minus 0.25 inches. If the specified thickness is less than 1 inch, any individual measurement must not be less than the specified thickness minus 25 percent.

# 3.5 MANUFACTURER'S SERVICES

# 3.5.1 General

The manufacturer, or its representative, must be on-site prior to, periodically during, and at completion of the application, to provide the specified inspections and certifications; and to ensure that preparations are adequate and that the material is applied according to manufacturer's recommendations and the contract requirements.

# 3.5.2 Manufacturer's Inspection

The manufacturer must inspect the fireproofing work after the work is completed in each area, including testing, repair, and clean-up, and must certify that the work complies with the manufacturer's criteria and recommendations. Before the sprayed material is covered, and after all of the fireproofing work is completed, including repair, testing, and clean-up; and after mechanical, electrical and other work in contact with fireproofing material has been completed, the manufacturer must re-inspect the work and certify that the entire project complies with the manufacturer's criteria and recommendations. Obtain and submit the Manufacturer's Inspection Report and certifications of approval stating that the spray-applied fireproofing in the entire project complies with the manufacturer's criteria and recommendations.

# 3.6 FIELD TESTS

The applied fireproofing must be tested by an approved independent testing laboratory to be selected by the A/E and paid for by the Contractor. Submit test reports documenting results of tests on the applied material in the Project. Report must include defects identified, repair procedures, and results of the retests when required. Perform the tests in approved locations: for density in accordance with ASTM E736, cohesion/adhesion in accordance with ASTM E736, and for thickness in accordance with ASTM E605/E605M. Determine densities in accordance with ASTM E605/E605M or Appendix A, "Alternate Method for Density Determination" of AWCI TM 12-A. Take density determinations at the flat portion of deck, beam bottom flange, beam web, column, and an equivalent area from the top of the lower beam flange. Areas showing a density less than specified will be rejected. A test sample must be located every

10,000 square feet of floor area. Any area showing less than minimum requirements must be corrected. Proposed corrective measures, in writing, must be approved before starting the corrective action. Corrected work must be retested.

# 3.6.1 Structural Components

Test each structural component type at roof decks, beams, columns, joists, and trusses. Minimum average thickness must be as required by UL Fire Resistance Directory. Density and cohesion/adhesion must be as specified.

# 3.6.2 Repair

Additional fireproofing material may be added to provide proper thickness. Correct rejected areas of fireproofing to meet specified requirements by adding fireproofing material to provide the proper thickness, or by removing defects and respraying with new fireproofing material. Use same type of fireproofing material for repairs as originally applied or use patching materials recommended by the manufacturer. Retest and reinspect repaired areas. Apply fireproofing material to voids or damaged areas by hand-trowel, or by respraying.

## 3.6.3 Visual Inspections

Inspections must be made by the certified independent laboratory prior to closure of concealed areas. These inspections may be phased, but must not occur less than five working days prior to the enclosure of the fireproofing. Sprayed areas must receive a final inspection. Fireproofed surfaces must be inspected after mechanical, electrical, and other work in contact with fireproofing material has been completed and before sprayed material is covered. Any locations missing fireproofing must be patched in accordance with the manufacturer's requirements.

# 3.6.4 Patching

Patch and repair damaged fireproofing. The patching material must be the same as that specified for that area.

# 3.7 CLEANUP

Thoroughly clean surfaces not indicated to receive fireproofing of sprayed material within a 24-hour period after application.

-- End of Section --

# SECTION 07 84 00

# FIRESTOPPING 05/10, CHG 1: 08/13

## PART 1 GENERAL

#### 1.1 SUMMARY

Furnish and install tested and listed firestopping systems, combination of materials, or devices to form an effective barrier against the spread of flame, smoke, and gases, and maintain the integrity of fire-resistance-rated walls and partitions, including through-penetrations and construction joints and gaps.

- a. Through-penetrations include the annular space around pipes, tubes, conduit, wires, cables, and vents.
- b. Construction joints include those used to accommodate expansion, contraction, or wind movement; firestopping material shall not interfere with the required movement of the joint.
- c. Gaps requiring firestopping include gaps between the top of the fire-rated walls and the roof deck above and at the intersection of shaft assemblies and adjoining fire-resistance-rated assemblies.

# 1.2 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	D6866	(2022) Standard Test Methods for Determining the Biobased Content of Solid, Liquid, and Gaseous Samples Using Radiocarbon Analysis
ASTM	E84	(2020) Standard Test Method for Surface Burning Characteristics of Building Materials
ASTM	E119	(2020) Standard Test Methods for Fire Tests of Building Construction and Materials
ASTM	E814	(2013a; R 2017) Standard Test Method for Fire Tests of Penetration Firestop Systems
ASTM	E1399/E1399M	(1997; R 2017) Standard Test Method for Cyclic Movement and Measuring the Minimum and Maximum Joint Widths of Architectural Joint Systems
ASTM	E1966	(2015; R 2019) Standard Test Method for Fire-Resistive Joint Systems

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W912QR25R0052 Specs Vol1-0000 P2#: 506474 - Manned/Unmanned Tactical Vehicle Lab (MUMT) Detroit Arsenal, MI (2020a) Standard Practice for On-Site ASTM E2174 Inspection of Installed Firestop Systems ASTM E2393 (2020a) Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers FM GLOBAL (FM) FM 4991 (2013) Approval of Firestop Contractors FM APP GUIDE (updated on-line) Approval Guide http://www.approvalguide.com/ INTERNATIONAL CODE COUNCIL (ICC) ICC IBC (2018) International Building Code U.S. GREEN BUILDING COUNCIL (USGBC) LEED v4.1 BDC Ref Guide (2023) LEED v4.1 Building Design and Construction Reference Guide UNDERWRITERS LABORATORIES (UL) UL 723 (2018) UL Standard for Safety Test for Surface Burning Characteristics of Building Materials UL 1479 (2015; Reprint May 2021) Fire Tests of Through-Penetration Firestops UL 2079 (2015; Reprint Jul 2020) Tests for Fire Resistance of Building Joint Systems UL Fire Resistance (2014) Fire Resistance Directory

# 1.3 SEQUENCING

Coordinate the specified work with other trades. Apply firestopping materials, at penetrations of pipes and ducts, prior to insulating, unless insulation meets requirements specified for firestopping. Apply firestopping materials at building joints and construction gaps, prior to completion of enclosing walls or assemblies. Cast-in-place firestop devices shall be located and installed in place before concrete placement. Pipe, conduit, or cable bundles shall be installed through cast-in-place device after concrete placement but before area is concealed or made inaccessible. Firestop material shall be inspected and approved prior to final completion and enclosing of any assemblies that may conceal installed firestop.

# 1.4 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL

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PROCEDURES:

SD-02 Shop Drawings

Firestopping System; G, AE

SD-03 Product Data

Firestopping Materials; G, AE

Environmental Product Declarations; S

Embodied Carbon Optimization Report/Action Plan; S

Extended Producer Responsibility; S

Bio-Based Materials; S

Recycled Content Materials; S

Local/Regional Materials; S

Material Ingredient Reporting; S

Low-Emitting Materials; S

SD-06 Test Reports

Inspection; G

SD-07 Certificates

Inspector Qualifications Firestopping Materials Installer Qualifications; G

1.5 SUSTAINABLE DESIGN REQUIREMENTS

1.5.1 Environmental Product Declarations

At a minimum, use materials or products with an Environmental Product Declaration in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.5.2 Embodied Carbon Optimization Report/Action Plan

At a minimum, use materials or products with an Embodied Carbon Optimization Report/Action Plan in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.5.3 Sourcing of Raw Materials

Provide products that meet one or more of the following categories:

1.5.3.1 Extended Producer Responsibility

At a minimum, use materials or products from manufacturers that

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participate in an extended producer responsibility program in accordance with the LEED Implementation Plan. Provide manufacturer letter verifying extended producer responsibility program is in place and that product is eligible. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

# 1.5.3.2 Bio-Based Materials

At a minimum, use materials or products with bio-based content in accordance with the LEED Implementation Plan. Provide manufacturer signed letter confirming ASTM D6866 test method was conducted validating bio-based material weight within product, type of bio-based material used within product, and confirmation raw material was legally harvested. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan. If bio-based content minimum is specified in this section, the greater of the two percentages governs.

#### 1.5.3.3 Recycled Content Materials

At a minimum, use materials or products with recycled content in accordance with the LEED Implementation Plan. Provide manufacturers product literature identifying the percentage of recycled material incorporated within each product used. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan. If recycled content minimum is specified in this section, the greater of the two percentages governs.

# 1.5.4 Material Ingredient Reporting

At a minimum, use materials or products with chemical inventory to at least 0.1% (1000 ppm) in accordance with the LEED Implementation Plan. Provide Health Product Declaration (HPD), Cradle to Cradle Certificate, Declare label, or other manufacturer's published content inventory in compliance with LEED v4.1 Material Ingredient Reporting credit. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

## 1.5.5 Local/Regional Materials

Use materials or products extracted, harvested, or recovered, as well as manufactured, within a 100 mile radius from the project site, if available from a minimum of three sources. provide a letter from the manufacturer stating the extraction location, manufacturing location, and purchasing location of the products provided, referencing the project name and location specifically and distance to the project site. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

## 1.5.6 Low-Emitting Materials

Use only firestopping materials that comply with LEED v4.1 BDC Ref Guide requirements. Provide manufacturer's product literature indicating VOC content. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for low-emitting material requirements.

## 1.6 QUALITY ASSURANCE

# 1.6.1 Installer

Engage an experienced Installer who is:

- a. FM Research approved in accordance with FM 4991, operating as a UL-Certified Firestop Contractor, or
- b. Certified, licensed, or otherwise qualified by the firestopping manufacturer as having the necessary staff, training, and a minimum of three years of experience in the installation of manufacturer's products in accordance with specified requirements. Submit documentation of this experience. A manufacturer's willingness to sell its firestopping products to the Contractor or to an installer engaged by the Contractor does not in itself confer installer qualifications on the buyer. The Installer shall have been trained by a direct representative of the manufacturer (not distributor or agent) in the proper selection and installation procedures. The installer shall obtain from the manufacturer and submit written certification of training, and retain proof of certification for duration of firestop installation.

## 1.6.2 Inspector Qualifications

The inspector shall have a minimum of two years of experience in construction field inspections of firestopping systems, products, and assemblies. The inspector shall be completely independent of, and divested from, the installer, the manufacturer, and the supplier of any material or item being inspected. The inspector shall not be a competitor of the installer, the contractor, the manufacturer, or supplier of any material or item being inspected. Include in the qualifications submittal a notarized statement assuring compliance with the requirements stated herein.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

Deliver materials in the original unopened packages or containers showing name of the manufacturer and the brand name. Store materials off the ground, protected from damage and exposure to elements and temperatures in accordance with manufacturer requirements. Remove damaged or deteriorated materials from the site. Use materials within their indicated shelf life.

## PART 2 PRODUCTS

## 2.1 FIRESTOPPING SYSTEM

Submit detail drawings including manufacturer's descriptive data, typical details conforming to UL Fire Resistance or other details certified by another nationally recognized testing laboratory, installation instructions, or UL-listing details for a firestopping assembly in lieu of fire-test data or report. For those firestop applications for which no UL-tested system is available through a manufacturer, a manufacturer's engineering judgment, derived from similar UL system designs or other tests, shall be submitted for review and approval prior to installation. Submittal must indicate the firestopping material to be provided for each type of application. When more than a total of five penetrations and/or construction joints are to receive firestopping, provide drawings that indicate location, "F," "T," and "L" ratings, and type of application.

Also, submit a written report indicating locations of and types of penetrations and types of firestopping used at each location; record type by UL-listed printed numbers.

#### 2.2 FIRESTOPPING MATERIALS

Provide firestopping materials, supplied from a single domestic manufacturer, consisting of commercially manufactured, asbestos-free, nontoxic products, FM APP GUIDE-approved, or UL-listed, for use with applicable construction and penetrating items, complying with the following minimum requirements:

# 2.2.1 Fire Hazard Classification

Material shall have a flame spread of 25 or less, and a smoke-developed of 50 or less, when tested in accordance with ASTM E84 or UL 723. Material shall be an approved firestopping material as listed in UL Fire Resistance or by a nationally recognized testing laboratory.

# 2.2.2 Toxicity

Material shall be nontoxic and carcinogen-free to humans at all stages of application or during fire conditions and shall not contain hazardous chemicals or require harmful chemicals to clean material or equipment.

# 2.2.3 Fire-Resistance Rating

Firestop systems shall be UL Fire Resistance-listed or FM APP GUIDEapproved with "F" rating at least equal to fire-rating of fire wall in which penetrated openings are to be protected. Where required, firestop systems shall also have "T" rating at least equal to the fire-rated floor in which the openings are to be protected.

## 2.2.3.1 Through-Penetrations

Firestopping materials for through-penetrations, as described in paragraph entitled "SUMMARY," shall provide "F," "T," and "L" fire-resistance ratings in accordance with ASTM E814 or UL 1479. Fire-resistance ratings shall be as follows:

## 2.2.3.1.1 Penetrations of Fire-Resistance-Rated Walls and Partitions

F Rating = Rating of wall or partition being penetrated.

2.2.3.1.2 Penetrations of the Ceiling Membrane of Roof-Ceiling Assemblies

F Rating = 1-1/2 hour, T Rating = 1-1/2 hour. Where the penetrating item is outside of a wall cavity the F rating must be equal to the fire-resistance rating of the floor penetrated, and the T rating shall be in accordance with the requirements of ICC IBC.

## 2.2.3.1.3 Penetrations of Fire- and/or Smoke-Resistance Rated Walls

F Rating =(as indicated) and L Rating = <10 cfm/sf (where L rating is required).

## 2.2.3.2 Construction Joints and Gaps

Fire-resistance ratings of construction joints, as described in paragraph entitled "SUMMARY," and gaps such as those the same as the construction in which they occur. Construction joints and gaps shall be provided with firestopping materials and systems that have been tested in accordance with ASTM E119, ASTM E1966 or UL 2079 to meet the required fire-resistance rating. Systems installed at construction joints shall meet the cycling requirements of ASTM E1399/E1399M or UL 2079. All joints at the intersection of the top of a fire-resistance rated wall and the underside of a fire-rated roof-ceiling assembly shall provide a minimum Class II movement capability.

## 2.2.4 Material Certification

Submit certificates attesting that firestopping material complies with the specified requirements. For all intumescent firestop materials used in through-penetration systems, manufacturer shall provide certification of compliance with UL 1479.

#### PART 3 EXECUTION

#### 3.1 PREPARATION

Areas to receive firestopping must be free of dirt, grease, oil, or loose materials which may affect the fitting or fire-resistance of the firestopping system. For cast-in-place firestop devices, formwork, or metal deck to receive device prior to concrete placement must be sound and capable of supporting device. Prepare surfaces as recommended by the manufacturer.

## 3.2 INSTALLATION

Completely fill void spaces with firestopping material regardless of geometric configuration, subject to tolerance established by the manufacturer. Install firestopping in accordance with manufacturer's written instructions. Provide tested and listed firestop systems in the following locations, except in floor slabs on grade:

- a. Penetrations of duct, conduit, tubing, cable and pipe through fire-resistance-rated walls and partitions.
- b. Penetrations of vertical shafts such as pipe chases and utility chutes.
- c. Gaps at perimeter of fire-resistance rated walls and partitions, such as between the top of the walls and the bottom of roof decks.
- d. Construction joints in fire-rated walls and partitions.
- e. Other locations where required to maintain fire-resistance rating of the construction.

# 3.2.1 Insulated Pipes and Ducts

Thermal insulation must be cut and removed where pipes or ducts pass through firestopping, unless insulation meets requirements specified for firestopping. Replace thermal insulation with a material having equal thermal insulating and firestopping characteristics.

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## 3.2.2 Fire Dampers

Install and firestop fire dampers in accordance with Section 23 30 00 HVAC AIR DISTRIBUTION. Do not firestop around fire dampers.

3.2.3 Data and Communication Cabling

Cabling for data and communication applications shall be sealed with re-enterable firestopping products and devices.

## 3.2.3.1 Re-Enterable Devices

Firestopping devices shall be pre-manufactured modular devices, containing built-in self-sealing intumescent inserts. Firestopping devices shall allow for cable moves, additions or changes without the need to remove or replace any firestop materials. Devices must be capable of maintaining the fire-resistance rating of the penetrated membrane at 0-percent to 100-percent visual fill of penetrants; while maintaining "L" rating of <10 cfm/sf measured at ambient temperature and 400 degrees F at 0-percent to 100-percent visual fill.

# 3.2.3.2 Re-Sealable Products

Provide firestopping pre-manufactured modular products, containing self-sealing intumescent inserts. Firestopping products shall allow for cable moves, additions, or changes. Devices shall be capable of maintaining the fire-resistance rating of the penetrated membrane at 0percent to 100-percent visual fill of penetrants.

## 3.3 INSPECTION

For all projects, the firestopped areas shall not be covered or enclosed until inspection is complete and approved by the Contracting Officer. Inspect the applications initially to ensure adequate preparations (clean surfaces suitable for application, etc.) and periodically during the work to assure that the completed work has been accomplished according to the manufacturer's written instructions and the specified requirements. Submit written reports indicating locations of -- and types of -penetrations and types of firestopping used at each location; type shall be recorded by UL-listed printed numbers.

## 3.3.1 Inspection Standards

Inspect all firestopping in accordance with ASTM E2393 and ASTM E2174 for firestop inspection, and document inspection results to be submitted.

#### 3.3.2 Inspection Reports

Submit inspection report stating that firestopping work has been inspected and found to be applied according to the manufacturer's recommendations and the specified requirements.

-- End of Section --

## SECTION 07 92 00

# JOINT SEALANTS 08/16, CHG 3: 11/18

## PART 1 GENERAL

# 1.1 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 C509	(2006; R 2021) Standard Specifiaction for Elastomeric Cellular Preformed Gasket and Sealing Material
ASTM C734	(2015; R 2019) Low-Temperature Flexibility of Latex Sealants After Artificial Weathering
ASTM C834	(2017) Standard Specification for Latex Sealants
ASTM C919	(2012; R 2017) Standard Practice for Use of Sealants in Acoustical Applications
ASTM C920	(2018) Standard Specification for Elastomeric Joint Sealants
ASTM C1193	(2013) Standard Guide for Use of Joint Sealants
ASTM C1521	(2013) Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints
ASTM D217	(2019b) Standard Test Methods for Cone Penetration of Lubricating Grease
ASTM D1056	(2020) Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber
ASTM D6866	(2022) Standard Test Methods for Determining the Biobased Content of Solid, Liquid, and Gaseous Samples Using Radiocarbon Analysis
ASTM E84	(2020) Standard Test Method for Surface Burning Characteristics of Building Materials

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH (CDPH)

CDPH SECTION 01350 (2017; Version 1.2) Standard Method for

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> the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources using Environmental Chambers

#### SCIENTIFIC CERTIFICATION SYSTEMS (SCS)

SCS

SCS Global Services (SCS) Indoor Advantage

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD)

SCAQMD Rule 1168 (2017) Adhesive and Sealant Applications

U.S. GREEN BUILDING COUNCIL (USGBC)

- LEED v4 BDC Ref Guide (2013; R 2020) USGBC LEED Reference Guide for Building Design and Construction, v4
- LEED v4.1 BDC Ref Guide (2023) LEED v4.1 Building Design and Construction Reference Guide

UNDERWRITERS LABORATORIES (UL)

UL 2818

(2013) GREENGUARD Certification Program For Chemical Emissions For Building Materials, Finishes And Furnishings

## 1.2 SUSTAINABILITY REPORTING

Work of this section is intended to contribute to the achievement of, or compliance with, the requirements of the Guiding Principles Validation and LEED Prerequisites and attempted Credits. Refer to Section 01 33 29.00 06 SUSTAINABILITY REPORTING for specific documentation requirements and list of Prerequisites, attempted Credits and LEED version.

Comply with product, material content, performance criteria, activity, documentation, and other technical requirements as described in the LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide as applicable.

Collect, organize, and submit product data, drawings, diagrams, photos and cost information necessary to demonstrate compliance with LEED v4 BDC Ref Guide or LEED v4.1 BDC Ref Guide requirements as applicable.

Data collection shall commence with the notice to proceed and will only be deemed complete upon acceptance of the Final Sustainability Notebook and LEED Online submission by the Contracting Officer, the LEED Project Administrator, and the Green Building Certification Institute.

#### 1.3 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

> Sealants; G, AE Primers; G, AE Bond Breakers; G, AE Backstops; G, AE Environmental Product Declarations; S Embodied Carbon Optimization Report/Action Plan; S Extended Producer Responsibility; S Bio-Based Materials; S Recycled Content Materials; S Local/Regional Materials; S Material Ingredient Reporting; S

SD-06 Test Reports

Field Adhesion; G

SD-07 Certificates

Indoor Air Quality For Interior Sealants; S

Indoor Air Quality For Interior Floor Joint Sealants; S

Indoor Air Quality For Interior Acoustical Sealants; S

1.4 PRODUCT DATA

Include storage requirements, shelf life, curing time, instructions for mixing and application, and accessories. Provide manufacturer's Safety Data Sheets (SDS) for each solvent, primer, and sealant material proposed.

- 1.5 SUSTAINABLE DESIGN REQUIREMENTS
- 1.5.1 Environmental Product Declarations

At a minimum, use materials or products with an Environmental Product Declaration in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.5.2 Embodied Carbon Optimization Report/Action Plan

At a minimum, use materials or products with an Embodied Carbon Optimization Report/Action Plan in accordance with the LEED Implementation Plan. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

1.5.3 Sourcing of Raw Materials

Provide products that meet one or more of the following categories:

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## 1.5.3.1 Extended Producer Responsibility

At a minimum, use materials or products from manufacturers that participate in an extended producer responsibility program in accordance with the LEED Implementation Plan. Provide manufacturer letter verifying extended producer responsibility program is in place and that product is eligible. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

## 1.5.3.2 Bio-Based Materials

At a minimum, use materials or products with bio-based content in accordance with the LEED Implementation Plan. Provide manufacturer signed letter confirming ASTM D6866 test method was conducted validating bio-based material weight within product, type of bio-based material used within product, and confirmation raw material was legally harvested. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan. If bio-based content minimum is specified in this section, the greater of the two percentages governs.

#### 1.5.3.3 Recycled Content Materials

At a minimum, use materials or products with recycled content in accordance with the LEED Implementation Plan. Provide manufacturers product literature identifying the percentage of recycled material incorporated within each product used. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan. If recycled content minimum is specified in this section, the greater of the two percentages governs.

## 1.5.4 Material Ingredient Reporting

At a minimum, use materials or products with chemical inventory to at least 0.1% (1000 ppm) in accordance with the LEED Implementation Plan. Provide Health Product Declaration (HPD), Cradle to Cradle Certificate, Declare label, or other manufacturer's published content inventory in compliance with LEED v4.1 Material Ingredient Reporting credit. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

## 1.5.5 Local/Regional Materials

Use materials or products extracted, harvested, or recovered, as well as manufactured, within a 100 mile radius from the project site, if available from a minimum of three sources. provide a letter from the manufacturer stating the extraction location, manufacturing location, and purchasing location of the products provided, referencing the project name and location specifically and distance to the project site. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for cumulative materials requirements and LEED Implementation Plan.

#### 1.5.6 Low-Emitting Materials

Use only sealant products that comply with LEED v4.1 BDC Ref Guide requirements for both VOC content and emissions. See Section 01 33 29.00 06 SUSTAINABILITY REPORTING for low-emitting material requirements.

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# 1.6 CERTIFICATIONS

1.6.1 Indoor Air Quality Certifications

Submit required indoor air quality certifications in one submittal package.

## 1.6.1.1 Adhesives and Sealants

Provide products certified to meet indoor air quality requirements by UL 2818 (Greenguard) Gold or SCS Global Services Indoor Advantage Gold, or provide certification or validation by other third-party program that products meet the requirements of this Section. Provide current product certification documentation from certification body.. When product does not have certification, provide validation that product meets the indoor air quality product requirements cited herein.

## 1.7 ENVIRONMENTAL CONDITIONS

Apply sealant when the ambient temperature is between 40 and 90 degrees F.

# 1.8 DELIVERY AND STORAGE

Deliver materials to the jobsite in unopened manufacturers' sealed shipping containers, with brand name, date of manufacture, color, and material designation clearly marked thereon. Label elastomeric sealant containers to identify type, class, grade, and use. Handle and store materials in accordance with manufacturer's printed instructions. Prevent exposure to foreign materials or subjection to sustained temperatures exceeding 90 degrees F or lower than 0 degrees F. Keep materials and containers closed and separated from absorptive materials such as wood and insulation.

# 1.9 QUALITY ASSURANCE

1.9.1 Compatibility with Substrate

Verify that each sealant is compatible for use with each joint substrate in accordance with sealant manufacturer's printed recommendations for each application.

# 1.9.2 Joint Tolerance

Provide joint tolerances in accordance with manufacturer's printed instructions.

# 1.9.3 Mock-Up

Provide a mock-up of each type of sealant using materials, colors, and techniques approved for use on the Project. Approved mock-ups may be incorporated into the Work.

# 1.9.4 Adhesion

Provide in accordance with ASTM C1193 or ASTM C1521.

## PART 2 PRODUCTS

# 2.1 SEALANTS

Provide sealant products that have been tested, found suitable, and documented as such by the manufacturer for the particular substrates to which they will be applied.

In areas with ambient temperatures that exceed 110 degrees F, do not use polybutene, bituminous, acrylic-latex, polyvinyl-acetate-latex sealants, polychloroprene (neoprene), polyvinyl-chloride (PVC), and polyurethane foams, and neoprene, PVC, and styrene butadiene rubber extruded seals and closure strips due to these materials having maximum recommended surface temperature ranges from 130 to 180 degrees F.

# 2.1.1 Interior Sealants

Provide ASTM C834. Provide sealant products used on the interior of the building (defined as inside of the weatherproofing system) meeting both emissions requirements of CDPH SECTION 01350 (limit requirements for either office or classroom spaces regardless of space type) and VOC content requirements of SCAQMD Rule 1168. Provide certification or validation of indoor air quality for interior sealants. Location(s) and color(s) of sealant for the following. Note, color "as selected" refers to manufacturer's full range of color options

LOCATION	COLOR
a. Small voids between walls or partitions and adjacent lockers, casework, shelving, door frames, built-in or surface mounted equipment and fixtures, and similar items.	As selected
b. Perimeter of frames at doors, windows, and access panels which adjoin exposed interior concrete and masonry surfaces.	Match frame color
c. Joints between edge members for acoustical tile and adjoining vertical surfaces.	White
d. Interior locations, not otherwise indicated or specified, where small voids exist between materials specified to be painted.	White
e. Joints formed where non-planar tile surfaces meet.	As selected
f. Joints formed between tile floors and tile base cove; joints between tile and dissimilar materials; joints occurring where substrates change.	As selected

# 2.1.2 Exterior Sealants

For joints in vertical surfaces, provide ASTM C920, Type S or M, Grade NS, Class 25, Use NT. For joints in horizontal surfaces, provide ASTM C920, Type S or M, Grade P, Class 25, Use T. Provide location(s) and color(s) of sealant as follows. Note, color "as selected" refers to manufacturer's

full range of color options:

LOCATION	COLOR
a. Joints and recesses formed where frames and subsills of windows, doors, louvers, and vents adjoin concrete or metal frames. Use sealant at both exterior and interior surfaces of exterior wall penetrations.	Match frame color
b. Expansion and control joints.	Match darker of adjacent surfaces
c. Interior face of expansion joints in exterior concrete walls where metal expansion joint covers are not required.	As selected
d. Voids where items pass through exterior walls.	As selected
e. Metal reglets.	As selected
f. Metal-to-metal joints where sealant is indicated or specified.	As selected
g. Joints between ends of copings and adjacent walls.	Match coping color

#### 2.1.3 Floor Joint Sealants

ASTM C920, Type S or M, Grade P, Class 25, Use T. Provide sealant products used on the interior of the building (defined as inside of the weatherproofing system) meeting either emissions requirements of CDPH SECTION 01350 (limit requirements for either office or classroom spaces regardless of space type) or VOC content requirements of SCAQMD Rule 1168. Provide certification or validation of indoor air quality for interior floor joint sealants. Provide location(s) and color(s) of sealant as follows. Note, color "as selected" refers to manufacturer's full range of color options:

LOCATION		COLOR
a. Seats of doors.	metal thresholds for ex	terior Gray

LOCATION	COLOR
b. Control and expansion joints in floors, slabs, ceramic tile, and walkways.	As selected

#### 2.1.4 Acoustical Sealants

Rubber- or polymer-based acoustical sealant in accordance with ASTM C919 to have a flame spread index of 25 or less and a smoke-developed index of 50 or less when tested in accordance with ASTM E84. Provide non-staining acoustical sealant with a consistency of 250 to 310 when tested in accordance with ASTM D217. Acoustical sealant must remain flexible and adhesive after 500 hours of accelerated weathering as specified in ASTM C734. Provide sealant products used on the interior of the building (defined as inside of the weatherproofing system) meeting either emissions requirements of CDPH SECTION 01350 (limit requirements for either office or classroom spaces regardless of space type) or VOC content requirements of SCAQMD Rule 1168. Provide certification or validation of indoor air quality for interior acoustical sealants. Provide documentation that acoustical sealant does NOT contribute to the accelerated corrosion of copper piping.

# 2.1.5 Preformed Sealants

Provide preformed sealants of polybutylene or isoprene-butylene based pressure-sensitive weather-resistant tape or bead sealants capable of sealing out moisture, air, and dust when installed as recommended by the manufacturer. At temperatures from minus 30 to plus 160 degrees F, sealants must be non-bleeding and have no loss of adhesion.

## 2.1.5.1 Foam Strip

Provide foam strip of polyurethane foam with cross-section dimensions as indicated on Drawings. Provide foam strip capable of sealing out moisture, air, and dust when installed and compressed in accordance with manufacturer's printed instructions. Service temperature must be minus 40 to plus 275 degrees F. Furnish untreated strips with adhesive to hold them in place. Do not allow adhesive to stain or bleed onto adjacent finishes. Saturate treated strips with butylene waterproofing or impregnate with asphalt.

## 2.2 PRIMERS

Non-staining, quick-drying type and consistency as recommended by the sealant manufacturer for the particular application. Provide primers for interior applications that meet the indoor air quality requirements of the paragraph SEALANTS above.

## 2.3 BOND BREAKERS

Type and consistency as recommended by the sealant manufacturer to prevent adhesion of the sealant to the backing or to the bottom of the joint. Provide bond breakers for interior applications that meet the indoor air quality requirements of the paragraph entitled "SEALANTS" above.

## 2.4 BACKSTOPS

Provide glass-fiber roving, neoprene, butyl, polyurethane, or polyethylene foams free from oil or other staining elements as recommended by sealant manufacturer. Provide 25- to 33-percent oversized backing for closed-cell and 40 to 50 percent oversized backing for open-cell material, unless otherwise indicated. Provide backstop material that is compatible with sealant. Do not use oakum or other types of absorptive materials as backstops.

## 2.4.1 Rubber

Provide in accordance with ASTM D1056, Type 2, (closed cell), Class B, round cross section for cellular-rubber sponge backing.

# 2.4.2 Synthetic Rubber

Provide in accordance with ASTM C509, Option I, Type II preformed rods or tubes for synthetic-rubber backing.

# 2.4.3 Neoprene

Provide in accordance with ASTM D1056, closed-cell expanded-neoprene cord Type 2, Class C, Grade 2C2 for neoprene backing.

# 2.5 CLEANING SOLVENTS

Provide type(s) recommended by the sealant manufacturer and in accordance with environmental requirements herein. Protect adjacent aluminum and bronze surfaces from solvents. Provide solvents for interior applications that meet the indoor air quality requirements of the paragraph entitled " SEALANTS" above.

# PART 3 EXECUTION

#### 3.1 FIELD QUALITY CONTROL

Perform a field adhesion test in accordance with manufacturer's instructions and ASTM C1193, Method A or <RID>ASTM C1521<RID>, Method A, Tail Procedure. Remove sealants that fail adhesion testing; clean substrates, reapply sealants, and re-test. Test sealants adjacent to failed sealants. Submit field adhesion test report indicating tests, locations, dates, results, and remedial actions taken.

# 3.2 SURFACE PREPARATION

Prepare surfaces according to manufacturer's printed installation instructions. Clean surfaces from dirt, frost, moisture, grease, oil, wax, lacquer, paint, or other foreign matter that would destroy or impair adhesion. Remove oil and grease with solvent; thoroughly remove solvents prior to sealant installation. Wipe surfaces dry with clean cloths. When resealing an existing joint, remove existing caulk or sealant prior to applying new sealant. For surface types not listed below, provide in accordance with sealant manufacturer's printed instructions for each specific surface.

# 3.2.1 Steel Surfaces

Remove loose mill scale by sandblasting or -- if sandblasting is

impractical or would damage finished work -- scraping and wire brushing. Remove protective coatings by sandblasting or using a residue-free solvent. Remove resulting debris and solvent residue prior to sealant installation.

# 3.2.2 Aluminum or Bronze Surfaces

Remove temporary protective coatings from surfaces that will be in contact with sealant. When masking tape is used as a protective coating, remove tape and any residual adhesive prior to sealant application. For removing protective coatings and final cleaning, use non-staining solvents recommended by the manufacturer of the item(s) containing aluminum or bronze surfaces.

# 3.2.3 Concrete and Masonry Surfaces

Where surfaces have been treated with curing compounds, oil, or other such materials, remove materials by sandblasting or wire brushing. Remove laitance, efflorescence, and loose mortar from the joint cavity. Remove resulting debris prior to sealant installation.

## 3.2.4 Wood Surfaces

Ensure wood surfaces that will be in contact with sealants are free of splinters, sawdust, and other loose particles.

# 3.3 SEALANT PREPARATION

Do not add liquids, solvents, or powders to sealants. Mix multiplecomponent elastomeric sealants in accordance with manufacturer's printed instructions.

# 3.4 APPLICATION

#### 3.4.1 Joint Width-To-Depth Ratios

Acceptable Ratios:

JOINT WIDTH	JOINT DEPTH		
	Minimum	Maximum	
For metal, glass, or other nonporous surfaces:			
1/4 inch (minimum)	1/4 inch	1/4 inch	
over 1/4 inch	1/2 of width	Equal to width	
For wood or concrete:			
1/4 inch (minimum)	1/4 inch	1/4 inch	
over 1/4 inch to 1/2 inch	1/4 inch	Equal to width	
over 1/2 inch to 1 inch	1/2 inch	5/8 inch	

JOINT WIDTH	JOINT DEPTH	
	Minimum	Maximum
Over 1 inch	prohibited	

Unacceptable Ratios: Where joints of acceptable width-to-depth ratios have not been provided, clean out joints to acceptable depths and grind or cut to acceptable widths without damage to the adjoining work. Grinding is prohibited at metal surfaces.

#### 3.4.2 Unacceptable Sealant Use

Do not install sealants in lieu of other required building enclosure weatherproofing components such as flashing, drainage components, and joint closure accessories, or to close gaps between walls, floors, roofs, windows, and doors, that exceed acceptable installation tolerances. Remove sealants that have been used in an unacceptable manner and correct building enclosure deficiencies to comply with Contract Documents requirements.

## 3.4.3 Masking Tape

Place masking tape on the finished surface on one or both sides of joint cavities to protect adjacent finished surfaces from primer or sealant smears. Remove masking tape within ten minutes of joint filling and tooling.

#### 3.4.4 Backstops

Provide backstops dry and free of tears or holes. Tightly pack the back or bottom of joint cavities with backstop material to provide joints in specified depths. Provide backstops where indicated and where backstops are not indicated but joint cavities exceed the acceptable maximum depths specified in JOINT WIDTH-TO-DEPTH RATIOS Table.

# 3.4.5 Primer

Clean out loose particles from joints immediately prior to application of primer. Apply primer to joints in concrete, wood, and other porous surfaces in accordance with sealant manufacturer's printed instructions. Do not apply primer to exposed finished surfaces.

## 3.4.6 Bond Breaker

Provide bond breakers to surfaces not intended to bond in accordance with sealant manufacturer's printed instructions for each type of surface and sealant combination specified.

## 3.4.7 Sealants

Provide sealants compatible with the material(s) to which they are applied. Do not use a sealant that has exceeded its shelf life or has jelled and cannot be discharged in a continuous flow from the sealant gun. Apply sealants in accordance with the manufacturer's printed instructions with a gun having a nozzle that fits the joint width. Work sealant into joints so as to fill the joints solidly without air pockets.

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Tool sealant after application to ensure adhesion. Apply sealant uniformly smooth and free of wrinkles. Upon completion of sealant application, roughen partially filled or unfilled joints, apply additional sealant, and tool smooth as specified. Apply sealer over sealants in accordance with the sealant manufacturer's printed instructions.

## 3.5 PROTECTION AND CLEANING

# 3.5.1 Protection

Protect areas adjacent to joints from sealant smears. Masking tape may be used for this purpose if removed between five and ten minutes after the joint is filled and no residual tape marks remain.

# 3.5.2 Final Cleaning

Upon completion of sealant application, remove remaining smears and stains and leave the work in a clean and neat condition.

- a. Concrete and Other Porous Surfaces: Immediately remove fresh sealant that has been smeared on adjacent masonry, rub clean with a solvent, and remove solvent residue, in accordance with sealant manufacturer's printed instructions. Allow excess sealant to cure for 24 hours then remove by wire brushing or sanding. Remove resulting debris.
- b. Metal and Other Non-Porous Surfaces: Remove excess sealant with a solvent-moistened cloth. Remove solvent residue in accordance with solvent manufacturer's printed instructions.

-- End of Section --